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BOOK OF ABSTRACTS

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Biochemistry and Molecular Biology for Peace, Health, Food Security, and Climate-Smart Sustainable Development in the AI Era

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522 abstracts accepted for presentation across 8 scientific tracks

About this volume

This volume contains the 522 abstracts accepted for presentation at the 42nd Scientific Conference & Annual General Assembly of the Nigerian Society of Biochemistry and Molecular Biology, held at the Obafemi Awolowo Auditorium, The Federal University of Technology, Akure (FUTA), 6th – 10th July, 2026.

Each abstract carries a unique identifier of the form **TRACK-NUMBER** (for example, **AIGCB-01**). Abstracts appear in the order shown below.

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TRACK 1 · AIGCB

Artificial Intelligence, Genomics, and Computational Biochemistry and Molecular Biology

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AIGCB-01

In silico Analysis of *Vigna subterranea* Compounds as Potential Antioxidant Enhancers of Superoxide Dismutase (SOD)

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Bambara groundnut (*Vigna subterranea*), an underutilised African legume, is valued for its nutritional profile and bioactive phytochemicals with potent antioxidant properties. This *in silico* study investigated 50 compounds from Bambara groundnut for their interaction with superoxide dismutase (SOD, PDB ID: 1AP5), a vital enzyme that neutralises superoxide radicals and combats oxidative stress. Using Schrödinger Suite (Maestro 12.8), ligands were prepared and docked in extra precision (XP) mode, followed by MM-GBSA binding free energy analysis and ADMET profiling via SwissADME. Four standout compounds gallocatechin (docking score: -5.794 kcal/mol), isorhamnetin (-5.452 kcal/mol), quercetin (-5.347 kcal/mol), and myricetin (-5.272 kcal/mol) outperformed the standard vitamin C (ascorbic acid; -4.705 kcal/mol). Myricetin showed the strongest binding stability (MM-GBSA dG Bind: -36.74 kcal/mol). ADMET results revealed favourable drug-likeness (Lipinski compliance or minor violations), high gastrointestinal absorption (especially gallocatechin and quercetin), minimal CYP450 inhibition, no blood-brain barrier penetration, and low predicted toxicity. These findings highlight gallocatechin, quercetin, myricetin, and isorhamnetin as superior natural enhancers of SOD activity compared to vitamin C, positioning them as promising candidates for nutraceuticals and therapeutics targeting oxidative stress-related disorders. Further experimental validation is recommended to unlock Bambara groundnut's health-promoting potential.

AIGCB-02

In silico Evaluation of *Azadirachta indica* Compounds Potential Bromo-Domain Containing Protein 4 Inhibitors in Triple Negative Breast Cancer Treatment

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Triple negative breast cancer (TNBC), being one of the most aggressive subtypes of breast cancer, presents significant therapeutic challenges due to its high recurrence rate, poor prognosis, and limited treatment options. Bromodomain-containing protein 4 (BRD4) has been implicated in tumour progression. Recent studies have shown the pharmacological properties of *Azadirachta indica* compounds; however, their potential as BRD4 inhibitors has not been fully explored. Hence, this study aims to fill this gap by performing an in-depth *in silico* evaluation of *Azadirachta indica* compounds as novel inhibitors using advanced computational drug discovery techniques. The current study utilised computer-aided drug design to investigate 50 phytochemical compounds from *Azadirachta indica* to check potential inhibition properties against BRD4 protein. The phytochemical compounds were docked onto the BRD4 protein, and the ligand with the lowest binding energy was evaluated over several parameters using Maestro software. Quantitative structure activity relationship (QSAR) were also performed to predict the resultant compounds potency as well as toxicity. The results revealed Azadirachtin to be the most potent agent in BRD4 inhibition with a docking score of -11.6 kcal/mol and showed promising *in silico* stability as well. Drug-likeness potential was further assessed based on Lipinski's rule of five, which reflects the safer nature of this drug agent. Moreover, wet-lab *in vitro* experiments followed by clinical trials are still needed to attest to the validity of these virtually piloted phytochemical compounds against BRD4 protein for TNBC targeted therapy.

AIGCB-03

Unlocking Indigenous Bio-Assets through Computational Pharmacology Pipelines for West African Traditional Medicine

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West African medicinal flora has extensive empirical use in traditional healthcare, yet remains largely excluded from modern drug discovery pipelines due to data fragmentation, the absence of standardised chemical references, and limited access to computational screening infrastructure.We developed Nigeria medicinal plants database (NigeriaMedPlants DB), a computational pharmacology platform that curates over 200 botanically verified plant species into an integrated digital ecosystem. The platform combines expert-led curation protocols with automated molecular docking using AutoDock Vina, QSAR-based toxicity profiling, and NLP-driven literature mining from PubMed. A Neo4j knowledge-graph architecture maps plant–phytochemical–disease relationships to support target-centric exploration of indigenous bioactivity, while a FastAPI-based interface provides high-performance programmatic access for drug developers. The platform delivers standardised structural identifiers (SMILES/InChI) alongside high-throughput prediction pipelines for docking and toxicity assessment, enabling systematic computational validation of traditional therapeutic indications. The open architecture provides accessible, reproducible workflows for screening West African phytochemicals against disease-relevant molecular targets. NigeriaMedPlants DB establishes a scalable computational framework for unlocking indigenous bio-assets, positioning West African phytochemicals as viable candidates for preclinical drug development against regional and global disease burdens. The resource equips researchers with the tools needed to systematically explore Nigeria's medicinal plant diversity for therapeutic candidate identification and natural product-based drug discovery.

AIGCB-04

Network Pharmacology and Molecular Modelling Decipher Potential Anti-Colorectal Cancer Mechanisms of *Warburgia ugandensis*

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Colorectal cancer (CRC) continues to rank among the most prevalent and deadly cancers globally, with its incidence increasing due to a combination of genetic predispositions, environmental exposures, and lifestyle factors. *Warburgia ugandensis* is a medicinal plant with reported anticancer properties, but its specific mechanisms against CRC remain unclear. This study employs an integrated computational approach to elucidate its anti-CRC potential. Phytochemicals from *W. ugandensis* were sourced from literature and the COCONUT database, then filtered according to Lipinski's and Veber's rules. Targets were predicted via SwissTargetPrediction and cross-referenced with CRC-related genes from GeneCards. STRING and Cytoscape were used to construct protein–protein interaction (PPI) networks and identify hub genes, followed by GO and KEGG pathway enrichment analyses. Top compounds were evaluated through molecular docking (PyRx), molecular dynamics simulations (GROMACS), and MM-PBSA binding free energy calculations, and ADMET profiling (SwissADME, ProTox-II). 21 drug-like compounds were identified, intersecting 411 CRC-related targets. PPI network analysis highlighted hub genes including PIK3CA, PIK3CD, GNAI1, GNAI3, and SRC. Enrichment analysis implicated PI3K-Akt, insulin receptor, and relaxin signalling pathways. Molecular docking identified Quercetin, Kaempferol, and Bemadienolide as top binders, with strong affinities for GNAI1 (-9.8 kcal/mol), GNAI3 (-9.6 kcal/mol), and PIK3CD (-8.7 kcal/mol). MD simulations validated the stability of the complexes, showing low RMSD/RMSF values and stable hydrogen bonding, with MM-PBSA revealing favourable binding free energies, strongest for Quercetin–GNAI1 (-86.2 ± 3.3 kcal·mol^{-1}). ADMET predictions indicated good gastrointestinal absorption and low-to-moderate toxicity. *W. ugandensis* phytochemicals, particularly Quercetin, Kaempferol, and Bemadienolide, potently and stably bind critical CRC proteins, inhibit key oncogenic pathways, and represent promising natural therapeutic candidates for CRC.

AIGCB-05

Beyond the Hype: A Critical Review of Artificial Intelligence and Blockchain as Convergent Enablers of a Resilient and Equitable Healthcare Ecosystem

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Healthcare systems globally face familiar pressures: staggering administrative waste, data trapped in silos, rising costs, and a research-to-practice pipeline that moves far too slowly. Artificial intelligence and blockchain have entered this landscape not as miracle cures, but as converging tools that might actually help address these foundational problems. This review provides clinicians and health leaders with a clear-eyed assessment of where this convergence stands today, focusing on applications moving beyond the lab into real-world settings. Synthesising peer-reviewed literature, industry reports, and expert consensus published between 2020 and 2026, the review emphasises implementations that have progressed beyond pilot phases. The convergence is materialising in three distinct areas. First, blockchain is creating verifiable audit trails for AI training data, addressing the "black box" problem—with post-quantum cryptography now deployed to secure sensitive genomic data. Second, decentralised science platforms are introducing transparency to research funding and peer review, offering a potential path out of the reproducibility crisis. Third, domain-specific AI models are integrating with blockchain-based credentials to streamline clinician mobility, enable transparent cross-border payments, and put personalised health tools directly into patients' hands. The question is no longer whether these technologies will become part of healthcare infrastructure, but how we shape their integration responsibly. Governance, equity, and algorithmic fairness remain genuine concerns, yet the emerging focus on verifiability and interoperability points toward a more resilient, patient-centred system.

AIGCB-06

Integrated *in silico* Pipelines for Identifying Bioactive Plant Extracts in Skincare: From Compound Discovery to Mechanistic Validation

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The growing demand for evidence-based botanical skincare ingredients has intensified interest in computational approaches capable of accelerating bioactive plant extract discovery, as conventional phytochemical research relying on empirical screening and bioassay-guided fractionation remains time-consuming, resource-intensive, and inadequate for capturing the multi-component, multi-target nature of plant extracts. This narrative review systematically examined the evolution of *in silico* methodologies applied to plant-derived actives for skincare, tracing the progression from isolated molecular docking studies to integrated workflows combining metabolomics, network pharmacology, molecular docking, molecular dynamics simulation, and experimental validation, with particular focus on dermatological concerns including skin aging, inflammation, hyperpigmentation, acne, and photoaging. Evidence across recent studies demonstrates that integrated computational pipelines can systematically connect phytochemical composition with molecular targets, biological pathways, and phenotypic outcomes; recurrent molecular hubs identified across studies include AKT1, TNF-alpha, RELA, COX-2, MMPs, and the Nrf2/KEAP1/ARE signalling axis, highlighting common mechanistic routes through which botanical extracts exert skin-protective effects. Addressing the persistent gaps of database dependency, absent pharmacokinetic filtering, and limited microbiome integration will be essential for producing predictions that hold up under experimental scrutiny and ultimately guide the rational formulation of next-generation cosmeceuticals.

AIGCB-07

In vitro Antioxidant and *in silico* studies on Lead - Neuroprotective Potential of *Persea americana* Seed Oil

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Lead exposure is a major environmental and public health problem associated with neurotoxicity through oxidative stress, inflammation, apoptosis, and genetic damage in brain tissues. This study evaluated the *in vitro* antioxidant capacity and *in silico* studies on neuroprotective potentials of *Persea americana* seed oil. The seed oil was extracted and characterised using Gas Chromatography–Mass Spectrometry (GC–MS) and Fourier Transform Infrared (FTIR) spectroscopy. *In – vitro* antioxidant activity was assessed using DPPH radical scavenging, ABTS radical cation decolorisation, ferric reducing antioxidant power (FRAP), and metal-chelating assays. Molecular docking of identified phytochemicals against key targets: protein kinase B (AKT1), caspase -3 (CASP3), B- cell lymphoma – 2 (BCL2), tumour necrosis factor – α (TNF-α), interleukin – 6 (IL-6) and p53 tumour suppressor protein (p53) was performed using AutoDock Vina, while pharmacokinetic and ADMET properties were predicted using SwissADME and pkCSM tools. GC–MS analysis identified bioactive compounds including 3,5-di-tert-butylphenol, diisobutyl phthalate, hexadecenoic acid while FTIR spectra confirmed hydroxyl, carbonyl, ester, alkene, and aliphatic functional groups associated with phenolics and fatty acids. The oil exhibited significant concentration-dependent antioxidant activity through effective free radical scavenging and reducing capacity. Molecular docking revealed strong binding affinities of the identified ligands towards the key target proteins with favourable drug-likeness and ADMET profiles. The findings suggest that *Persea americana* seed oil may possesses considerable neuroprotective potential and may serve as a promising natural therapeutic candidate against lead-induced neurotoxicity. However, it is recommended that in – vivo studies should be carried out to validate the above findings.

AIGCB-08

Techno-Economic Optimisation of an Off-Grid Solar PV System for Rural Electrification of Asarara Community, Kebbi State, Nigeria

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This study presents the techno-economic optimisation of an off-grid photovoltaic (PV) system for sustainable rural electrification of Asarara Community in Kebbi State, Nigeria. The system was modelled, simulated, and optimised using HOMER Pro, while PVsyst was used for technical validation. The optimisation focused on minimising the net present cost (NPC) and levelised cost of energy (LCOE) while ensuring reliable electricity supply. Simulation results showed that the optimised off-grid PV system generated 941,872 kWh/year, with an NPC of ₦143 million and an LCOE of ₦23.06/kWh. The performance analysis using PVsyst revealed a performance ratio of 0.353 and a solar fraction of 1.000, indicating complete load satisfaction and high system reliability. Optimal battery sizing and inverter configuration significantly reduced unmet load and excess energy. The results confirm that proper component sizing and technoeconomic optimisation improve system efficiency and reduce lifecycle cost. The study demonstrates that an optimised off-grid PV system is a viable and sustainable solution for electrifying remote rural communities, improving energy access, and supporting socioeconomic development.

AIGCB-09

Computational and Kinetic Evaluation of *Aframomum melegueta* Phytochemicals as Inhibitors of SARS-CoV-2 Main Protease

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Coronavirus disease 2019 (COVID-19) triggered Severe Acute Respiratory Syndrome, Coronavirus 2 (SARS-CoV-2) generated significant international concern within the medical field. The main protease (M^{pro}) of SARS-CoV-2 is essential for viral replication and transcription, presenting a promising target for the design and development of novel COVID-19 therapies. This research aims to investigate the inhibitory effect of *Aframomum melegueta* on SARS-CoV-2 main protease (3CLpro) via computational and kinetics studies. A total of 100 phytochemicals found in *Aframomum melegueta* were evaluated for their binding affinity to the protein. ADMETox screening of the top five binding compounds identified syringin as the lead candidate, showing inhibitory activity against SARS-CoV-2 main protease similar to the reference inhibitor boceprevir. Molecular dynamic simulations were utilised to access key structural dynamics, including solvent accessibility surface area, root mean square fluctuation and number of hydrogen bond. These results revealed a strong affinity between 3CLpro and syringin. Low RMSF values were recorded at the enzyme's active site indicating stability of the enzyme-ligand complex. The non-bonded interactions energies resulted to a binding energy of -7.864KJ/mL, hence showed a promising binding affinity to9 3CLpro. An *invitro* kinetic study was carried out on *Aframomum melegueta* at 276.8µg/mL displayed inhibition of SARS-CoV-2 main protease activity at different concentrations of 100%, 50%, 30%, 10%, 3% and 0.03%. This investigation identifies syringin, a bioactive compound found in *Aframomum melegueta*, as a potential candidate for the development of a therapeutic agent against COVID-19.

AIGCB-10

Sustainable Bioplastic production Through AI-Guided Genetic Engineering of Plastic-Degrading Bacteria

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One of the most common critical environmental challenges of the 21st century is plastic, including pollution and groundbreaking solutions for sustainable materials administration. Current advances in engineering and engineering AI-guided present prospects for converting plastic waste into bioplastics, connecting environmental biotechnology, synthetic biology, and computer modelling. This review provides a widespread study of plastic-degrading bacteria, their metabolic pathways, and enzymatic machinery, underlining biochemical bottlenecks in monomer integration and bioplastic synthesis. We look at artificial intelligence as the machines' learning role in accelerating metabolic optimisation; enzyme invention; and microbial strain blueprint, including predictive phenotype-genotype mapping and autonomous digital twins. Genetic engineering approaches ranging from normal optimisation to dynamic regulatory circuits and modular artificial ones are always discussed in the perspective of PHA, PLA, PET, and promising polymer upcycling platforms. Case studies exemplify victorious PET-to-PHA AI-optimised depolymerase variants with industrial significance for the valorisation of aromatic monomers. Incorporation into techno-economic analysis, processes, regulatory considerations and assessments is emphasised, focusing on the interaction between biological improvement and sustainability. Lastly, we recognise key setbacks, including data shortage, multi-omics integration, and restricted genetic apparatus for environmental isolates, though we outline promising opportunities such as groundwork models for enzyme design, plastic-specific microbial frameworks, and autonomous biofactories. By converging circular bioeconomy ideology, AI, and synthetic biology, AI-guided plastic biofactories characterise a scalable, environmentally responsible pathway in the direction of sustainable bioplastic production, contributing both scientific insight and practical solutions for worldwide plastic management.

AIGCB-11

In silico ADME and Molecular Docking Studies of Pharmacological Activities of Phytoconstituents of Black Beans (*Phaseolus vulgaris* L.) Seeds

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The *Phaseolus vulgaris* L. commonly known as common bean, French bean or kidney bean, is a staple food with deep ethnomedicinal roots used to treat a variety of ailments, including diabetes, hypertension, gastrointestinal disorders, and inflammation. The objective is to identify the most promising compounds for further experimental validation and to contribute to the growing body of research supporting the medicinal relevance of *Phaseolus vulgaris*. The method used are pharmacokinetics and target predictions, protein-protein interaction, gene network analyses, molecular docking and molecular dynamic (MD) simulation. The results revealed the intriguing pharmacokinetic profiles where majority of the phytoconstituents exhibited high gastrointestinal absorbance (GIA), non-permeability to blood-brain barrier (BBB) and moderate water solubility. The targets predicted include Xanthine dehydrogenase/oxidase (XDH), Aldose reductase (AKR1B1), Protein disulfide-isomerase (P4HB), Acetylcholinesterase (ACHE), Oestradiol 17-beta-dehydrogenase 1 (HSD17B1), and showed involvement of kinases such as CDK1, CDK2, MAPK14, MAPK3, CSNK2A1, and HIPK2. Kaempferol have good biding affinity with Aldose reductase (-10.0 kcal/mol) while Genistein bind with Oestradiol 17-beta-dehydrogenase 1 (-10.3 kcal/mol). The MD results indicate that both the Genistein-HSD17B1 and Kaempferol-AKR1B1 complexes are stable with moderate flexibility while the MMGBSA binding free energies confirm favourable thermodynamic stability, albeit with some decrease in binding affinity over the course of the simulation. Overall, these findings underscore the multifaceted nature of *P. vulgaris* phytochemicals in influencing gene interactions and highlight their potential as therapeutic agents by targeting critical molecular pathways associated with chronic diseases, including cancer and metabolic disorders.

AIGCB-12

Role of Artificial Intelligence for Early Detection of Breast Cancer

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Breast cancer is a global public health concern and the most leading cause of cancer-related death among women. Despite widespread use of conventional diagnostic methods, they are limited by numerous challenges such as patient discomfort, considerable rates of false-positive and false-negative results. However, these limitations lead to paradigm shift and stimulated increasing interest in artificial intelligence (AI) as a supportive tool for improving early breast cancer detection. Recent advances in AI, particularly machine learning and deep learning have demonstrated considerable potential to enhance diagnostic accuracy and efficiency through automated interpretation of medical images. For instance, deep learning-based systems consistently outperform traditional computer-aided diagnostic approach by improving sensitivity, specificity and identifying subtle pathological features that may escape human evaluation. AI-based diagnostic models process mammographic, ultrasound, and magnetic resonance imaging (MRI) data using advanced computational techniques for lesion detection, segmentation, and classification. These systems are trained on large, well-annotated imaging datasets, allowing them to learn complex features associated with malignancy, including abnormal tissue architecture, density variations, and textural irregularities. In mammography, AI primarily utilises computer vision-driven pattern recognition, whereas MRI applications assess signal intensity and contrast enhancement patterns linked to pathological changes. Ultrasound imaging similarly benefits from AI-assisted quantitative analysis, reducing operator dependency and improving diagnostic consistency. Commonly applied algorithms include support vector machines, artificial neural networks, decision trees, and ensemble learning methods such as random forests. Altogether, available evidence indicates that AI-based approaches can drastically reduce diagnostic errors, accelerate detection timelines, and support more reliable clinical decision-making in breast cancer care.

TRACK 2 · BMPMS

Biochemistry and Molecular Biology Based Approaches to Peace, National Security and Biosafety

8 abstracts · BMPMS-01 to BMPMS-09

BMPMS-01

Evidence of GMO Marker and Allergen Genes in Wheat and Soybean Products from Lagos Marts: Implications for Biosafety and Food Labelling

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Nigeria heavily imports wheat due to high demand for wheat-based products, so also is soybean. Several countries that export these food products have legalised the cultivation and commercialisation of genetically modified (GM) crops, thereby raising concerns about the possibility of introducing genetically modified food into the Nigerian Food System. The circulation of unlabelled genetically modified food products in metropolitan markets may compromise consumer choice and pose health and allergenicity risks. Hence, the study is designed to screen for the presence of GMO marker genes (P353, Cry1Ab, EPSPS, and tNOS) and allergen genes (Gly m 5, Gly m 6, Tri a 14, and Tri a 36) in wheat and soybean products that are obtained from metropolitan marts in Lagos, Nigeria. Thirteen (grains and processed) samples of local and foreign origin (UK, Mexico, China, Singapore) were selected for this study. DNA extraction was carried out followed by PCR-based methods to detect the presence of GMO marker and allergen genes. The results revealed the presence of CamV35, tNOS, Cry1AB, EPSPS genes in wheat. While tNOS and CamV35 genes were found in soybean and only tNOS gene was found in bulgur wheat. In contrast, none of the allergy genes investigated was found in the samples studied. The outcome of this study provides molecular evidence for the presence of GM foods in Nigerian markets and supports the need for GMO labelling with biosafety enforcement. Furthermore, it is pertinent to address the need for strengthened biosafety regulations and routine molecular surveillance, and enhance consumer confidence.

BMPMS-03

Biochemical Effects of Hydro-Ethanol Leaf Extract of Kale (*Brassica oleracea* var. acephala) on Arsernic-Induced Infertility in Male Wistar Rats

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Infertility remains a global concern, with environmental toxicants such as arsenic contributing significantly to male reproductive dysfunction through oxidative stress–mediated mechanisms. This study examined the protective effects of hydro-ethanol leaf extract of *Brassica oleracea* var. *acephala* (kale) against arsenic-induced reproductive toxicity in male experimental animals. Thirty male Wistar rats were randomly divided into six groups (n = 5): control, arsenic-treated, arsenic + low-dose kale extract, arsenic + medium-dose kale extract, arsenic + high-dose kale extract group, and kale-only group. Result obtained shows a significant decrease in antioxidant enzyme activities, CAT (12.73 ± SEM to 8.29 U/mg protein), SOD (7.73 ± SEM to 3.52 U/mg protein), GPx (26.93 ± SEM to 18.05 U/mg protein) and GSH (1.90± SEM to1.03 mg/g) levels with significant increase in MDA (3.27 ± SEM to 5.42 mol/mg protein) levels compared with the control group ($p \leqslant 0.05$). Arsenic administration also significantly reduced serum levels of FSH (4.74 ± SEM to 2.56 mIU/ml), LH (3.24 ± SEM to 1.85 mIU/ml) and testosterone (3.05 ± SEM to 1.47 ng/ml) compared with the control group ($p \leqslant 0.05$). However, administration of hydro-ethanol kale leaf extract significantly improved antioxidant enzyme activities, reduced lipid peroxidation and restored reproductive hormone levels, in treated groups compared to the arsenic-treated group ($p \leqslant 0.05$) in a dose-dependent manner. These findings suggest that kale leaf extract may serve as a potential natural therapeutic agent for the management of oxidative stress-associated male infertility.

BMPMS-04

Antibiotic Susceptibility and Plasmid mediated *Escherichia coli* resistance in Urinary Tract Infections

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This research aims to assess the antibiotic susceptibility and plasmid mediated*Escherichia coli* resistance from urinary tract infections. Mid-stream urine specimen (20mls) were obtained from 250 patients with clinical signs of urinary tract infections. *Escherichia coli* were isolated through culture and routine biochemical analysis. Antibiotics testing to 9 antibiotics was conducted by use of disk diffusion assay. The presence of plasmid was assessed by use of gel electrophoresis while curing was done using sodium dodecyl sulphate (SDS) at 10% concentrations to treat the isolates. Out of 250 study participants, *E. coli* had a prevalence rate of 65.6%. Isolates of *E. coli* were 100% susceptible to Amikacin and meropenem; and exhibited resistance of 87.8%, 75.6%, 73.8% and 68.3% to ampicillin, ceftazidime, trimethoprim-sulfamethoxazole and ceftriaxone respectively. The multi antibiotic resistant indices of all the 14 MAR isolates were in the range of 0.2 – 0.5. All the 14 multiple antibiotic resistant isolates showed presence of plasmids; and bands ranging from 1 to 2 with molecular weight ranging from 3.14 kbp to 3.82kbp. Resistant curing at 10% sodium deodecyl sulphate (SDS) concentration was partially efficient as only the lighter plasmids were cured and disappeared while the heavier plasmids persisted. Curing of plasmids established plasmid-mediated resistance. This research revealed a significant presence of *E. coli* to frequently prescribe drugs. Drug resistance to meropenem and amikacin was not observed. Hence, regular monitoring of resistance is vital for the treatment of UTI and patient care.

BMPMS-05

Molecular Epidemiology and Antiretroviral Drug Resistance among HIV-1–Infected Individuals on HAART in Edo North, Nigeria

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HIV-1 genetic diversity and the emergence of drug resistance mutations (DRMs) continue to challenge the long-term effectiveness of antiretroviral therapy (ART), particularly in sub-Saharan Africa. This study investigated the molecular epidemiology and resistance profiles of HIV-1 among ART-experienced individuals in Edo North, Nigeria. A hospital-based cohort of 416 HIV-1-infected individuals on HAART was evaluated using clinical and laboratory data. Viral load testing identified virological failure (⩾1,000 copies/mL) in 13.2% of participants. Plasma samples from these individuals were subjected to RNA extraction, RT-PCR amplification, and Sanger sequencing of the protease and reverse transcriptase regions of the HIV-1 *pol* gene. Drug resistance mutations were identified using the Stanford HIV Drug Resistance Database, and phylogenetic analysis was performed to determine viral subtypes. Subtype G was predominant (91.8%), followed by CRF02_AG (8.2%), consistent with regional trends. Reverse transcriptase-associated DRMs were detected in 69.4% of cases, with non-nucleoside reverse transcriptase inhibitor (NNRTI) mutations being the most common (65.2%). Protease inhibitor-associated mutations were observed in 24.5% of individuals. Virological failure was significantly associated with poor adherence, prior ART exposure, and second-line therapy. Mutation patterns aligned with treatment regimens, indicating drug-selective pressure. These findings reveal a high burden of NNRTI resistance and confirm the predominance of subtype G. Strengthening adherence support and integrating routine resistance testing into HIV care are essential to improve treatment outcomes and limit the spread of resistant HIV strains.

BMPMS-06

Comparative Effects of Glycerol and Shea Butter as Plasticisers in *Borassus aethiopum* Shoot Starch–Chitosan Composite Films

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The growing demand for sustainable and biodegradable materials has stimulated research into biopolymer-based films derived from renewable resources. This study investigated the comparative effects of glycerol and shea butter as plasticisers on the physicochemical and mechanical properties of composite films produced from *Borassus aethiopum* shoot starch and chitosan. Film-forming solutions were prepared using varying concentrations of starch (1–2% w/v) and chitosan (0–2% w/v), while glycerol and shea butter were incorporated individually and in combination at concentrations of 30% and 50% (w/v) as plasticising agents. The resulting films were evaluated for thickness, water solubility, elongation at break, and tensile strength. The results showed that glycerol exhibited a strong plasticising effect on the starch–chitosan matrix. Films plasticised with glycerol demonstrated increased thickness, higher water solubility, and improved elongation at break, indicating enhanced flexibility of the polymer network. However, this increase in flexibility was accompanied by a reduction in tensile strength, particularly at higher glycerol concentrations. In contrast, films plasticised with shea butter showed reduced film thickness, lower water solubility, and decreased elongation at break, suggesting a more compact and hydrophobic film structure. Shea butter plasticisation generally resulted in improved tensile strength compared with glycerol-plasticised films. Blending starch with chitosan significantly enhanced the structural properties of the films. Increasing chitosan concentration led to higher tensile strength and thicker films, while reducing water solubility and elongation. The combined use of glycerol and shea butter produced intermediate properties, indicating a synergistic interaction between the hydrophilic and hydrophobic plasticisers, which helped balance film flexibility and strength. Overall, the study demonstrates that the type and concentration of plasticiser play a critical role in determining the functional properties of *Borassus aethiopum* starch–chitosan composite films. The findings highlight the potential of combining natural plasticisers to tailor biodegradable film characteristics for sustainable packaging and other biomaterial applications.

BMPMS-07

Exploring The Neurotherapeutic Potential of *Mitracarpus scaber* in Huntington's disease: Comparative Molecular Docking of Solvent-Specific Phytochemicals against Mhtt and Trkb

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Huntington's disease (HD) remains a significant neurodegenerative disorder with limited therapeutic options, posing a challenge to global health. Advances in biochemistry and molecular biology integrating computational approaches, are enhancing drug discovery, while sustainable plant-derived bioactive compounds offer climate-smart alternatives. This study investigates the neurotherapeutic potential of solvent-specific phytochemicals from *Mitracarpus scaber* (*M. scaber*) against key HD-associated targets, mutant huntingtin (mHTT) and tropomyosin receptor kinase B (TrkB). Phytochemical constituents of aqueous and ethanol extracts of *M. scaber* were characterised using Gas Chromatography–Mass Spectrometry (GC–MS). Selected compounds were subjected to molecular docking to evaluate binding affinities toward mHTT and TrkB, alongside drug-likeness and ADMET profiling for pharmacokinetic and toxicity prediction. Results revealed that compounds from the aqueous extract, including D-friedoolean-14-en-3-one and β-sitosterol, exhibited significantly stronger binding affinities ($p < 0.0001$), while ethanol extract constituents such as squalene and 26-hydroxycholesterol also showed strong interactions ($p < 0.01–0.0001$) compared to reference compounds (trehalose and 7,8-dihydroxyflavone). ADMET analysis indicated favourable pharmacokinetic properties and low predicted toxicity. These findings highlight the potential of M. scaber-derived phytochemicals as modulators of HD-associated molecular targets and provide a foundation for future *in vitro* and *in vivo* validation toward the development of sustainable neurotherapeutic agents.

BMPMS-08

Impact of Cosmetic-Endocrine Disrupting Chemicals on Renal Function Indices and Electrolyte Balance among Female Undergraduates in Edo State University, Iyamho

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Cosmetic products are widely used among young women; however, many formulations contain endocrine-disrupting chemicals (EDCs) that may interfere with normal metabolic and renal biochemical homeostasis following prolonged exposure. This study assessed the association between cosmetic use and renal function indices among female undergraduate students at Edo State University, Iyamho. A cross-sectional comparative design involving 199 participants, categorised into cosmetic users and non-users, was employed. Venous blood samples were collected aseptically, centrifuged, and serum analysed for urea, creatinine, uric acid, and magnesium using standard colorimetric methods (urease–Berthelot, Jaffe–Slot, uricase, and xylidyl blue assays, respectively), while serum sodium and potassium were also measured. Estimated glomerular filtration rate (eGFR) was calculated using the CKD-EPI equation to assess renal filtration function. Data were analysed using inferential statistics and multivariate logistic regression at $p < 0.05$. Results revealed that cosmetic users had significantly higher serum urea, creatinine, uric acid, and magnesium levels, alongside significant alterations in sodium and potassium compared with non-users ($p < 0.05$). In addition, eGFR was significantly reduced among cosmetic users, suggesting early impairment in renal filtration efficiency. Duration of cosmetic exposure was associated with more pronounced biochemical changes across all parameters. Logistic regression analysis showed significant associations between cosmetic use and altered renal indices, indicating a possible exposure-related effect. Overall, findings suggest that prolonged cosmetic use may be associated with early subclinical alterations in renal biochemical function among young women, potentially linked to cumulative exposure to EDCs, underscoring the need for regulatory surveillance, public health awareness, and further studies.

BMPMS-09

Purification and Immobilisation of α-Amylase Produced From Fermented Cassava Mash Wastewater Using Sodium Alginate-Coated Gelatin

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Enzymes are extensively utilised in industry for their high efficiency and selectivity. However, their low stability during certain industrial processes often results in significant loss of catalytic activity. Encapsulation offers a promising solution by stabilising enzymes and protecting them from environmental stresses such as extreme temperatures, pH variations, mechanical forces, organic solvents, and proteases. In this study, amylase enzyme was immobilised by entrapment in alginate-coated gelatin beads. The performance metrics and physicochemical properties including efficiency, reusability, effects of metal ions, organic solvents, inhibitors, pH, and temperature on the activity and stability of sodium alginate-coated gelatin-immobilised amylase (SAG/amylase) were investigated. Kinetic parameters were also determined. The results indicated that SAG/amylase could be reused for up to 8 hydrolysis cycles. The immobilised amylase exhibited optimal activity at 30°C and p 3, respectively. Stability tests showed that SAG/amylase was stable at 30°C, with maximum pH stability observed at pH 3. The immobilised was highly thermostable with residual activity of 98-50% at 30-90 °C for 100 min and 62-96% at pH 2-12 for 4 h. The kinetic parameter Km was 0.47 mM, while the Vmax value was 0.33 U/min. SAG/amylase showed a preference for starch with maximum activity and was maximally inhibited in the presence of SDS and β-Mercaptoethanol. These findings suggest that immobilisation of amylase in alginate-coated gelatin supports is a promising approach for enhancing enzymatic stability and activity, making it suitable for industrial applications.

TRACK 3 · BMCCA

Biochemistry and Molecular Biology Climate Change Adaptation

3 abstracts · BMCCA-01 to BMCCA-03

BMCCA-01

Transcriptomic Insights into Low-Temperature (LT) Tolerance in Japonica Rice

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Rice (*Oryza sativa* L.) sustains over half the global population, rendering its yield and quality critical for food security. Originating in tropical and subtropical regions, rice is highly sensitive to LTs. Despite global warming, unpredictable cold spells cause damage to rice plants, particularly during the critical stage of pollen development. Furthermore, LT exposure during early panicle formation exacerbates these pollen defects, though the underlying molecular mechanisms remain unclear. In this study, we investigated the effects of LTs (19.0 °C and 18.5 °C) throughout reproductive development on panicle architecture and fertility of 28 japonica rice varieties exhibiting varying levels of LT tolerances. Physiologically, LT stress altered panicle architecture, particularly increasing spikelet density on basal branches while decreasing overall seed fertility in susceptible and moderately tolerant varieties such as Sasanishiki and Hitomebore. At LT (18.5 °C) conditions, Hitomebore exhibited a marked decline in seed fertility. In contrast, the extremely-tolerant cultivar 'Tohoku 234' maintained stable panicle architecture and reproductive performance. Transcriptome profiling revealed robust regulation of genes related to stress tolerance, flowering time, and cell cycle processes in Tohoku 234, along with the identification of some variety-specific candidate loci. These findings demonstrate that the ability to maintain panicle integrity and reproductive success under LT stress is a hallmark of the extremely tolerant varieties like 'Tohoku 234'. The candidate genes in this study represent valuable targets for future functional studies and may contribute to the development of climate-resilient, high-yielding rice cultivars.

BMCCA-02

Challenges and Emerging Solutions in the Identification of Monozygotic Twins for Forensic Investigation

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Forensic investigations involving monozygotic twins is always accompanied with significant challenges that almost always resulting into miscarriages of justice. This is majorly due to the fact that monozygotic twins nearly have identical genetic profiles. The present review aims at overcoming these challenges by providing the detailed evaluation of the transition from conventional DNA testing to high-resolution methods such as DNA methylation analysis, which identify de novo mutations and environmental markers unique to each twin. Furthermore, the review examines the integration of dactyloscopic data such as fingerprint as a secondary biometric layer to enhance identification clarity. The study analyses recent case studies and experimental data from Pubmed, ScienceDirect, Web of Science and other reputable journals to identify critical barriers including technical complexity, high analytical costs and the current lack of standardised legal admissibility for epigenetic evidence. Analysis of these methods shows that combining biometric and genetic approaches increases the reliability of forensic individualisation and distinction between twins, thereby minimising errors in crime resolution involving monozygotic twins. In conclusion, the findings of this study provide a comprehensive overview of how integrating multi-omic and biometric approaches can strengthen suspect identification and ensure judicial accuracy in cases involving monozygotic twins.

BMCCA-03

Climate Change Impacts on the Biochemistry and Nutritional Quality of Plantain: Challenges and Mitigation Strategies for Sustainable Food Security

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Climate change poses a growing threat to the biochemical composition and nutritional quality of staple crops, with significant implications for food security and public health in tropical regions. Plantain (*Musa* spp.), a major source of carbohydrates, dietary fibre, minerals, and bioactive compounds for millions of people particularly in sub-Saharan Africa is highly sensitive to climate-induced stresses such as elevated temperatures, altered rainfall patterns, drought, flooding, and increased pest and disease pressure. This study examines the impact of climate change on the biochemistry and nutritional quality of plantain, focusing on changes in carbohydrate metabolism, protein content, lipid profiles, mineral bioavailability, vitamin stability, and antioxidant compounds. Evidence indicates that heat and water stress disrupt photosynthesis and starch biosynthesis, leading to reduced dry matter content, altered sugar–starch balance, and declines in micronutrients such as potassium, magnesium, iron, and provitamin A carotenoids. Oxidative stress triggered by extreme climatic conditions further affects enzymatic activities and accelerates postharvest deterioration, thereby reducing nutritional value and shelf life. Mitigation and adaptation strategies aimed at safeguarding plantain nutritional quality under changing climatic conditions include climate-smart agronomic practices (improved irrigation systems, mulching, and soil organic matter management), breeding and deployment of stress-tolerant and nutrient-dense cultivars, integrated pest and disease management, and postharvest handling innovations to minimise biochemical losses. Understanding the biochemical responses of plantain to climate change and implementing effective mitigation strategies are essential for maintaining its nutritional integrity and ensuring resilient food systems in climate-vulnerable regions.

TRACK 4 · ERIBM

Ethics, Regulation, and Responsible Innovation in Biochemistry and Molecular Biology

3 abstracts · ERIBM-01 to ERIBM-03

ERIBM-01

Evaluation of *Zingiber officinale* and *Costus afer* Extracts against Pathogenic Bacteria from Processed Street-vended *Rhynchophorus phoenicis* and *Palaemon serratus* in Delta State, Nigeria

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Roasted *Rhynchophorus phoenicis* (palm weevil larvae) and *Palaemon serratus* (shrimp) are popular ready-to-eat street-vended snacks in Delta State, Nigeria. This study assessed the microbial safety of these roasted snacks and evaluated the antimicrobial potency of *Zingiber officinale* (ginger) and *Costus afer* (bush cane) extracts against isolated pathogenic bacteria. Samples were collected from four major junctions in Udu and Ughelli-South Local Government Areas. Microbiological, proximate, and phytochemical analyses were performed on the snacks and plant materials. Bacterial isolates were subjected to molecular identification through genomic DNA extraction, amplification, purification, and Sanger sequencing at Inqaba Biotec, South Africa, identifying *Staphylococcus aureus*, *Micrococcus varians*, *Klebsiella pneumoniae*, and *Morganella morganii*. Ethyl ether and aqueous extracts were prepared from ginger and bush cane using standard protocols. Antimicrobial activity was tested with paper disc and well-in-agar diffusion methods at varying concentrations. Proximate analysis indicated crude protein contents of 35.6% in *Palaemon serratus* and 18.76% in *Rhynchophorus phoenicis*, with crude carbohydrate levels of 4.80% and 2.78%, respectively. The 80:20 (ginger:bush cane) ethyl ether combination displayed the highest antagonistic activity, notably against *Klebsiella pneumoniae*, yielding minimum inhibitory concentrations of 27.8 mg/ml for ginger extract and 50.87 mg/ml for bush cane extract. A quadratic model was applied to determine optimal shelf-life extension of the snacks against these pathogens. These results demonstrate that locally available plant extracts offer a cost-effective, natural strategy for controlling foodborne pathogens, preserving seafood/snack quality, and enhancing public health safety in the Niger Delta region by potentially reducing foodborne disease incidence.

ERIBM-02

Polycyclic Aromatic Hydrocarbons and Heavy Metal Content of Selected Vegetables Purchased from Marine Base Jetty, Port Harcourt

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Industrial activities at the coastal shorelines of Niger Delta is increasing daily because of its economic importance but can be detrimental to the health of humans and the environment. The aim of this study is to determine the level of polycyclic aromatic hydrocarbon (PAHs) and heavy metal content in vegetables sold close to Marine base jetty, Port Harcourt. Heavy metals and PAHs analysis were done using Atomic Absorption Spectrophotometer (AAS) and Gas Chromatography respectively. Data was obtained for Heavy metal and PAHs levels in *Ocimum gratissimum and Telfaria occidentalis* exposed to Marine base Industrial activities and those unexposed. The results of this study showed that the total concentration of PAHs was found to be higher in the exposed samples when compared to the unexposed. Heavy metals such as Cd, Pd and Ni were found to be below detectable limits in the exposed and unexposed samples of all the selected vegetables in this study. Zn levels were *Ocimum gratissimum* (18.33±0.05 and 10.93±0.05) and *Telfaria occidentalis* (18.55±0.30 and 9.51±0.20) for exposed and unexposed respectively. From these results, Zn levels were found to be increased significantly in the exposed samples when compared to the unexposed. This study shows that exposure of vegetables to the Marine base jetty significantly increased the levels of PAHs and heavy metal contaminants in the selected vegetables which can be harmful to health with further introduction of these contaminants.

ERIBM-03

Instructional Facilities Management and Lecturers' Job Performance in Universities in North-Central, Nigeria

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This study investigated instructional facilities management and lecturers' job performance in universities in North-Central, Nigeria. The main purpose of the study was to determine the relationship between Instructional Facilities Management and Lecturers' Job Performance in Universities in North-Central, Nigeria. Four research questions were raised and four hypotheses were formulated to guide the study. The study adopted correlational research design. The population of the study comprised of all HODs and Lecturers' in Faculty of Education in universities in North-Central, Nigeria. The sampling technique for the study is multistage sampling technique and the sample size comprised of 21 HODs and 239 Lecturers in Eight Universities in Three States and FCT: Three Federal, Two States and Three Private Universities. The researcher used four sets of instruments namely Instructional Facilities Availability Checklist (IFAC) and Lecturers' Job Performance Questionnaire (LJPQ) which were responded by HODs, Instructional Facilities Functionality Questionnaire (IFFQ) and Instructional Facilities Maintenance Questionnaire (IFMQ) were responded by lecturers'. The face and content validity of the instruments were insured by two experts in the Department of Educational Management. The validity and reliability of the four instruments were analysed using Statistical Package for Social Science (SPSS) and the instruments yielded a reliability index of 0.91, 0.99, 0.99 and 0.96 respectively. Research questions were analysed using frequency count, percentage, mean score and standard deviation, the criterion measure for taking decision was mean score of 2.50 and above is considered as positive response and mean score of 2.49 and below is considered as negative response. Hypotheses 1, 2, 3 were analysed using simple linear regression and hypothesis 4 was analysed using multiple regressions at 0.05 level of significance. Findings of the study revealed that instructional facilities are available, fairly functional, rarely maintained and lecturers' job performance is high and there is a significance relationship between instructional facilities management and lecturers' job performance in Faculty of Education in Universities in North-Central, Nigeria. The study recommended that government should provide available university facilities; the facilities should be functional and well maintained in order to promote teaching and learning.

TRACK 5 · NMBCW

Nutritional and Metabolic Biochemistry for Community Well-Being

160 abstracts · NMBCW-01 to NMBCW-162

NMBCW-01

Dietary Pattern, Nutritional Status, and Biochemical Indices of Breast Cancer Patients Undergoing Chemotherapy in Maryland County, Liberia

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Cancer refers to a broad group of diseases considered by the uncontrolled growth and spread of abnormal cells. If left untreated, it can result in death. This study aimed to evaluate the dietary patterns, nutritional status, and biochemical indices of breast cancer patients undergoing chemotherapy in Maryland County, Liberia. A cross-sectional descriptive study was conducted to assess the dietary patterns, nutritional status, and biochemical indices of breast cancer patients undergoing chemotherapy. Total of 33 participants were enrolled in the study, most of whom were aged 41–60 years (84.8%). Life style and dietary practices were poor, with no physical activity, low meal frequency, frequent breakfast missing, and limited consumption of fruits, vegetables, dairy products, and animal protein. The median body mass index (BMI) was 21 kg/m², with 39.4% underweight and 27.2% overweight or obese. Biochemical assessments revealed mild anaemia, normal liver and renal function indices, normoglycaemia, and largely acceptable haematological parameters during chemotherapy. The observed poor dietary habits, low BMI could attributed to appetite suppression effects of the chemotherapeutic agents in addition to the mechanistic tissues necrosis. Therefore, integrating nutritional counselling and lifestyle interventions into cancer care is essential to improve treatment tolerance and overall health outcomes.

NMBCW-02

Immunomodulatory, Antioxidant, and Hepatoprotective Effects of *Cajanus cajan* Leaf Extracts in *Plasmodium berghei*-Induced Hepatic Dysfunction Rats

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Malaria-induced hepatic dysfunction is driven by a complex interplay of inflammation, oxidative stress, and impaired antioxidant defence systems. This study investigated the immunomodulatory, antioxidant, and hepatoprotective effects of aqueous and ethanolic leaf extracts of *Cajanus cajan* in *Plasmodium berghei*-infected rats. Forty-two male Wistar mice were divided into normal control, infected untreated, chloroquine-treated, and extract-treated groups (200 and 400 mg/ml doses). Key biomarkers assessed in liver tissues included pro-inflammatory tumour necrosis factor-alpha (TNF-α), anti-inflammatory interleukin-10 (IL-10), oxidative stress markers reactive oxygen species (ROS) and thiobarbituric acid reactive substances (TBARS), antioxidant enzymes catalase (CAT), superoxide dismutase (SOD), glutathione S-transferase (GST), and liver function indices aspartate aminotransferase (AST) and alanine transaminase (ALT). Results showed that infection significantly elevated TNF-α, ROS, and TBARS levels while suppressing IL-10 and antioxidant enzyme activities. Treatment with *C. cajan* extracts, particularly at 400 mg/ml, markedly reduced TNF-α and oxidative stress markers while enhancing IL-10 levels and restoring antioxidant enzyme activities toward normal values. Ethanolic extracts demonstrated superior efficacy in modulating IL-10 and oxidative stress parameters. Additionally, extract-treated groups exhibited improved hepatic enzyme activities, indicating restoration of liver function and cellular integrity. Comparatively, chloroquine treatment showed limited effects on oxidative and inflammatory markers despite its antimalarial activity. The findings suggest that *Cajanus cajan* exerts a multi-target therapeutic effect by attenuating inflammation, enhancing antioxidant defence mechanisms, and promoting hepatic recovery. These results highlight its potential as a complementary therapeutic agent in malaria-associated hepatic injury and warrant further molecular and clinical investigations.

NMBCW-03

Phytochemicals and Antibacterial Potential of Cashew *(Anacardium occidentale* [L]) Leaves against Antibiotic Resistant Vibrio Species Associated with Diarrhoea Infections

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Diarrhoea infections remain a major cause of morbidity and mortality worldwide. This study evaluated the antibacterial activity of *Anacardium occidentale* leaf extracts against *Vibrio* species isolated from diarrhoeic stool samples. The leaves of *A. occidentale* were extracted by cold water, hot water and ethanol. Qualitative and quantitative phytochemical analyses of extracts were carried out using standard methods. Antibacterial potentials of *A. occidentale* extracts (50, 100,200 and 400 mg/mL) were determined against *Vibrio* spp. isolates using agar well diffusion method. Bioactive compounds in hot water and ethanol extracts *A. occidentale* leaves were investigated using standard procedure. Ethanol extract of *A. occidentale* leaves had the highest percentage extraction yield of 22.4%. Phytochemical constituents recorded were saponins, tannins, terpenoids, cardiac glycosides, anthraquinone, alkaloids, flavonoids, steroids and phenols. Hot water extract of *A. occidentale* exhibited the highest content of total flavonoids (1551.329 ± 43.554 mg/g) and total Flavonoid (162.178 ± 14.574 mg/g) Hot water extract of *A. occidentale* (400 mg/mL) recorded highest inhibition zone against *V. vulnificus* (26.67±0.88 mm). The minimum inhibitory concentrations of the *A. occidentale* extracts ranged from 100 mg/mL to 400 mg/mL. Gas chromatography-mass spectrometry (GC-MS) analysis identified 9-octadecenoic acid and n-hexadecanoic acid as major compounds present in both the hot water and ethanol extracts. The findings revealed that *A. occidentale* leaves contain bioactive phytoconstituents with significant inhibitory activity against antibiotic-resistant *Vibrio* species associated with diarrhoeal infections. The hot water extract, in particular, shows promising potential for the development of natural agents in the treatment of diarrhoeal diseases.

NMBCW-04

Modulatory effect of Bitter Leaf (*Vernonia amygdalina)* Flavoured Non-Alcoholic Beer on Antioxidant Mechanisms and Cholinergic Enzyme Activities in Scopolamine-Induced Amnesic Rats

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Cognitive impairment, a hallmark of Alzheimer's disease (AD), is strongly associated with structural and functional deterioration in the brain. Scopolamine administration has been widely employed as an experimental model to mimic AD-related memory deficits in rodents. Given the limitations, high costs, and adverse effects of current pharmacological therapies, attention has shifted towards natural products with strong antioxidant potential, since oxidative stress is a key mechanism underlying AD pathology. This study investigated the effect of *Vernonia amygdalina* (bitter leaf) flavoured non-alcoholic beer (NAB) on antioxidant status and cholinergic enzymes in the brain of scopolamine-induced amnesic rats. Memory impairment was induced through intraperitoneal administration of scopolamine (1 mg/kg) for 3 days. Thirty-five male Wistar rats were randomly assigned into seven groups (n = 7). Group 1 served as control (distilled water), while Group 2 received scopolamine only. Groups 3 and 5 were administered NAB (25% and 50%, respectively) in combination with scopolamine. Groups 4 and 6 received NAB alone (25 mg/kg and, respectively), while Group 7 received the standard drug, donepezil (2.5 mg/kg), in combination with scopolamine. The effects of the treatments on acetylcholinesterase (AChE), butyrylcholinesterase (BChE), monoamine oxidase (MAO), reduced glutathione (GSH), and thiobarbituric acid reactive substances (TBARS) were evaluated. The observed arginase inhibition and moderated nitric oxide (NO) levels in NAB-treated rats indicate modulation of the nitrergic pathway. Results showed that scopolamine significantly ($p < 0.05$) elevated TBARS levels and cholinesterase activities (AChE and BChE), accompanied by a decline in antioxidant status. Treatment with NAB improved antioxidant defences and significantly reduced TBARS, AChE, BChE, and MAO activities. Notably, the 50% NAB formulation was more effective than the 25% formulation. These findings suggest that bitter leaf–flavoured non-alcoholic beer mitigates scopolamine-induced cognitive deficits through attenuation of oxidative stress, inhibition of neuronal degeneration, and enhancement of cognitive function.

NMBCW-05

Neuroprotective Effect of Bitter Leaf-Flavoured Alcohol-Free Beer on High Fat Diet/Streptozotocin-Induced Diabetic Wistar Rats

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Diabetes-related neurodegeneration, driven by chronic hyperglycaemia and disrupted cholinergic signalling, remains an underexplored complication of type 2 diabetes mellitus. *Vernonia amygdalina* (bitter leaf), valued in African ethnomedicine for antioxidant and hypoglycaemic properties, was substituted for hops at varying ratios in brewing an alcohol-free wheat beer, and the formulations were tested for brain-protective activity in a diabetic rat model. Type 2 diabetes was established in male Wistar rats via two weeks of high-fat feeding combined with a single intraperitoneal dose of streptozotocin (35 mg/kg). Confirmed diabetic animals (fasting blood glucose ⩾ 200 mg/dL) received daily oral doses of the beer formulations (100% hops, 75:25, 50:50, 25:75 hops-to-bitter-leaf, and 100% bitter leaf) or acarbose for fourteen days, after which brain tissue was analysed for total protein, malondialdehyde, nitric oxide, arginase, monoamine oxidase, acetylcholinesterase, and butyrylcholinesterase. Untreated diabetic animals showed marked depletion of brain protein alongside elevated oxidative and cholinergic markers relative to healthy controls. Bitter leaf-containing formulations reversed this pattern, restoring protein content and significantly lowering malondialdehyde, nitric oxide, arginase, and cholinesterase activities, while monoamine oxidase activity remained largely unaffected except in hops-dominant groups, which showed a paradoxical increase. Since hops alone did not reproduce these benefits, bitter leaf appears to be the active component responsible for the neuroprotection observed, and the beer may therefore be useful as a dietary option for managing diabetes-related brain complications.

NMBCW-06

Modulation of Oxidative Stress and Apoptosis Gene Expression by Diosmin in Arsenate-Induced *Drosophila melanogaster*

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Arsenate exposure is known to induce oxidative stress and apoptosis in biological systems, leading to cellular and molecular damage. This study investigated the protective effects of diosmin against arsenate-induced apoptotic alterations in *Drosophila melanogaster* by evaluating the behavioural activity, antioxidant biomarker and expression of apoptosis-related genes, including DrICE, Dronc, and p53. Diosmin supplementation protected *Drosophila melanogaster* against arsenate-induced toxicity by reducing mortality, improving locomotor activity, and enhancing progeny emergence. It also alleviated oxidative damage by restoring antioxidant and thiol homeostasis, reducing lipid peroxidation and nitric oxide levels, and preserving protein integrity, demonstrating potent antioxidant property. Flies exposed to arsenate showed significant up-regulation of DrICE and Dronc, indicating activation of effector and initiator caspase-mediated apoptotic pathways. The increase in p53 expression further suggested the induction of cellular stress and DNA damage responses. Supplementation with diosmin significantly reduced the expression of DrICE and Dronc compared with the arsenate-treated group, with greater protective effects observed at the 2 mg of diosmin / 10 g diet. Diosmin also non-significantly ($p > 0.05$) decreased p53 expression, indicating reduced cellular stress and improved genomic stability. The findings demonstrate that diosmin possesses significant protective potential against arsenate-induced oxidative stress and apoptosis in *Drosophila melanogaster*, and may serve as a promising natural therapeutic agent for mitigating arsenic-related toxicity.

NMBCW-07

Purification and Characterisation Of Rhodanese From *Lactobacillus buchneri* Isolated From Fermented Cassava

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Cyanide is a potent metabolic toxin that inhibits cytochrome c oxidase, leading to histotoxic hypoxia. In cassava (*Manihot esculenta*), a major staple in tropical regions, cyanogenic glycosides such as linamarin and lotaustralin release hydrogen cyanide (HCN) upon hydrolysis, posing significant food safety concerns in tropical regions, when inadequately processed. Microorganisms involved in cassava fermentation are known to play a key role in cyanide detoxification, primarily through the enzyme rhodanese. This study aimed to report the purification and characterisation rhodanese from *Lactobacillus buchneri* isolated from naturally fermented cassava pulp. Fresh cassava tubers were naturally fermented for six days, and serial dilutions of the pulp were plated on nutrient agar. A rhodanese-producing bacterium was isolated, screened on MRS agar containing KCN, and identified as *L. buchneri* based on morphological and biochemical characteristics. Rhodanese was purified from culture supernatant using ammonium sulfate precipitation, ion-exchange, and gel filtration chromatography, achieving a 2.8-fold purification with 12.5% yield. The enzyme exhibited a specific activity of 2.15 RU/mg, a native molecular weight of 35 kDa, and *Km* values of 0.06 mM (KCN) and 0.05 mM (Na2S2O3). Optimal activity was observed at pH 6.0 and 40 °C, with high substrate preference for thiosulfate. The enzyme was moderately stable at 30 °C but rapidly inactivated above 70 °C. Inhibitory effects were observed with EDTA, urea, 2-mercaptoethanol, and various metal ions. These findings demonstrate that *L. buchneri* produces an active rhodanese with cyanidedetoxifying potential, underscoring its role in safe cassava fermentation and its possible application in biotechnological cyanide detoxification.

NMBCW-08

Hypoglycaemic and Hypolipidaemic Effect of Aqueous and Methanolic Leaf Extract Of *Lonchocarpus cyanescens* in Normal Rats

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Across nations and civilisations, traditional healthcare systems have historically relied heavily on medicinal plants as a readily available and reasonably priced source of therapeutic chemicals. They have been used for millennia and are frequently the cornerstone of traditional medicine, especially in underdeveloped areas. *Lonchocarpus cyanescens* is one of such medicinal plants. It is used in the treatment of various diseases such as diabetes mellitus, leprosy, stomach ache etc. The aim of this study is to investigate the hypoglycaemic and hypolipidaemic effect of the aqueous and methanolic leaf extract of the plant leaves. A total of forty rats was rats used for the study. Dose response study was carried out for a period of fourteen days and a total of twenty eight rats was used. The rats were divided into seven groups of four rats each. Group two to six was administered 200mg/kg, 500mg/kg and 1000mg/kg of both aqueous and methanolic leaf extract of the plant. Blood glucose level of both extracts was determined on weekly basis using Accu-chek glucometer. The administration of 200mg/kg, 500mg/kg and 1000mg/kg of both extract showed that they possess the ability to reduce blood glucose level. Hypoglycaemic and hypolipidaemic study of the aqueous and methanolic leaf extracts of the plant was conducted forperiod of 12 weeks. A total of twelve rats was used for the study. The rats were divided into three groups of four rats each, group one, group two and group three. Rats in group two and three were administered 200mg/kg of aqueous and methanolic leaf extract respectively. After the twelve week treatment period, rats were euthanised, blood samples collected for analysis for hypolipidaemic effect. The parameters analysed for both the hypoglycaemic and hypolipidaemic study include blood glucose, cholesterol, triacylglycerides, high density lipoproteins. Administration of 200 mg/kg of both extracts showed that the extracts possess hypoglycaemic effect. This effect was significant ($P<0.05$) on weeks 2, 7, 8, 9, 11 and 12 when compared to control and weeks 2, 5, 8, 9 and 10 when compared with basal values of rats. Administration 200mg/kg of the extracts did not significantly ($P>0.05$) decrease or increase the concentration of lipid profile parameters such as CHOL, TAG, LDL, HDL throughout the period of study.

NMBCW-09

Nephroprotective Effect of *Phyllatus amarus* Leaf Extract and Zinc In Streptozotocin-induced Diabetes in Wistar Rats

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Diabetes mellitus is associated with electrolyte imbalance and renal dysfunction, which contribute to disease progression and complications. *Phyllatus amarus* has gained attention due to its phytochemical constituents and potential therapeutics effect in metabolic disorder. This study investigated the effects of methanolic extract of *Phyllanthus amarus*, zinc supplementation on renal biomarkers and electrolyte homeostasis in streptozotocin-induced diabetic rats. Thirty-six Wistar rats were induced using STZ (60mg/kg bwt.), followed by treatment with methanolic extract of *Phyllanthus amarus* (100mg/kg bwt.) and zinc (100mg/kg bwt.), both individually and in combination. Kidney function tests, serum electrolyte were assessed. The evaluated biochemical markers comprised serum electrolyte, urea, and creatinine concentrations, in addition to kidney urea and creatinine levels. The results showed that diabetes reduced serum potassium, chloride, and phosphorus concentrations while increasing serum and kidney urea and creatinine levels compared with the control group. Treatment with *Phyllanthus amarus* and improved selected electrolyte and renal parameters, with notable reductions in serum urea and creatinine concentrations. Zinc supplementation showed variable effects across the measured indices, while combined administration of zinc and *Phyllanthus amarus* produced mixed responses depending on the biomarker evaluated. The findings suggest that *Phyllanthus amarus* and zinc possess varying capacities to modulate diabetes-induced alterations in electrolyte homeostasis and renal biochemical function, with individual treatments showing more consistent improvements than combination therapy.

NMBCW-10

Attenuation of Erectile Dysfunction by *Ageratum conyzoides* Leaf Extract in Paroxetine-Induced Sexually Impaired Male Rats

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Erectile dysfunction still poses a significant health problem worldwide, and it is even made worse by the concomitant use of selective serotonin reuptake inhibitors such as paroxetine. The current study aimed to explore the potential therapeutic use of *Ageratum conyzoides* L. leaf extract (EEACL) in reducing paroxetine-induced sexual dysfunction, a plant species that was recently found to have a wide range of bioactive metabolites such as quercetin and kaempferol.

Thirty male rats were treated with paroxetine and then given EEACL (15, 30, and 45 mg/kg) or sildenafil citrate (4 mg/kg). Biochemical analyses were conducted to determine the levels of penile enzymes serum hormones. The untreated group showed higher penile PDE-5 (1.16±0.05 mmol/min/mg) and arginase (6.82±0.12 mmol/min/mg) activities compared to other groups, and it also showed a significantly lower ($p < 0.05$) penile nitric oxide (59.28 ± 1.32) and serum testosterone (0.35±0.05 mg/mL) compared to other groups. The 45 mg/kg EEACL treatment successfully counteracted these changes by significantly inhibiting PDE-5 (0.68±0.05 mmol/min/mg) and arginase (5.35±0.26 mmol/min/mg). The hormonal normalisation was indicated by the significant increase in testosterone levels to 2.30±1.05 ng/mL, which was accompanied by the induction of steroidogenic enzymes 3β-HSD (0.33±0.06 mmol/min/mg) and 17β-HSD (0.29±0.03 mmol/min/mg). Moreover, the extract reduced vascular risk factors by decreasing LDL (13.59±0.91 mmol/L) and atherogenic index from 0.19±0.16 to 0.09±0.01. The restorative potential of EEACL via mechanisms such as PDE-5 and arginase inhibition, 3β-HSD and 3β-HSD activation, positions EEACL as a viable aphrodisiac candidate for sexual dysfunction.

NMBCW-11

Assessment of Time-Course and Dose-Response Reproductive Toxicity of Cadmium in Animal Model

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Cadmium is a widespread environmental toxicant known to impair male reproductive function, yet its time-dependent and dose-related effects are not fully understood. This study determined the median lethal dose (LD50) of cadmium (89.44 mg/kg) and evaluated its progressive reproductive toxicity in male Wistar rats. Using a controlled experimental design, rats were administered $1/10^{th}$ and $1/20^{th}$ of the LD50 orally for a period of 30, 60, and 90 days. Key assessments included sexual behaviour, sperm quality, hormonal profiles, oxidative stress markers, serum cadmium levels, and testicular histopathology. Data were analysed using ANOVA with Tukey's post hoc test ($p < 0.05$). Results showed a dose- and duration-dependent increase in serum cadmium levels, with the highest concentration observed in the $1/10^{th}$ dose at 90 days. Cadmium exposure significantly reduced testicular weight, sperm count, motility, and viability, alongside marked impairments in sexual behaviour, including reduced mount and intromission frequencies and prolonged latencies. Sperm DNA damage, abnormal morphology, and compromised membrane integrity were also evident. Hormonal disruptions were observed in testosterone, follicle-stimulating hormone, and luteinising hormone levels. Oxidative stress played a central role, as indicated by decreased antioxidant enzymes (SOD, GPx, GSH) and elevated malondialdehyde levels. Histopathological analysis confirmed structural degeneration of testicular tissue, particularly at high dose ($1/10^{th}$) and longer exposure periods. Repeated cadmium exposure induced progressive reproductive dysfunction through oxidative stress, hormonal imbalance, impaired spermatogenesis, and structural testicular damage, highlighting the need for stricter regulation to reduce male infertility risk.

NMBCW-12

Evaluation of Antidiabetic and Organ-Protective Potential of Ethanol Leaf Extract of *Carissa edulis* in Alloxan-Induced Diabetic Albino Rats

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Plant-derived remedies offer promising, low-cost options for managing diabetes mellitus, where conventional drugs are often costly or poorly tolerated. *Carissa edulis* (Lemon Tsuntsu), long valued in folk medicine for treating diabetes, has not been adequately studied for its biochemical effects on major organ systems. Leaves were air-dried, ground, and extracted with ethanol to obtain the test extract. Alloxan was used to induce diabetes in albino rats, which were then grouped into normal control, diabetic control, metformin-treated, and extract-treated sets (n = 4/group) given their respective treatments orally once daily. Qualitative phytochemical tests detected alkaloids, flavonoids, tannins, terpenes, steroids, cardiac glycosides, resins, carbohydrates, saponins, and phenolic compounds within the extract. Fasting blood glucose dropped markedly from 17.81 ± 0.20 mmol/L in untreated diabetic rats to 3.19 ± 0.05 mmol/L, comparable to metformin (2.92 ± 0.03 mmol/L). The extract raised total protein and albumin levels, corrected electrolyte disturbances, and lowered bilirubin concentration appreciably. Hepatic enzymes (ALT, AST, ALP) dropped relative to diabetic controls, pointing to liver-protective action, while urea and creatinine were lowered, reflecting improved renal status. Cholesterol, triglycerides, and LDL were also reduced, indicating a favourable effect on lipid metabolism, and haematological parameters shifted back toward normal ranges. Collectively, these results confirm that *Carissa edulis* exerts antidiabetic, hepatoprotective, nephroprotective, lipid-lowering, and blood-protective effects, lending scientific backing to its ethnomedicinal application. Future work should isolate the responsible bioactive compounds and clarify their mechanism of action.

NMBCW-13

Production and Characterisation of Bioethanol From *Colocasia esculenta* and *Ananas comosus* PeelsVia Batch Fermentation Using *Saccharomyces cerevisiae*

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This study investigated the production and characterisation of bioethanol from a 6:4 blend of *Colocasia esculenta* (cocoyam) and *Ananas comosus* (pineapple) peels through batch fermentation using *Saccharomyces cerevisiae* as inoculum. The feedstock blend was subjected to pretreatment, hydrolysis, fermentation, and bioethanol recovery. Moisture content of substrate was determined using gravimetric oven-drying method. Six fermentation conditions were tested at pH (4.0, 5.5, and 6.0), temperature (30 and 37°C) for a 96-hours fermentation duration. Ethanol fraction of each sample mixture was recovered by simple distillation, and the volume of distillate was recorded. Alcohol content, density, viscosity, and flash point of the bioethanol were evaluated. Ignition residue, specific gravity, iodoform, reducing sugar, and flammability tests of the resulting bioethanol were also evaluated. Fourier Transform Infrared (FTIR) Spectroscopy was conducted to confirm the presence of bioethanol in the crude product. Batch fermentation of the feed stock blend produced varying distillate volumes ranging from 215.0 mL to 272.5 mL. The condition of pH 5.5 at 30°C produced the highest distillate volume, while pH 4.0 at 37°C produced the lowest. The maximum bioethanol content of 11.37% was obtained from the feedstock blends. The result showed that the bioethanol produced has physicochemical properties consistent with standard bioethanol quality parameters. This supports its suitability for renewable biofuel applications while simultaneously promoting agricultural waste valorisation, environmental sustainability, and renewable energy development in Nigeria. Further purification through distillation is recommended to achieve fuel-grade purity.

NMBCW-14

Phytochemical and Anti-Nutritional Composition of African Star Apple (*Chrysophyllum aficanum*)

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The phytochemical composition and anti-nutritional factors of African star apple (*Chrysophyllum africanum)* was investigated. The fresh fruit was obtained and identified by a qualified botanist. It was then dried in the laboratory for two weeks. The dried fruit was made into powder in which exactly 100g was dissolved in 500ml of ethanol. Qualitative and quantitative analysis of phytochemicals were carried out using standard methods. The phenolic compounds present include flavonoid (+), alkaloid (+), saponin (+) and tannin (+) whereas quantitative analysis yielded 2.40±0.020 (mg %), 0.670±0.231 (mg %) and 1.476±0,231 (mg %) for alkaloid, flavonoid and saponin respectively. The result of anti nutritional factor indicated 33.80±1.224 (mg %), 0,005±0.001 (mg %). 0.132±0.021 and 0.0058±0.001 (mg %) for phytate, oxalate, cyanide and nitrate respectively. The result of this study concluded that people should minimise the consumption of this fruit so as to prevent the effect of anti-nutritional factor present in it.

NMBCW-15

Monodora myristica Seed Extract and Its Biosynthesised Selenium Nanoparticles Attenuate Inflammation and Renal Dysfunction in Diabetic Rats: Implications for Functional Nutraceutical Development

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Diabetes mellitus is a major global health burden characterised by chronic hyperglycaemia, oxidative stress, and persistent inflammation that collectively trigger the progression of debilitating complications, including diabetic nephropathy. The growing demand for effective, safe, and affordable complementary interventions has stimulated interest in plant-derived functional foods and nutraceuticals. *Monodora myristica* (African nutmeg), an underutilised culinary spice rich in bioactive phytochemicals, represents a promising candidate for the development of nutraceuticals targeting diabetes-associated inflammation and organ dysfunction. This study evaluated the anti-inflammatory and renoprotective potential of ethanol extract of *M. myristica* seed (EEMS) and its biosynthesised selenium nanoparticles (SeNPs) in streptozotocin-induced diabetic Wistar rats. Diabetic animals received oral administration of EEMS (25, 50, and 100 mg/kg body weight) or SeNPs (10 and 20 mg/kg body weight) for 14 days. Both EEMS and SeNPs significantly ($p < 0.05$) suppressed the elevated concentrations of the pro-inflammatory cytokines interleukin-6 (IL-6), interleukin-1β (IL-1β), and tumour necrosis factor-α (TNF-α), while markedly reducing renal injury biomarkers, including cystatin C, angiotensin-converting enzyme (ACE), and neutrophil gelatinase-associated lipocalin (NGAL), relative to untreated diabetic controls. The selenium nanoparticle formulation demonstrated greater therapeutic efficacy than the crude extract, suggesting enhanced bioavailability and biological activity. Further investigations are warranted to identify the bioactive compounds responsible for these effects and access their long-term safety.

NMBCW-16

Effect of Sourdough Fermentation on Nutritional, Antioxidant and Functional Properties of Tiger Nut–Unripe Plantain Composite Bread Enriched with Fenugreek

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This study investigated the effects of sourdough fermentation on breads produced from composite flours of tiger nut (*Cyperus esculentus*), unripe plantain (*Musa paradisiaca*), and fenugreek seed (*Trigonella foenum-graecum*). The breads were evaluated for proximate composition, antioxidant capacity, colour attributes, amino acid profile, and anti-nutritional factors. Furthermore, biological effects were assessed in L-NAME- and high-fat diet-induced rats by measuring oxidative stress markers, including reactive oxygen species (ROS) and malondialdehyde (MDA) levels in kidney and heart tissues. Results showed that sourdough fermentation significantly improved the physicochemical and nutritional properties of the composite breads. Fermentation enhanced moisture distribution, increased mineral bioavailability, and improved fibre functionality. Notably, it facilitated the enzymatic degradation of anti-nutritional compounds such as phytates and tannins, thereby improving nutrient bioavailability. Amino acid analysis revealed increased levels of essential amino acids, indicating enhanced protein quality of the composite formulations. *In vivo* findings demonstrated that consumption of the sourdough breads significantly reduced ROS production and MDA levels in oxidatively stressed rats, suggesting improved antioxidant potential. Overall, these results highlight the effectiveness of sourdough fermentation in enhancing both the nutritional quality and functional properties of composite breads.

NMBCW-17

Procambarus clarkii -based Diet Enhanced the Haematological Parameters, Organ and Carcass /Body Weight Ratios of Female Wistar Rats

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Majority of sea foods have been documented to possess anti-inflammatory, anti-constrictive and blood boosting abilities in tissues of organisms that consume them, *Procambaris clarkia* is not an exemption. Therefore, the need to probe into its organ, carcass body/weight ratio and haematological parameter enhancement is imperative. Fifty female Wistar rats (Average weight: 92.07 ± 3.45g) were grouped into five (A – E) and were fed oncontrol diet (100% inclusion of *Oreochromis niloticus*-based diet*)*, 25%, 50%, 75%, and 100%- inclusions of *Procambaris clarkia*-based diet respectively for six week. Determination of haematological parameters as well as estimation of organ (liver, kidney, heart, brain, small intestine, eye), carcass body/ weight ratios were done using standard methods. Haematological parameters revealed that the packed cell volume (PCV), Red blood cell (RBC), haemoglobin content (HC), mean cell volume (MCV), mean corpuscular haemoglobin (MCH)of rats fed on the test diet at the three inclusion levels compared favourably ($p > 0.05$)with that of the control group in an inclusion dependent manner. Likewise, the same trend was observed ($p>0.05$)in carcass, organ/body weight ratio except for the heart and eye tissues ($p < 0.05$) in whichsignificant differences were observed. Overall, *Procambarus clarkia* proved its capabilities in boosting the blood parameters and prevention of inflammation and constriction in the organs of rats.

NMBCW-18

Selenium Biofortification Enhances Phenolic Content and Antioxidant Potential of Conventional Hybrid Maize (Zea mays L.)

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Selenium biofortification still presents an option that can be adopted to address micronutrient deficiencies in staple foods. This study aimed to assess the effect of selenium biofortification on the phytochemical and antioxidant properties of conventional hybrid maize (*Zea mays* L.). The study involved growing conventional hybrid maize using organic manure fortified with selenium at 0.05%, 0.1%, and 0.5%. Harvested mature grains were then tested for total phenol and flavonoid contents, in addition to carrying out antioxidant assays using DPPH, ABTS, FRAP, hydroxyl radical, nitric oxide, and iron chelating methods. Total phenol content was greatly improved in selenium biofortified maize, from 1.593±0.041 mg GAE/g in the no manure treatment to 1.799±0.054 mg GAE/g at 0.05% selenium, but there was no significant difference between the 0.1% (2.010±0.007 mg GAE/g) and 0.5% (2.079±0.003 mg GAE/g) selenium concentrations. Flavonoid content increased from 1.111±0.029 mg GAE/g to 1.518±0.001 mg GAE/g with increasing selenium concentration up to 0.1%, but reduced slightly with a further increase in concentration to 0.5% (1.192±0.093 mg GAE/g). ABTS, hydroxyl radical, and nitric oxide scavenging abilities increased with selenium concentration, while FRAP decreased. Although DPPH scavenging ability was initially low at the 0.05% selenium concentration (51.584±0.097%) compared to both the non-fertilised (63.636±1.364%) and organically fertilised (67.080±4.480%) control samples, it improved with increasing selenium concentration (65.909±4.967% at 0.1% and 66.804±7.207% at 0.5%). Iron chelating ability was not significantly influenced by selenium concentration, as the selenium biofortified maize exhibited lower activity (49.167±0.674% at 0.05%, 50.598±0.432% at 0.1%, and 48.366±0.405% at 0.5%) than the non-fertilised control sample (56.167±1.672%). This study shows that selenium biofortification can improve the phytochemical profile and antioxidant properties of conventionally bred hybrid maize, thereby making it a potential functional food.

NMBCW-19

Apigenin Enhances the Blood Pressure-Lowering Effects of Ramipril in Nω-Nitro-L-Arginine Methyl Ester-Induced Hypertension in Rats: Involvement of ACE mRNA Expression and Key Enzymes

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Hypertension is a major risk factor for cardiovascular and other chronic diseases, and its management often requires long term pharmacotherapy that may benefit from complementary agents. This study investigated the blood pressure lowering effects of apigenin in combination with ramipril in Nω-Nitro-L-Arginine Methyl Ester induced hypertensive rats, with particular emphasis on angiotensin converting enzyme activity, ACE mRNA expression, endothelial function and key enzymes associated with nitric oxide metabolism. Hypertension was induced in rats using L-NAME at 40 mg/kg/day. Animals were assigned to nine groups including normotensive control, hypertensive control, apigenin treated groups at 25 and 50 mg/kg/day, ramipril treated group at 2 mg/kg/day, hypertensive rats treated with apigenin, ramipril, or their combination. Treatments were administered orally for ten consecutive days. L-NAME administration resulted in significant elevation of blood pressure, increased ACE and arginase activities, upregulation of ACE mRNA expression, downregulation of endothelial nitric oxide synthase gene expression, and a marked reduction in nitric oxide levels. Treatment with apigenin and ramipril, either alone or in combination, significantly attenuated these alterations by reducing blood pressure, suppressing ACE activity and ACE mRNA expression, inhibiting arginase activity, enhancing eNOS gene expression, and restoring nitric oxide bioavailability. The combined treatment produced more pronounced effects than either agent alone. These findings suggest that apigenin enhances the antihypertensive efficacy of ramipril through modulation of ACE gene expression and key enzymes involved in endothelial function, supporting its potential as a complementary therapeutic strategy for hypertension management.

NMBCW-20

Glycaemic and Antioxidant Properties of Peanut Bars Enriched with Ginger (*Zingiber officinale*) and Orange Peel (*Citrus sinensis*)

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This study evaluated the glycaemic and antioxidant properties of peanut bars enriched with ginger (*Zingiber officinale*) and orange peel (*Citrus sinensis*) using *in vitro* analytical approaches. The formulated products were assessed for glycaemic indices, amylose and amylopectin contents, and antioxidant capacities. Antioxidant activity was characterised through total phenolic and total flavonoid contents, as well as radical scavenging and reducing assays including 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2′-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), ferric reducing antioxidant power (FRAP), and iron chelation capacity. The results indicated that enrichment significantly enhanced the measured properties of the peanut bars relative to the unfortified control. Notably, the enriched samples exhibited lower predicted glycaemic indices, suggesting moderated glucose release and improved suitability for glycaemic management. In addition, higher amylose to amylopectin ratios were observed, reflecting potential for slower starch digestibility and improved metabolic response. The enrichment also led to marked increases in total phenolic and flavonoid contents, which corresponded with enhanced antioxidant activities across all evaluated assays. The ginger-enriched formulation demonstrated strong free radical scavenging capacity, whereas orange peel incorporation contributed prominently to metal chelation and reducing power. Collectively, these findings highlight the potential of incorporating plant-derived bioactive ingredients into peanut-based snack products to modulate glycaemic response and enhance antioxidant capacity.

NMBCW-21

Eating Practices and Nutritional Knowledge among Adolescents in Kaduna Metropolis Secondary Schools

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Adolescence is a formative stage for establishing lifelong dietary habits. However, irregular meal patterns and reliance on energy-dense foods are increasingly reported among Nigerian adolescents. This study assessed eating practices, dietary diversity, and nutritional knowledge among adolescents in selected secondary schools in Kaduna Metropolis. A cross-sectional survey was conducted among 400 adolescents aged 10–19 years using structured questionnaires. Data were collected on socio-demographic characteristics, meal patterns, food frequency, 24-hour dietary diversity, nutritional knowledge, and perceived health effects. Descriptive statistics were applied to summarise findings. Respondents were predominantly female (65.3%), aged 16–19 years (43.3%), and in SS3 class (36.0%). Breakfast skipping was widespread, with 62.3% reporting they never ate breakfast, while 43.5% sometimes skipped meals. Snacking was common, with over 65% consuming snacks daily, primarily biscuits/crackers (54.5%). Fast food consumption was frequent, with 41.5% eating it weekly and 16.3% often or daily. Food frequency analysis revealed high intake of cereals, roots/tubers, fried/snack foods, and sweets, but limited consumption of fruits and vegetables. The 24-hour dietary diversity assessment confirmed high consumption of cereals (91.0%) and oils/fats (84.3%), but moderate intake of protein-rich foods and vitamin A-rich vegetables. Nutritional knowledge was generally strong, yet misconceptions persisted regarding breakfast skipping (62.3%) and fast-food healthiness (47.8%). Reported health effects included fatigue (30.5%) and weight gain (28.0%). Adolescents in Kaduna exhibit irregular meal habits, high reliance on energy-dense snacks, and gaps in nutritional knowledge despite awareness of basic dietary principles. Targeted nutrition education and school-based interventions are essential to promote healthier eating practices and improve adolescent health outcomes.

NMBCW-22

Evaluation of Food Fortification Programmes in Nigeria: Evidence from Household Consumption of Fortified Staple Foods in Northern Nigeria

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Food fortification is a cost-effective strategy for preventing micronutrient deficiencies. Although Nigeria's fortification programmes have prioritised the fortification of widely consumed staple foods (such as flour, semovita, semolina, vegetable oils, sugar and salt), evidence on their effectiveness in reaching vulnerable populations remains limited. This cross-sectional survey conducted in three states of Kebbi, Sokoto, and Zamfara assessed the coverage of fortified foods, as a proxy for programme reach, by estimating the proportion of households accessing fortified products. Enumeration Areas (EAs) served as primary sampling units in a two-stage sampling design (EAs followed by households). Sample sizes were determined using Srivastava's formula (Vaidya, 2023), whereas sampling procedures were guided by Kiregyera (1999). A total of 3,268 households were sampled and interviewed across the 3 states. Findings indicate high usage of staple food vehicles: 91.3% of respondents reported using vegetable oil, 83.0% wheat flour, 90.9% maize flour, and 94.5% semolina flour in household food preparation. Similarly, 73.1% and 86.3% of households reported using sugar and salt, respectively. However, a substantial proportion of respondents reported using unbranded products, including vegetable oil (67.7%), maize flour (82.8%), and salt (71.5%), which are less likely to be unfortified. In contrast, all respondents reported using branded and presumably fortified wheat flour, semolina, and sugar. Additionally, 90.9% of households used white granulated sugar, while 93.0% reported using table salt. Findings show high staple-food consumption, but dependence on unbranded products may reduce food-fortification effectiveness. Stronger regulation and access to fortified foods for vulnerable groups are needed in the study area.

NMBCW-23

Comparative Assessment of the Nutritional Status of Under-Five Children from Internally Displaced Persons (IDPs) and Non-IDP Households Attending Primary Health Care Centres in Kaura Namoda, Zamfara State

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Childhood malnutrition remains a serious public health challenge in conflict-affected settings, where displacement often worsens food insecurity, poverty, and limited access to healthcare services. Under-five children living in Internally Displaced Persons (IDP) households are particularly vulnerable to poor nutritional outcomes. This study compared the nutritional status of under-five children from IDP and non-IDP households attending Primary Health Care (PHC) centres in Kaura Namoda, Zamfara State, Nigeria.A facility-based comparative cross-sectional study was conducted among n = 300 under-five children (IDP: n = 150; non-IDP: n = 150). Caregivers were interviewed using a structured questionnaire to obtain socio-demographic and feeding information. Anthropometric measurements (weight, height/length, and mid-upper arm circumference) were taken using standard WHO procedures. Nutritional indices weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) were computed using WHO growth standards. Data were analysed using SPSS version 25. Group differences were assessed using chi-square and independent t-tests, while multivariate logistic regression identified predictors of malnutrition. Statistical significance was set at $p < 0.05$. Stunting was significantly higher among IDP children compared to non-IDP children (38.0% vs. 21.3%; $\chi^2 = 10.12$, $p = 0.001$). The prevalence of wasting was also greater in the IDP group (18.7% vs. 9.3%; $\chi^2 = 5.45$, $p = 0.020$), as was underweight (29.3% vs. 14.7%; $\chi^2 = 8.76$, $p = 0.003$). Moderate-to-severe acute malnutrition (MUAC < 12.5 cm) was observed in 16.0% of IDP children compared to 6.7% among non-IDP children ($\chi^2 = 6.58$, $p = 0.010$). After adjustment for socio-demographic factors, IDP status remained independently associated with undernutrition (AOR = 2.41; 95% CI: 1.45–4.02; $p = 0.001$). Low caregiver education (AOR = 1.89; 95% CI: 1.12–3.18; $p = 0.017$) and low household income (AOR = 2.76; 95% CI: 1.63–4.67; $p < 0.001$) were also significant predictors. Under-five children from IDP households in Kaura Namoda experience significantly poorer nutritional outcomes than non-IDP peers. Strengthened nutrition-specific and social protection interventions targeting displaced populations are urgently required.

NMBCW-24

Nutritional and Antioxidant Properties of Indigenous Cashew and Sesame Seed Oils: Prospects for Nutraceutical and Functional Food Applications: A Critical Review

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Native oil-bearing seeds are a promising source of functional lipids, bioactive substances and nutritional phytochemicals for health, food innovation and nutraceutical research. Cashew (*Anacardium occidentale*) and sesame (*Sesamum indicum*) are commercially important seeds in Nigeria and other tropical countries, but their nutritional and antioxidant characteristics have not been studied. This research objectively assesses cashew and sesame seed oils' lipid content, physicochemical quality, antioxidants and nutraceutical potential. Their fatty acids, tocopherols, phenolic compounds, lignans, phytosterols, oxidative stability and health benefits distinguish them. Fats, especially unsaturated fatty acids like oleic and linoleic acids, in both oils may improve cardiovascular and metabolic health. Lignan-rich sesame oil contains sesamin, sesamolin and sesamol, which are antioxidants and biologically active. Although unstudied, cashew seed oil contains nutritionally beneficial fatty acids and bioactive compounds that may have nutraceutical and functional characteristics. The review also discusses how extraction and processing affect oil yield, antioxidant retention, physicochemical quality and shelf-life stability. Most crucially, sesame oil out performs cashew seed oil in antioxidant, lipid-lowering and functional food integration. In Kogi State, Nigeria, where cashews grow in vast amounts, cashew seed oil has not been completely tapped but has great potential. Location-specific biochemical data, comparison studies, clinical evidence and standardised extraction and quality assessment methods are research gaps. This shows that cashew and sesame seed oils are promising in functional foods, nutraceuticals and sustainable nutrition. They need further experimental, formulation and clinical investigations to prove their health benefits and improve food and nutrition.

NMBCW-25

Antioxidant Activity of Aqueous Extract of Siam Weed (*Chromolaena odorata*) Leaf in Sodium Nitroprusside-Induced Oxidative Stress on Rat's Hepatic and Renal Tissues

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Oxidative stress is a major contributor to hepatic and renal dysfunction, which is as a result of an imbalance between reactive oxygen species (ROS) and antioxidant defences in the system. This study investigated the protective role of aqueous extract of *Chromolaena odorata* (*C. odorata)* leaf against Sodium nitroprusside-induced oxidative stress in male Albino Wistar rats. Biomarkers of oxidative stress [lipid peroxidation, nitric oxide, and glutathione (GSH)] were analysed in hepatic and renal tissues. Sodium nitroprusside (SNP) induction significantly elevated malonaldehyde and nitric oxide levels while reducing glutathione concentration, confirming oxidative damage. However, when aqueous extract of *C. odorata* was added to the analysis, it reversed these alterations in a dose-dependent manner, restoring glutathione levels and reducing lipid peroxidation and nitric oxide concentrations. These findings demonstrate that the aqueous extract of *C. odorata* leaf possesses potent antioxidant and protective properties against hepatic and renal oxidative damage, validating its ethno medicinal use and highlighting its potential as a natural therapeutic agent in oxidative stress–related disorders.

NMBCW-26

In vitro and Molecular Evaluation of Erectogenic Effect of Phenolic-Rich Leafy Vegetables Targeting Nitric Oxide (NO)/cGMP/cholinergic/Renin-Angiotensin-Aldosterone and Antioxidant Pathways

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Leafy vegetables are a reservoir of bioactive compounds with therapeutic potential in the management of erectile dysfunction (ED). In this study, the antioxidant and enzyme-modulatory effects of ten commonly consumed leafy plants: Bitter leaf, Curry, *Moringa*, African spinach, Bologi, Utazi, African basil, Fluted pumpkin, Waterleaf, and African jointfir were investigated. The antioxidant activities were assessed using the 1,1-diphenyl-2-picrylhydrazyl and hydroxyl radical scavenging assays, the ferric reducing antioxidant power assay, and the Iron-Chelating capability assay. Furthermore, the effect of the extracts on key enzymes [phosphodiesterase-5 (PDE-5), arginase, angiotensin-I-converting enzyme (ACE), and acetylcholinesterase (AChE)] implicated in ED pathophysiology was evaluated. Molecular docking simulations were performed to identify high-affinity bioactives and characterise their interaction profiles. Phenolic analysis revealed that *Moringa* leaf possessed the highest total phenolic content, followed by curry leaf, while waterleaf exhibited the lowest antioxidant potential. All the vegetables inhibited arginase, PDE-5, ACE, and AChE activity, with African spinach showing the most pronounced inhibition. *In silico* docking identified rutin, quercitrin, isoquercitrin, and orientin as leading bioactive candidates, displaying strong binding affinities and favourable interaction profiles with ED-associated protein receptors, thereby supporting their potential roles as natural erectogenic agents that could help improve erectile function and firmness. Collectively, these findings highlight phenolic-rich leafy vegetables as sources of antioxidant and enzyme-modulating compounds as functional dietary/adjunct therapeutic agents against ED.

NMBCW-27

Evaluation of Bioactive Phytoconstituents and Multifactorial Antioxidant Potential of *Acalypha wilkesiana* Leaf Aqueous Extract

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Medicinal plants remain an important source of therapeutic agents due to their rich bioactive constituents and antioxidant properties. *Acalypha wilkesiana* holds a prominent place in traditional medicine systems, particularly in Southwest Nigeria. The leaves are used for treatment of skin infections. This study investigated the phytochemical profile, mineral content, and antioxidant capacity of *Acalypha wilkesiana* leaf aqueous extract. Phytochemical screening revealed the presence of alkaloids, flavonoids, glycosides, saponins, terpenoids, and tannins. Total phenolic content (TPC) determined by the Folin-Ciocalteu method ranged from 0.4560 to 1.3726 mg GAE/g across concentrations of 50-800 µg/mL, with gallic acid equivalent concentration increasing from 48.01 to 144.48 µg/mL. Antioxidant activity was evaluated through multiple assays. The DPPH radical scavenging assay demonstrated very strong activity with percentages ranging from 96.24% to 100% across 50-100 µg/mL, reaching maximum scavenging at 800 µg/mL. Reducing power increased concentration-dependently from 15.19% at 50 µg/mL to 259.20% at 800 µg/mL. Metal chelation activity showed a dose-dependent increase from 37.61% at 125 µg/mL to 59.89% at 1000 µg/mL. Additionally, the extract exhibited measurable inhibition of lipid peroxidation in an egg yolk model, with percentage inhibition ranging from 9.72% to 22.18% across 50-800 µg/mL. These findings indicate that *Acalypha wilkesiana* leaf aqueous extract is rich in bioactive phytoconstituents, particularly saponins and tannins, and possesses potent antioxidant properties including free radical scavenging, reducing power, metal chelation, and lipid peroxidation inhibition, suggesting its potential as a natural source of antioxidants for therapeutic and nutraceutical applications.

NMBCW-28

GC-MS Analysis and Antioxidant Activities of Methanolic Leaves Extract of *Pennisetum pedicellatum*

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Pennisetum pedicellatum T. commonly called Desho grass, is a monocot angiosperm plant belonging to the family Poaceae. The plant has been used traditionally for treatment of several diseases such as hypertension, cancer, and diabetes and demonstrated pharmacological activities. This study aimed at evaluating the antioxidant activities and bioactive compounds present in methanolic leaves extract of *Pennisetum pedicellatum*. The *in vitro* antioxidant activity of the extract was evaluated using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging activity and ferric reducing antioxidant power (FRAP) methods. The bioactive compounds in the extract were detected using Gas Chromatography-Mass Spectroscopy (GC-MS) technique. The extract shows high free radical scavenging activity of 58.74 %, 65.98 %, 78.45 %, 86.23 %, and 94.55 % at 0.2 mg/mL, 0.4 mg/mL, 0.6 mg/mL, 0.8 mg/mL, and 1.0 mg/mL, respectively. Similarly, the extract exhibited significant ferric reducing antioxidant power up to 47.63 %, 56.35 %, 66.12 %, 73.04 %, and 85.72 %, at 0.2 mg/mL, 0.4 mg/mL, 0.6 mg/mL, 0.8 mg/mL, and 1.0 mg/mL, respectively. The GC-MS chromatogram of the extract was found to has a total of 11 bioactive compounds. The identified compounds and their concentration in the extract were in the order of 3-eicosene, (E)- (23.46 %), 1-octadecene (18.18 %), eicosane (15.57 %), tetracontane (10.02 %), carbonic acid (9.33 %), 5-octadecene, (E)- (7.15 %), 5-eicosene, (E)- (6.42 %), 1-hexacosene (3.28 %), dodecane (2.72 %), octacosane (2.06 %), and 7-hexadecene, (Z)- (1.81 %). Therefore, the present study indicated that methanolic leaves extract of *Pennisetum pedicellatum* demonstrated high significant antioxidant activities and contains various bioactive compounds that have been documented with several pharmacological activities.

NMBCW-29

Heliotropium indicum L. Attenuates High-Fat, High-Carbohydrate Diet-Induced Metabolic Dysfunction-Associated Steatotic Liver Disease in Rats via NRF2/HO-1 Activation and NF-κB Suppression

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Heliotropium indicum L. is an ethnomedicinal herb with a diverse array of phenolic and alkaloid constituents whose capacity to prevent diet-driven hepatic lipid accumulation has yet to be systematically investigated. The present study therefore examined whether whole *Heliotropium indicum* powder (HI) and its ethanolic extract (EHI) could prevent hepatic and metabolic deterioration in rats maintained on a high-fat, high-carbohydrate (HFHC) dietary regimen. The proximate composition of HI and the radical-scavenging capacity of EHI were determined prior to the intervention. Male Wistar rats were randomly allocated into four experimental groups: standard diet, HFHC diet, HFHC diet co-administered with HI, or HFHC diet co-administered with EHI, for a duration of 19 weeks. Endpoint assessments encompassed anthropometric indices, serum biochemical parameters, liver histopathology, immunohistochemical profiling, and immunoblot analyses. Animals maintained on the HFHC diet developed metabolic and hepatic perturbations bearing the hallmarks of early-stage metabolic dysfunction-associated steatotic liver disease (MASLD) when compared with standard-diet controls. Relative to HFHC controls, administration of either HI or EHI lowered circulating insulin levels and HOMA-IR scores, diminished hepatic lipid deposition, restored SOD1 and CAT activity, and downregulated the pro-inflammatory mediators NF-κB, IL-6, TNF-α, and IL-1β, with no significant change observed in GPx1 expression. NRF2 and HO-1 protein expression was upregulated by both treatments relative to the HFHC group; nuclear NRF2 translocation was more prominent in EHI-treated animals, whereas whole plant HI was more consistently associated with recovery of the anti-inflammatory cytokine IL-10. Collectively, these outcomes point to coordinated engagement of antioxidant-response and inflammatory-resolution mechanisms in the context of early-stage MASLD.These findings demonstrate that *Heliotropium indicum*, both as a whole plant preparation and as an ethanolic extract, affords significant hepatoprotection in HFHC-fed rats through the simultaneous induction of the NRF2/HO-1 cytoprotective pathway, attenuation of NF-κB-orchestrated inflammatory cascades, reversal of hepatic steatosis, and restoration of insulin sensitivity. These results underscore the pharmacological relevance of *Heliotropium indicum* as a promising hepatoprotective botanical, and future mechanistic studies incorporating confirmatory metabolite identification and pyrrolizidine alkaloid safety profiling are strongly encouraged.

NMBCW-30

Mycotoxin Contamination Analysis of Improved Varieties Maize (*Zea mays* L.) and Groundnut (*Arachis hypogaea* L.)

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Food-borne mycotoxins constitute a major concern to public health in many developing countries. Their consumption is associated with gastrointestinal illnesses. This study aimed to determine the level of mycotoxin contamination in improved varieties of Maize and groundnut. The growth of fungal species was determined using the spread-plate method after dilution (APHA, 2001). The yeast and mould count of the maize samples shows varying levels of fungal contamination across the different samples ranging from 0.014×10^4 CFU/g in Samma 17 to 0.080×10^4 CFU/g in Samma 53 whereas the yeast and mould counts of the groundnut samples (G1–G26) ranged from 0.020×10^4 CFU/g (G3) to 0.081×10^4 CFU/g (G26). Aflatoxigenic fungi in improved groundnut (*Arachis hypogea*) reveals a distinct contamination profile dominated by *Aspergillus parasiticus*, which constitutes 56% of the isolated fungi, followed by *Aspergillus flavus* at 44% whereas aflatoxigenic fungi in improved maize reveals a contamination profile dominated by *Aspergillus flavus*, which constitutes 63% of the isolated fungi, followed by *Aspergillus parasiticus* at 31% and *Aspergillus fumigatus* 6%. The results obtained indicates that the level of mycotoxin contamination is within the permissible limit by the regulatory agencies across the studied improved varieties of maize and groundnut. This is an indication that the improved varieties may have more resistance to contamination by mycotoxins.

NMBCW-31

Nutritional and Chemical Properties of Leaf Powder and Protein Isolate of an underutilised plant- *Lecaniodiscus cupanioides*

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Lecaniodiscus cupanioides Planch is a medicinal plant primarily used in traditional medicine, and is mostly found in tropical Africa. This study was designed to analyse the nutritional and some chemical properties of *Lecaniodiscus cupanioides*. The freshly harvested leaves were processed into two forms: leaf protein isolate (LPI) and whole leaf powder (WLP). The leaves were analysed using standard procedures according to AOAC. The moisture content of the leaves ranged from 5.48 ± 0.006 in leaf powder to 54.45 ± 0.008% in protein isolate, and crude protein ranged from 31.65 ± 0.006 in leaf powder to 18.17 ± 0.003% in protein isolate. Sodium, the most abundant mineral found in the plant and ranged from 344.44 ± 0.63 in leaf powder to 258.51±0.01mg/100g, followed by calcium, potassium, and magnesium, while copper is the lowest and ranged from 0.37 ± 0.01 to 0.58 ± 0.00mg/100g. The essential amino acids ranged from 0.62±0.01 to 0.77 ± 0.01% in tyrosine and in glycine 0.11±0.01 to 0.12±0.01%. There was a relatively high level of tannin, flavonoid, phenol, and terpenoid in the leafy vegetable powder sample, but low in saponin. The leaf powder (WLP) exhibited higher DPPH (2,2-diphenyl-1-picrylhydrazyl) and FRAP (Ferric reducing antioxidant power) antioxidant activities, at 59.58 ± 1.82% and 62.99 ± 0.16%, respectively. The percentage inhibitory properties of α-amylase, α-glucosidase, and angiotensin-converting enzyme were 61.90 ± 0.71%, 70.73 ±2.67%, and 55.74±1.48%, respectively. Vitamin A has a higher concentration in the leaf powder, which ranged from 2.85±0.06 in leaf powder to 0.17± 0.00mg/g. Both samples, especially the whole leaf powder, contain essential nutrients, antioxidant activities, vitamins, and inhibitory activity against angiotensin-1-converting enzymes, α-amylase, and α-glucosidase enzyme. Therefore, this medicinal plant, especially the leaf powder, can be a good source of functional food due to its nutritional content and health-promoting properties.

NMBCW-32

Comparative Nutritional Evaluation of Raw Bambara Groundnut (*Vigna subterranea*) and Soya Beans (*Glycine max*)

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Protein-energy malnutrition and micronutrient deficiencies remain public health challenges in many developing communities. Legumes serve as important sources of dietary protein, energy, minerals, and bioactive compounds that support human nutrition and metabolic health. Soyabeans and Bambara groundnut are valuable grain legumes cultivated in Africa due to their nutritional quality, affordability, and food security potential. However, comparative information on their nutritional and antinutritional characteristics under similar analytical conditions remains limited. This study evaluated the proximate composition, mineral elements, and antinutritional factors of raw Soyabean and Bambara groundnut seeds. Raw seeds were analysed using standard Association of Official Analytical Chemists procedures. All determinations were performed in triplicate, expressed as mean ± standard deviation, and compared using Student's *t*-test at $p < 0.05$. Soyabean showed significantly ($p < 0.05$) higher crude protein (36.99%), crude fat (17.99%), crude fibre (5.47%), ash (4.55%), and gross energy (4.108 kcal/g), whereas Bambara groundnut had higher carbohydrate (57.95%) and moisture (8.74%) contents. Soyabean contained higher phosphorus, iron, zinc, manganese, copper, and selenium, while Bambara groundnut exhibited higher sodium, potassium, calcium, and magnesium contents. Bambara groundnut showed higher phytate and oxalate levels, while soyabean had higher trypsin inhibitor activity and tannin content. Saponin content showed no significant difference ($p > 0.05$). The findings demonstrate that Soyabean and Bambara groundnut possess complementary nutritional attributes. In conclusion, appropriate processing methods may enhance their nutrient bioavailability, reduce antinutritional factors, and increase their contribution to food security and community well-being.

NMBCW-33

Comparative Evaluation of Mineral and Proximate Compositions of *Musa paradisiaca* (Linn.) Across Different Post-Harvest Weeks

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Plantain *(Musa paradisiaca)* is a major staple food in the tropical and subtropical regions, which is consumed in various ways at different maturity stages. It is rich in carbohydrate, and also a good source of minerals. There is however no comparative scientific data on the changes that occur in the mineral and proximate compositions on a weekly basis after harvest. This study therefore, evaluates the changes in mineral and proximate compositions of plantain within two weeks after harvest so as to ascertain when best it can be consumed for maximal mineral and health benefits. A bunch of matured plantain was harvested and authenticated. Four fingers were taken from the bunch on the day of harvest (week 0) then, one week (week 1) and two weeks (week 2) after harvest respectively; and were pulverised respectively. The mineral and proximate compositions were determined following standard protocols. The results show significant increase ($p < 0.05$) in potassium, calcium, sodium, and copper concentrations across weeks with the highest concentrations at week 2 of post-harvest. However, the concentration of iron was significantly high at week 1 of post-harvest, while the proximate values at weeks 0 and 1 were significantly better than at week 2. Consequently, it is inferred that *Musa paradisiaca* is richer in macro-minerals at week 2 of post-harvest, but richer in proximate values at weeks 0 and 1. Therefore, it should be consumed at week 2 after harvest for maximal macro-minerals nutrients, and between weeks 0 and 1 for enhanced proximate.

NMBCW-34

Assessment of Eating Behaviour, Food Security, Food Handling and Gut Microbiota Composition of Adolescent School Girls in Igabi LGA, Kaduna State

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Adolescence marks a developmental period of increasing autonomy from caregivers in many cognitive, social and behavioural domains, including food acquisition, preparation and consumption. This study was to assess the eating behaviour, food handling, food security and gut microbiota composition of adolescent school girls in Igabi LGA, Kaduna State. A cross-sectional study was conducted among 229 adolescent girls attending public and private secondary schools in the study area. The study revealed that private school girls have a higher frequency of 3 meals 90(89%) per day. 40(32%) of public school girls are more likely to skip breakfast. Also private school girls tends to choose healthier food choice 80(78%) while public school girls are more likely to eat out 80(63%). Food-security was markedly better in private schools (78% food-secure vs 48% public), with severe insecurity affecting (13%) of public pupils. Only (32%) of public-school participants reported proper storage and good hygiene was cited by (40%). *Staphylococcus species* is the most prevalent bacteria in private schools (28.2%) and public schools (18.3%). Relationship linked bacteria diversity to better regular meals, food secure and better hygiene practices ($p < 0.05$). Together, these results provide new insights into the complex relationships among eating habits, food security, food handling and gut microbiota composition during adolescence. Adolescence may represent a critical window of opportunity to promote healthy eating practices that shape a homoeostatic gut microbiota with health and life-long benefits.

NMBCW-35

Assessment of Glycaemic Index, Vitamins, and Mineral Composition of Cookies made with Composite Flour of Wheat, Orange-fleshed Sweet Potato, Oyster Mushroom and Avocado Pear Seed

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This study evaluated the glycaemic index, vitamin, and mineral compositions of cookies made with composite flour of four plants namely orange-fleshed sweet potato (O), oyster mushroom (M), avocado pear seed (A), and whole wheat flour (W). The composite formulations were wheat + orange-fleshed sweet potato + avocado seed flours (W.O.A-50:40:10 %), wheat + mushroom+ avocado seed flours (W.M.A-50:40:10 %), wheat + orange-fleshed sweet potato + mushroom flours (W.O.M-40:30:30 %), orange-fleshed sweet potato + mushroom+ avocado seed flours (O.M.A-40:40:20 %) and wheat flour only (W-100%). Glycaemic index of W.O.A composite was within recommended range relative to W (control). Vitamin results indicated a significantly higher ($P<0.05$) amount of vitamin A in W.O.A., but for vitamin B1 and B2, W had higher amounts than the composites, vitamin B3 and vitamin C were higher in W.M.A. while highest concentration of vitamin D was recorded in W.O.A. Vitamins E and K were higherin W.O.M. relative to W. Mineral results indicated that magnesium was higher in Wthan in the composites, calcium was higher in W.O.M, potassium and zinc higher in W.M.A. while sodium and iron were higher in W.O.A. relative to W. Apart from W.O.A. cookies, their glycaemic index suggests the composite flour cookies may not increase blood sugar if consumed. Thus, this study indicate the possible use of the studied mixture of composite flours to reduce the amount and total dependability on Wheatin making cookies that will produce similar or better nutrient outcomes in the face of world wheat scarcity.

NMBCW-36

Bioactive Composition, Antioxidant and Antimicrobial Activities of *Pentaclethra macrophylla* Seed Oil Extracted by Maceration

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African oil bean seed (*Pentaclethra macrophylla*) is a nutrient- and oil-rich legume widely consumed in West Africa and recognised for its diverse phytochemical constituents and bioactive potential. This study evaluated the phytochemical composition, antioxidant, antimicrobial, and lipid peroxidation inhibitory activities of *P. macrophylla* seed oil extracted using *n*-hexane by maceration. Proximate analysis identified the seed as a viable oil source with a crude fat content of 29.61%. Phytochemical profiling revealed abundant bioactive compounds, particularly phenols (434.87 mg/g) and flavonoids (108.34 mg/g), alongside alkaloids, saponins, tannins, terpenoids, steroids, and cardiac glycosides. Antioxidant activity was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2′-azinobis-(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS), and Ferric Reducing Antioxidant Power (FRAP) assays. The oil exhibited stronger radical scavenging activity against ABTS than DPPH, while FRAP analysis demonstrated substantial reducing power. Lipid peroxidation studies showed effective inhibition at lower concentrations. Antimicrobial activity was observed against *Staphylococcus aureus, Escherichia coli, Candida albicans,* and *Aspergillus flavus*, with greater susceptibility observed for *E. coli* and *A. flavus*. Fourier-transform infrared spectroscopy confirmed the presence of characteristic triglyceride functional groups, including ester, hydroxyl, and unsaturated fatty acid bonds. These results demonstrate *P. macrophylla* seed oil as a promising natural source of antioxidant and antimicrobial agents with potential applications in food preservation and pharmaceutical development.

NMBCW-37

Dietary Diversity and Anthropometric Outcomes among School-Going Adolescent Boys and Girls in Rimi Town, Katsina State, Nigeria

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Malnutrition during adolescence remains a critical issue, with significant implications for physical growth, cognitive development, and long-term health outcomes. Adolescents in Rimi Town, Rimi Local Government, face nutritional challenges, particularly due to inadequate intake of fruits and vegetables, which contributes to undernutrition and related health risks. This study aimed to investigate the nutritional status of school-going adolescents in Rimi Town, with a focus on anthropometric measurements, socio-economic factors, and dietary habits. A cross-sectional design was employed, involving the assessment of height, weight, BMI, MUAC, and dietary patterns, as well as socio-economic indicators such as parental education and employment. The results showed a steady increase in height, weight, and BMI with age, but many adolescents, especially females, had lower BMI values, indicating potential undernutrition. Socioeconomic factors such as low educational attainment and reliance on farming occupations were found to impact dietary diversity, with a heavy dependence on vegetables and insufficient intake of fruits, vegetables, and fruits. The study highlights the urgent need for targeted interventions to improve adolescent nutrition in the region through education, school-based programs, and policy reforms to enhance food security and promote healthier diets.

NMBCW-38

Ocimum gratissimum Attenuates Ethanol-Induced Oxidative Stress and Hepato-Renal Dysfunction

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While ethanol is widely used in social and medicinal contexts, its metabolic byproducts induce significant oxidative stress, leading to organ toxicity. *Ocimum gratissimum* (OG) is recognised for its antioxidant properties, yet its efficacy against ethanol-induced tissue damage remains insufficiently explored. This study evaluated the hydroethanolic extract of *Ocimum gratissimum* (OG) as a protective agent in ethanol-intoxicated rats. Five groups (n=5) were treated over 30 days to compare control, OG-only, ethanol-only, and pre-/post-treatment protocols. Ethanol exposure significantly increased malondialdehyde (MDA) and aspartate aminotransferase (AST) while decreasing glutathione (GSH) and total antioxidant capacity (TAC). Nephrotoxicity was evidenced by elevated creatinine and reduced protein levels. Administration of *O. gratissimum* (250 mg/kg) effectively attenuated these effects, significantly lowering AST and MDA while restoring GSH and TAC levels in liver homogenate. Furthermore, OG treatment normalised creatinine levels and improved protein level in kidney homogenate. The results suggest that *O. gratissimum* possesses potent antioxidant and tissue-stabilising properties, making it a viable candidate for the treatment of ethanol-induced hepato-renal injury. These findings demonstrate that *Ocimum gratissimum* exerts significant reno-protective and hepatoprotective effects against ethanol-induced oxidative damage. The extract shows high potential as a therapeutic agent for mitigating organ toxicity associated with alcohol consumption.

NMBCW-39

An *andrographis paniculata*-Based Diet Demonstrates Antidiabetic and Hepatoprotective Effects in Streptozotocin-Induced Diabetic Male Wistar Rats

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Diabetes mellitus is a major metabolic disorder with increasing global prevalence and associated complications. Medicinal plants are widely used as alternative therapies in low-income countries. *andrographis paniculata* (king of bitters) is traditionally used in Nigeria for diabetes management, but scientific validation remains limited. Qualitative and quantitative phytochemical analyses were conducted. Male Wistar rats (n = 5) were pretreated for 28 days with a basal diet, metformin (14.3 mg/kg body weight), and diets containing 0.5%, 1%, or 3% powdered *A. paniculata* leaves prior to streptozotocin-induced diabetes. Phytochemical analysis revealed flavonoids (4.21 ± 0.02), abundant saponins (82 ± 2.08), phenols (48.09 ± 0.03), tannins (25.52 ± 0.22), steroids, and alkaloids. Pretreatment with metformin and *A. paniculata* significantly reduced blood glucose levels (126 ± 0.70 to 103.5 ± 6.36; 108.2 ± 5.72 to 99.72 ± 4.73; 99.63 ± 4.84 to 97.67 ± 24.20; and 95 ± 34.71 to 87.94 ± 13.40) compared with untreated diabetic rats (111.89 ± 16.26 to 150.33 ± 14.36). Lipid profile and antioxidant markers (CAT, SOD, GSH) improved significantly ($p < 0.05$), with dose-dependent effects. Dietary *A. paniculata* exhibits antidiabetic, hypolipidaemic, and antioxidant properties and may serve as a functional dietary prophylactics.

NMBCW-40

Investigating the *in vitro* Bioactivities of *Boswellia dalzielii*: Anti-inflammatory, Wound healing, Enzyme inhibition, and Antimicrobial Effects of Leaf vs. Stem bark Extracts

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Boswellia dalzielii (Burseraceae) (*B. dalzielii*) is traditionally used in West Africa to treat wounds, inflammatory skin disorders, mental conditions, and microbial infections. Despite its ethnomedicinal importance, its dermatological potential has not been fully validated scientifically. This study evaluated the comparative *in vitro* effects of aqueous leaf (BDL) and stem bark (BDSB) extracts on skin-relevant bioactivities.HaCaT keratinocytes were used to assess cytocompatibility and wound-healing potential via viability and scratch assays. Anti-inflammatory activity was measured by TNF-α/IFN-ɣ-induced production of nitric oxide and cytokines (IL-6, IL-8). Enzyme-inhibitory activity against collagenase, elastase, and hyaluronidase was determined, and antibacterial effects were tested against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Both extracts were highly cytocompatible, maintaining keratinocyte viability and morphology at 25–200 µg/mL. They enhanced cell migration in scratch assays, with BDSB showing superior wound-healing effects. Treatment with the extracts significantly ($p < 0.05$) reduced nitric oxide, IL-6, and IL-8 levels, reflecting pronounced anti-inflammatory effects. Both extracts inhibited collagenase, elastase, and hyaluronidase, indicating preservation of extracellular matrix integrity. Antibacterial testing showed strong activity against *S. aureus* (MIC = 0.31 mg/mL), while *P. aeruginosa* was inhibited only at higher concentrations (10 mg/mL). This study provides the first comparative *in vitro* evaluation of *B. dalzielii* leaf and stem bark extracts across multiple dermatologically relevant activities. The findings offer scientific support for its traditional use in wound healing, inflammation modulation, and antimicrobial therapy, highlighting its potential as a natural source for skin health applications.

NMBCW-41

Quantitative Evaluation of the Nutritional and Antinutritional Factors in Dried *Solanum lycopersicum* (tomato) Sold in Gboko Market, Benue State

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Solanum lycopersicum (tomato) is an admired and widely consumed fruit that has the challenge of being seasonal due to its short shelf life and limited processing facilities. The drying of tomato has gradually been embraced as a traditional way to bridge the gap created by its availability during the wet and dry seasons. This study was carried out to determine the quality of dried *Solanum lycopersicum* through proximate analysis and the measure of the antinutritional factors in the fruit since the value of food is determined by the presence of the nourishing compounds or the measure of the deleterious antinutrients. The result of the proximate analysis revealed 63% of carbohydrates, 24% moisture, 7% protein, 4% ash content, 1% crude fat and 1% crude fibre. The amount of antinutrients in phytic acid (0.64285%), saponin (0.63935%), oxalate (0.2747%), HCN (0.19135%), trypsin inhibitor (0.1246%) and tannins (0.064715%) were also determined. The result shows that the dried tomato obtained from the area has good energy content, an appreciable amount of protein and an ash content that is indicative of its vitamins. The low antinutrients found in most of the factors analysed attract their potential health importance. The drying of tomato could also be embraced and used as a local method of preservation owing to its good nutritional content, low antinutrients and cost friendliness.

NMBCW-42

The Ultra-Processed Food Transition in Sub-saharan Africa: Consumption Patterns, Demographic Vulnerabilities and Cardiometabolic Consequences

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Sub-Saharan Africa is undergoing a rapid nutritional shift, moving from traditional, high-fibre diets toward the increased consumption of industrially manufactured ultra-processed foods (UPFs). This systematic review, based on a comprehensive search of literature from 2009 to 2026, investigates the patterns and health impacts of this transition. The proliferation of UPFs is largely driven by urbanisation, the spread of international food retailers, and their growing affordability. This trend presents distinct risks, with children and women being particularly vulnerable due to targeted marketing and socioeconomic pressures. Mechanistically, these products contribute to metabolic dysfunction through gut microbiome disruption, inflammation, and appetite dysregulation. Critically, a 10% increase in dietary UPFs is associated with a 12% higher risk of type 2 diabetes. This "nutrition transition" exhibits a socioeconomic inversion, where UPFs have shifted from luxury items to dietary staples for the urban poor, creating a dual burden of obesity and micronutrient deficiency, especially in children. The proliferation of UPFs poses a substantial threat to public health and economic progress in the region. Consequently, effective interventions necessitate context-specific policies, such as simplified front-of-pack warning labels, strategic tariffs, and marketing regulations that include the informal food sector, moving beyond conventional approaches developed for Western populations.

NMBCW-43

Effect of Drying Methods on the Antioxidant, Phytochemical, and Mineral Content of *Talinum triangulare* (Water Leaf)

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Drying is one of the oldest and most widely used methods of food preservation. Different drying techniques affect food in different ways. This study investigated the effect of different drying methods on the antioxidant activity, phytochemical composition, and mineral content of waterleaf (*Talinum triangulare*). Fresh waterleaf samples were obtained from Coke Village Market, New Site Bayero University, Kano, Nigeria and subjected to three drying methods: sun-drying, shade-drying, and oven-drying. The dried samples were pulverised into powder and analysed using standard laboratory procedure of Trease and Evans. Qualitative phytochemical screening revealed the presence of several bioactive compounds, including alkaloids, flavonoids, phenols, terpenoids, steroids, cardiac glycosides, Coumarin, glycosides, and anthraquinones. Quantitative phytochemical analysis showed that the drying methods significantly influenced the concentration of these bioactive compounds. Shade-dried samples recorded higher levels of Flavonoids (15.29 ± 1.68 mgQE/g), phenols (176.3± 0.67 mgGAE/g), and Saponins (1.36 ± 0.09mgSE/g), indicating better preservation of heat-sensitive Phytochemicals. The antioxidant activity of the extracts was evaluated using the DPPH radical scavenging assay. The results indicated that all extracts exhibited considerable antioxidant activity, which increased with increasing concentrations. The IC50 values confirmed the antioxidant potential of the samples, with the shade-dried extract (5.30 ± 1.29 µg/ml) showing slightly stronger activity compared with oven-dried (6.15 ± 2.90µg/ml) and sun-dried (8.12 ±1.19µg/ml) samples which shows a significant difference at ($p<0.05$). The Mineral analysis revealed the presence of essential elements, including potassium, calcium, iron, magnesium, and sodium, with potassium being the most abundant. These findings demonstrate that Shade-drying may be recommended for household or small scale preservation of waterleaf because it better retains antioxidant and phytochemical quality, with possible benefits for nutritional value. Further research should be carried out on Macronutrient, Nutritional and anti-nutritional factors of these plants.

NMBCW-44

Hypolipidaemic Potential of a Polyherbal Aqueous Extract in Alloxan-Induced Diabetic Wistar Rats

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Dyslipidaemia and cardiovascular anomalies are strongly associated with hyperglycaemia. Plants contain important bioactive compounds that can aid in the management of diabetes mellitus. Hence, this study evaluated the effect of a polyherbal aqueous extract on plasma lipid profile and atherogenic indices in alloxan-induced Wistar rats. Forty Wistar rats were randomly divided into eight groups (5 rats each) entitled: normal control; test control (diabetes induced, untreated); T-100mg, T-200mg, and T-300mg (treatment groups induced and treated with 100mg/kg, 200mg/kg, and 300mg/kg of the polyherbal extract respectively); TC-100mg, TC-200mg, and TC-300mg (treatment control groups non-induced, but administered 100mg/kg, 200mg/kg, and 300mg/kg of the extract respectively). Diabetes was induced through a single intraperitoneal injection of a freshly prepared alloxan solution (160 mg/kg body weight). The polyherbal aqueous extract was prepared from a combination of five selected herbs and administered orally for two weeks. Blood samples were collected under chloroform anaesthesia, and lipid profile parameters were analysed. The normal control and treated groups had significantly (p<0.05) lower total cholesterol, LDL, and non-HDL, but higher HDL cholesterol concentrations than the test control. Triglyceride and VLDL cholesterol concentrations of all treated groups did not differ significantly from the normal control, with T-300mg having significantly (p<0.05) lower values than the test control. Castelli's risk index-II, atherogenic coefficient, and cardiac risk ratio of the test control were significantly (p<0.05) higher than the normal control and all treatment groups except T-100mg. Therefore, the polyherbal extract has the potential to ameliorate plasma lipid profile alterations and cardiovascular complications associated with diabetes.

NMBCW-45

Antidiabetic effect of dry and fresh hydroethanolic leaf extracts of *Carica papaya* in high-fat diet and STZ-induced diabetes mellitus

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The International Diabetes Federation reported in Diabetes Atlas 2019 that 463 million adult possess Diabetes mellitus and future predictions show that these figures will rise to 46 % by 2045. Diabetes mellitus causes complication such as dyslipidaemia. The study evaluated the antidiabetic effect of fresh and dried *Carica papaya* leaf extracts in high fat diet and streptozotocin-induced diabetic rats. A total of 66 male Wistar rats was divided into eleven groups with six animals in each group and were acclimatised for fourteen days. The groups include; normal control, diabetic control, metformin control (14 mg/kg bwt), Dried extract only (400 mg/kg bwt), Dried extract only (200 mg/ kg bwt), Fresh extract only (400 mg/kg bwt), Fresh extract only (200 mg/kg bwt), Induced + dried extract only (400 mg/ kg bwt), Induced + dried extract (200 mg/kg bwt, Induced + fresh extract (400 mg/kg bwt), and Induced + fresh extract (200 mg/kg bwt). Diabetes was induced in the rats with high fat diet and streptozotocin (i.p., 55 mg/kg bwt) except the normal control and the extracts only groups. Treatment with extracts and metformin followed after 72 hrs of induction. On the 15th day, the animals were sacrificed and blood serum was prepared for biochemical analysis. The concentrations of insulin, inflammatory biomarkers, and lipid profile parameters were evaluated. Diabetic rats treated with the dried extract at 200 mg/kg bwt significantly ($p<0.05$) increased the insulin concentration when compared to the diabetic control. Both extracts significantly ($p<0.05$) reduced the concentrations of lipid profile parameters in diabetic rats: TG, TC, LDL-c, VLDL-c and TNF- α and significantly ($p<0.05$) increased the HDL-c. Meanwhile the fresh extract at 400 mg/kg profoundly significantly ($p<0.05$) reduced the concentrations of lipid profile parameters profoundly in diabetic rats: from TG (79.26 ± 4.239 mg/dl), TC (61.98 ± 1.347 mg/dl) to TG (56.94 ± 0.763 mg/dl) and TC (36.56 ± 0.917 mg/dl). The extracts demonstrated antidiabetic effect by lipid-modulating effect and increasing the level of insulin. Thus, *Carica papaya* leaf is suggested to be a promising source of antidiabetic drug.

NMBCW-46

Chlorogenic Acid Mitigates Phenyl Hydrazine-Induced Haemolytic Anaemia and Associated Oxidative Stress in Swiss Mice

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Haemolytic anaemia has been the bane of several blood borne diseases like malaria, and it appears intractable especially in endemic areas like the tropics and developing economies. The potential ability of nutraceuticals are being investigated as affordable haematinics. Chlorogenic acid (CGA) is a plant-based polyphenol widely distributed in the diet, with therapeutic capacities. This study is designed to investigate the haematinic property of chlorogenic acid using phenyl hydrazine-induced haemolytic anaemia model in mice. Fifty-four adult male Swiss mice were used for the study. Forty-eight mice were administered 40 mg/kg dose of phenyl hydrazine (PHZ) intraperitoneally twice at 12 hours interval to induce anaemia. Those animals that were confirmed to be anaemic were weight-matched into seven groups(n = 6/group) as follows: Group I- untreated non-anaemic animals received distilled water only, Group II- PHZ only, Group III- PHZ + ferrous sulphate (2 mg/kg), Group IV- PHZ + CGA (3.75 mg/kg), Group V- PHZ + CGA (7.5 mg/kg), Group VI- PHZ + CGA (15 mg/kg), Group VII- PHZ + CGA (30 mg/kg). The treatment with chlorogenic acid was by oral gavage for 5 consecutive days. On day 6, blood specimens were obtained for haematological parameters. The liver and spleen were excised, weighed and processed for antioxidant assay, oxidative stress markers and liver function test. Chlorogenic acid reversed the perturbations in the haematological indices, reduced oxidative stress, and elevated bilirubin associated with exposure to phenyl hydrazine at the exposures of 15 and 30 mg/kg. Chlorogenic acid possesses significant haematinic potential at moderate doses.

NMBCW-47

Protective effect of *Garcinia kola* seed ethanolic extract against doxorubicin-induced oxidative stress in Wistar rats

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This study examined the effect of an ethanolic extract of *Garcinia kola* seed on doxorubicin-induced oxidative stress in Wistar rats. Doxorubicin (DOX)-induced oxidative injury was achieved by intraperitoneal administration of a cummulative dose of 15 mg/kg body weight delivered in six divided doses over a two week period. Thirty (30) rats wSSere randomly assigned into six groups of five animals each (n = 5): Normal Control (NC), Garcinia kola extract alone (GK), DOX only, DOX+G.kola extract (250mg/kg), DOX+G.kola (500mg/kg) and DOX+Simvastatin (5mg/kg). Garcinia kola extract and simvastatin treatments were administered orally in 14 divided doses over four weeks, comprising two weeks of pretreatment followed by two weeks concurrent with doxorubicin administration. At the end of the treatment term, oxidative stress biomarkers including reduced glutathione (GSH) and malondialdehyde (MDA) concentration, and also cardiac injury markers lactate dehydrogenase (LDH) and creatine kinase (CK) activities were evaluated. Cardiac tissues were also examined histopathologically. Results obtained from the study showed that administration of doxorubicin resulted in significant increase of myocardial oxidative stress as evidenced by elevated MDA and depletion of GSH concentration compared with the normal control group ($p < 0.05$). Treatment with G. kola ethanolic extract produced dose-dependent antioxidant and cardioprotective effects as the 500 mg/Kg dose markedly reduced lipid peroxidation and restored GSH toward normal values relative to the DOX-treated group ($p<0.05$). The activities of Creatine kinase (CK) and lactate dehydrogenase (LDH) (IU/L) were respectively recorded as follows; NC (32.00±1.50; 55.25±0.5), DOX (38.83±1.20; 81.75±2.75), GK (29.07±0.63; 61.25±2.06), DOX+Garcinia kola 250 mg/kg (26.45 ± 1.48; 68±2.94), DOX+Garcinia kola 500 mg/kg (18.60 ± 1.65; 73.5±3.42), and DOX+Simvastatin (18.88 ± 1.09; 40.5±1.73). Doxorubicin treatment significantly elevated CK and LDH activities compared with the normal control ($p < 0.05$), indicating myocardial injury. However, co-administration of Garcinia kola extract significantly attenuated these alterations in a dose-dependent manner when compared with the DOX-only group ($p < 0.05$). Histopathological findings further corroborated these biochemical results, showing reduced myocardial degeneration and oxidative damage in Garcinia kola-treated groups relative to the untreated DOX group. In conclusion, ethanol seed extract of Garcinia kola demonstrated significant antioxidant and cardioprotective activities against doxorubicin-induced cardiotoxicity likely mediated through attenuation of oxidative stress and preservation of myocardial integrity. These findings strongly support the therapeutic potential of Garcinia kola as natural cardioprotective agent

NMBCW-48

Proximate Analysis of Fortified Sorghum Flour Produced in Federal University of Education Pankshin, Plateau State, Nigeria

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In synthesis, fortified sorghum flour represents a persuasive solution to protein-energy malnutrition, with Nigerian, African, and international studies agreeing on its nutritional benefits. This study aims to evaluate the proximate analysis of fortified sorghum flour produced in Federal University of Education Pankshin, Plateau State, Nigeria. A laboratory-based experimental design was adopted. Both sorghum, millet, finger millet, acha, soybean, tiger nuts, and dried date fruits were purchased from the daily market in Pankshin. Dried samples were milled into fine flour, sieved, packaged in airtight sterilised containers then transported to the Biochemistry Department of the National Veterinary Research Institute (NVRI), Vom, for proximate analysis. The parameters observed includes Moisture content (6.3 ± 0.29), crude protein (28.41 ± 0.48), crude fibre ((4.67 ± 0.56), ash content (5.78 ± 0.45), nitrogen-free extract (NFE) (77.97 ± 0.53). and crude fat (5.62 ± 0.50), respectively. Mineral analysis revealed that calcium was higher in fortified sorghum (1.58 ± 0.33) compared to unfortified sorghum (0.57 ± 0.04), though the difference was not statistically significant ($p > 0.05$). Phosphorus content showed no significant difference between the two groups. The metabolisable energy (M.E) of fortified sorghum was significantly higher (363.97 ± 0.15). However, there was a significant statistical difference betweenproximate composition analysis of fortified and unfortified sorghum (P = 0,000, $P<0.05$). Fortified sorghum flour contained significantly higher levels of crude protein (28.41% vs. 8.56%), crude fat (5.62% vs. 1.69%), crude fibre (4.67% vs. 3.63%), ash (5.78% vs. 4.74%), and metabolisable energy (363.97 kcal vs. 354.86 kcal) compared to the unfortified sample. Moisture content was slightly higher in fortified flour (6.3% vs. 5.84%) while carbohydrate (NFE) was significantly lower in fortified flour (52.32% vs. 77.97%). These findings demonstrated that fortification of sorghum flour substantially produces clear nutritional and sensory benefits, while unfortified sorghum retained higher carbohydrate (NFE) values. Nutrition education campaigns should raise awareness among students about the benefits of fortified sorghum flour as a cost-effective dietary improvement. Both local farmers and food processors should be trained to adopt fortification practices that optimise nutrient retention and consumer acceptability.

NMBCW-49

Effect of Some Medicinal Plants on Weight Changes in an Experimental Rat Model

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Traditional African medicinal plants have been utilised in supporting digestive, metabolic, antiinflammation and antioxidant functions. This study investigated the effects of local medicinal plants *Irvingia gabonensis*; bush mango (IG), *Abelmoschus esculentus*; okra (AE), *Hunteria umbellata*, osu (HU) on body weight changes in rodents. Proximate composition of the sample medicinal plants was determined using standard methods. Fifty-four (54) male Wistar rats after a period of acclimatisation, were divided into nine (9) groups of six (6) animals each, and for thirtysix (36) days were fed *ad libitum* formulated diets as follows: Group 1 - normal rat pellet, Group 2 - Fybogel 1.5g, Group 3 - Fybogel 3.0g, Group 4 - IG 5.0g, Group 5 - IG 10.0g, Group 6 - AE 5.0g, Group 7 - AE 10.0g, Group 8 - HU 5.0g, Group 9 - HU 10.0g. Group 1 served as normal control, while Groups 2 and 3 served as positive controls. All diets were isocaloric. Weights of rats were recorded at the beginning and end of the experimental period, and percentage body weight changes calculated. AE recorded the highest fibre content of 24.37±0.65% followed by HU with 19.80±1.56% and IG with 15.57±1.10%. Carbohydrate content was highest with IG (58.86±1.73%), HU recorded 55.35±2.93%, while the significantly lower value of 38.19±0.77% was recorded for AE. Ash content of IG (6.17±1.40%) was the lowest, with AE and HU recording comparative levels of 9.23±1.65% and 9.90±0.62% respectively. Compared to the controls, rats fed the IG diets gained the least weight 4.5% and 1.9%, followed by rats on the AE diet 27.1% and11.8% respectively. There was no difference ($P>0.05$) in percentage weight gain of rats on the HU 10.0g diet compared to the rats on the normal control diet. The results suggest plant fibres, particularly in the context of traditional medicinal plants, modulate weight changes which may ultimately dictate their potential therapeutic applications. The drastic reduction in weight of rats on the IG diet suggests it may have an anti-obesogenic effect and influence gastrointestinal function and overall health.

NMBCW-50

Formulation and Multinutrient Fortification of Commonly Consumed Complementary Foods in Karshi, Abuja, Nigeria

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Adequate nutrition during infancy is essential for optimal growth and development. Traditional complementary foods in Nigeria are predominantly carbohydrate-based and often deficient in essential nutrients. This study evaluated the formulation, nutritional composition, and sensory acceptability of carrot-fortified complementary foods developed from locally available ingredients in Karshi, Abuja, Nigeria. A community-based survey involving 330 mother-child pairs was conducted using a semi-structured questionnaire to identify commonly consumed complementary foods. Complementary food formulations were produced from sorghum, soybean, groundnut, date fruit, and carrot using standard processing methods including soaking, boiling, blanching, roasting, drying, and milling. Three carrot-fortified formulations (FCF1, FCF2, and FCF3) containing 15%, 10%, and 5% carrot, respectively, were developed alongside control samples: pap (100% sorghum) and Tom Brown (sorghum-soybean-groundnut blend). Proximate composition, mineral, vitamin, amino acid, and anti-nutrients were determined, while sensory evaluation was conducted using a 9-point hedonic scale. The carrot-fortified complementary foods had significantly improved nutritional quality compared to traditional pap. FCF3 recorded the highest protein content (18.32±0.09%), while FCF1 contained the highest levels of iron (46.74±1.68 mg/100 g), zinc (8.45±0.64 mg/100 g), calcium (67.66±1.57 mg/100 g), and vitamin A (1.230±0.007 mg/100 g). FCF2 demonstrated superior amino acid composition, particularly lysine, phenylalanine, and methionine, and achieved the highest overall sensory acceptability score (6.33±1.37). All anti-nutritional factors were within acceptable safety limits. The study demonstrates that carrot fortification significantly enhances the nutritional value and acceptability of complementary foods. FCF2 shows strong potential as a cost-effective, locally produced complementary food to improve infant nutrition and reduce micronutrient deficiencies in resource-limited settings.

NMBCW-51

Quercetin and Ascorbic Acid as Nutritional Interventions against Arsenic-Induced Nephrotoxicity: Protecting Kidney Function and Tissue Integrity in Obese Wistar Rat Model

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Co-existence of obesity and arsenic exposure is linked to increases oxidative stress and kidney damage, with complications potentiallyinfluenced by individual's body mass index status. This study evaluated the protective effects of quercetin and ascorbic acid in mitigating arsenic toxicity in obese vs non-obese Wistar rats. 70 male Wistar rats, 135-220g, were grouped into 10 groups (n=7) of non-obese and obese rats. Obesity was induced by high fat diet. A/ F: control non-obese/obese; B/G: sodium arsenite 0.75 mg/kg bodyweight (5% LD50); C/H: sodium arsenite + quercetin 50mg/kg/kg bodyweight (10% LD50); D/I: sodium arsenite + ascorbic acid 595 mg/kg bodyweight (10% LD50); E/J: sodium arsenite + quercetin + ascorbic acid. All treatments were administered orally daily for 28 days. Kidney function was assessed by measuring serum biomarkers including urea, creatinine, uric acid, electrolytes and its integrity was evaluated by H&E histology. Data were presented as mean±SD, one-way ANOVA, $p<0.05$. Arsenic exposure significantly increased ($p<0.05$) body weight, kidney weight, serum urea, creatinine, and uric acid in both groups with obese rats showing greater elevation. Co-treatment with quercetin and ascorbic acid significantly reduced ($p<0.05$) markers in obese rats and improved kidney architecture compared to sodium arsenite only groups. Single treatments were less effective than co-treatment across all groups. Dietary supplementation with quercetin and ascorbic acid mitigated arsenic-induced kidney injury, with enhanced protection in obese rats. These findings support nutritional antioxidant interventions as practical strategies to reduce arsenic burden and improve community wellbeing in nutritionally vulnerable populations.

NMBCW-52

Effects of a Polyherbal Formulation on High Fat Diet/Streptozotocin-Induced Type-2 Diabetic Nephropathy in Rats

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Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder associated with oxidative stress and renal dysfunction, necessitating the development of safer and more effective therapeutic agents. This study investigated the nephroprotective effects of a polyherbal formulation (PHF) containing *Parinari curatellifolia* (25%), *Annona muricata* (10%), *Garcinia kola* (10%), *Allium cepa peel* (15%), *Musa paradisiaca peel* (25%), and *Spondias mombin* (15%) in streptozotocin-induced diabetic rats. Male Wistar rats were induced with T2DM using streptozotocin (35 mg/kg) and divided into normal control, diabetic control, metformin-treated (150 mg/kg), and PHF-treated groups (200 and 400 mg/kg) for 14 days. Fasting blood glucose (FBG), oxidative stress biomarkers, lipid peroxidation (LPO), nitric oxide (NO), renal function indices (creatinine, urea, and uric acid), and kidney histopathology were evaluated. PHF administration significantly reduced fasting blood glucose levels compared with the diabetic control group ($p < 0.0001$). Treatment also significantly enhanced antioxidant defences, evidenced by increased superoxide dismutase (SOD), glutathione (GSH), glutathione peroxidase (GPx), and catalase activities, alongside reduced lipid peroxidation and nitric oxide levels. Renal function markers, including creatinine, urea, and uric acid, were significantly lowered in PHF-treated groups. Histopathological findings further demonstrated marked improvement in renal architecture following PHF treatment. These findings suggest that the polyherbal formulation possesses potent antidiabetic, antioxidant, and nephroprotective properties, indicating its potential as a therapeutic candidate for the management of diabetes-associated renal complications.

NMBCW-53

Comparative Antioxidant Activity and SDS-PAGE Leaf Protein Profiling of Six Indigenous Nigerian Leafy Vegetables

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Leafy vegetables are inexpensive, readily accessible sources of essential vitamins, minerals, and bioactive compounds that play vital roles in human nutrition and health. This study investigated the antioxidant activities and SDS-PAGE leaf protein profiles of six indigenous Nigerian leafy vegetables: *Telfairia occidentalis*, *Corchorus olitorius*, *Cnidoscolus aconitifolius*, *Talinum triangulare*, *Moringa oleifera*, and *Manihot esculenta*, obtained from Covenant University (CU) and Ibeshe (IB) town in Ogun State, Nigeria. Antioxidant potential was evaluated using four standard assays: 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay, Ferric Reducing Antioxidant Power (FRAP), Total Antioxidant Activity (TAA), and Total Antioxidant Capacity (TAC). For CU samples, FRAP values ranged from 0.933–1.494, DPPH scavenging activity from 81.26%–90.67%, TAA from 0.679–2.57, and TAC from 0.31–0.491. For IB samples, FRAP ranged from 0.776–2.516, DPPH from 81.65%–89.98%, TAA from 0.68–2.298, and TAC from 0.183–0.477. SDS-PAGE analysis revealed nine distinct protein bands with molecular weights ranging from 20–70 KDa, indicating notable protein diversity among the vegetables. The results demonstrate that these leafy vegetables possess significant antioxidant properties and nutritional proteins that may help combat oxidative stress, prevent chronic diseases, and ameliorate malnutrition in vulnerable populations.

NMBCW-54

Nutritional Characterisation of Commercial Granola Snacks: Implications for Metabolic Disease Prevention and Experimental Validation

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Granola snacks are increasingly promoted for the prevention and management of metabolic diseases due to their composition of whole grains, nuts, and bioactive compounds. However, scientific validation of these claims requires preliminary evaluation of their nutritional composition. This study therefore assessed the nutritional profile of selected granola snack brands sold in Calabar, Cross River State, Nigeria, as a basis for subsequent validation in animal models. Five granola brands were purchased from supermarkets in Calabar and coded A–E. Samples were homogenised prior to analysis. Proximate composition was determined using standard AOAC methods. Mineral content was analysed using Atomic Absorption Spectroscopy, while phosphorus was determined using UV spectrophotometry (HACH method). Vitamin, carbohydrate, and amino acid profiles were analysed using High-Performance Liquid Chromatography (HPLC), while fatty acid composition was determined using Gas Chromatography (GC). Moisture content ranged from 3.75–4.65%, indicating good shelf stability. Sample E showed the highest fat (25.09%), fibre (18.78%), and protein (25.10%), while sample C had the highest carbohydrate content (72.05%). Minerals such as calcium (19.05–26.42 mg), potassium (12.85–24.42 mg), magnesium (1.03–2.41 mg), and iron (0.82–1.28 mg) were present across samples. Vitamins A, C, D, K, and B-complex were detected. Carbohydrate profiling revealed simple and complex sugars including inulin, suggesting potential prebiotic benefits. Fatty acid analysis identified both saturated and unsaturated fatty acids, notably oleic and linoleic acids. All samples contained essential amino acids, indicating good protein quality. Nutritional variability reflects differences in ingredient composition and may influence their metabolic health benefits. The granola snacks demonstrated nutrient-dense profiles supportive of potential roles in metabolic health. However, variability among brands highlights the need for further *in vivo* studies to validate their efficacy in metabolic disease prevention and management

NMBCW-55

Assessment of *Heliotropium indicum* Supplemented Cookies on Prostate Enlargement and biochemical markers in Testosterone-Induced Benign Prostatic Hyperplasia Rats

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Benign prostatic hyperplasia (BPH) is a progressive enlargement of the prostate gland associated with increased prostate mass and altered growth dynamics. This study evaluated the effect of *Heliotropium indicum* supplemented cookies on prostate size, prostate index, percentage inhibition, and percentage recovery, serum prostate-specific antigen (PSA) and dihydrotestosterone (DHT) in testosterone-induced BPH in rats. Male Wistar rats were divided into normal control, testosterone-induced BPH (negative control) rats, BPH rats treated with finasteride as the standard treatment, while other treatment groups received diets containing 5% and 10% inclusion levels of *Heliotropium indicum* supplemented cookies. The experiment lasted for 28 days. At the end of the experimental period, prostate weight and prostate index were calculated, percentage inhibition of prostate growth and percentage recovery were calculated. Serum prostate-specific antigen (PSA) and dihydrotestosterone (DHT) levels were also determined. Untreated BPH had significant ($p < 0.05$) increased prostate weight and prostate index when compared to the normal control, with corresponding elevations in PSA and DHT levels. Treatment with *Heliotropium indicum* supplemented cookies significantly reduced prostate size when compared with the untreated BPH, alongside a reduction in PSA and DHT levels. The treated groups demonstrated substantial inhibition of prostate growth, with percentage inhibition increasing progressively across doses (approximately moderate inhibition at lower dose to high inhibition at higher dose). Percentage recovery showed a progressive increase across the treatment groups, with lower inclusion level exhibiting relatively reduced recovery and higher inclusion level indicating marked improvement toward normal prostate size. These findings indicate that *Heliotropium indicum* cookies supplemented possess significant anti-hyperplastic effect and demonstrate strong restorative effects on prostate morphology, supporting their potential as a functional dietary intervention for management of BPH.

NMBCW-56

Proximate Composition and Fatty Acid Profile of Two Brands of Beef and Chicken Sausages Consumed in Port Harcourt

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Processed meat products such as sausages consist of minced meat combined with various non-meat ingredients and additives. This study evaluated the proximate and fatty acid profiles of two brands of beef (Samples A and B) and chicken (Samples C and D) sausages using AOAC method and GC-MS respectively. The proximate analysis showed that moisture content ranged from 54.58±13.90% (sample D) to 73.01±0.21% (sample A). Ash content was generally higher in chicken sausages, particularly Sample D (3.257±0.03%). Lipid levels varied considerably, ranging from 2.90±0.13% (sample C) to 10.33±3.15% (sample D). Crude protein contents were comparable across all samples. There was observed differences in carbohydrate and crude fibre contents. Fatty acid profiling revealed the presence of both saturated and unsaturated fatty acids in all samples. Beef sausages generally contained higher levels of saturated fatty acids particularly palmitic and stearic acids. Sample A recorded the highest palmitic acid content (6.99±0.01ppm) whereas the highest level among chicken sausages was observed in Sample C (0.77±0.01ppm). Similarly, Sample B had the highest stearic acid content (16.95±10.05ppm), compared with Sample D (1.78±0.21ppm) among chicken sausages. Essential polyunsaturated fatty acids, including linoleic, α-linolenic and arachidonic acids, were detected across samples. Overall, chicken sausages demonstrated a more favourable nutritional profile, characterised by lower saturated fat levels, higher unsaturated fatty acid content and mineral levels, while the higher saturated fat content of beef sausages may have implications for cardiovascular health if consumed excessively. Chicken sausages may therefore represent a healthier option.

NMBCW-57

The Effect of Cooked and Grilled *Arachis hypogaea* (Groundnut) Seeds on Lipid Profile of Wistar Albino Rats

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Arachis hypogaea (Groundnut) rich in healthy fats and has been recognised for their potential in cardiovascular health. However, the impact of different cooking methods on lipid profile still remains unclear. This study evaluated the effects of dietary inclusion of grilled and cooked groundnut (*Arachis hypogaea*) on lipid profile parameters in Wistar albino rats. Animals were assigned into five groups: normal control (Group A), 25% grilled groundnut (Group B), 50% grilled groundnut (Group C), 25% cooked groundnut (Group D), and 50% cooked groundnut (Group E), with respective proportions incorporated into standard rat chow. Lipid profile indices including total cholesterol (TCHOL), triglycerides (TRIG), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL) were determined using RandOX kit and results expressed as mean ± SEM. Results indicated a progressive increase in TCHOL, TRIG, LDL, and VLDL levels in treated groups compared to the control. Notably, Group E (50% cooked groundnut) exhibited the highest levels of TCHOL (268 ± 44.98 mg/dL), TRIG (97.66 ± 12.99 mg/dL), LDL (228.80 ± 42.47 mg/dL), and VLDL (19.53 ± 2.60 mg/dL). Conversely, HDL levels were significantly reduced in Groups C (47.66 ± 6.39 mg/dL) and E (37.66 ± 7.62 mg/dL. Moderate alterations were observed in Groups B and D compared to higher inclusion levels. The findings demonstrate that increased consumption of both grilled and cooked groundnut, particularly at higher inclusion levels, adversely affects lipid metabolism by elevating atherogenic lipid. Cooked groundnut poses lower effect, especially when consumed in moderation.

NMBCW-58

Therapeutic Potential of Plant-Based Fermented Foods in Metabolic Syndrome and Type 2 Diabetes: A Review of Randomised Controlled Studies

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Metabolic syndrome (MetS) and type 2 diabetes mellitus (T2DM) are among the most prevalent non-communicable diseases worldwide, contributing substantially to cardiovascular morbidity and mortality. These conditions are closely linked to lifestyle factors, particularly dietary habits. Increasing interest has therefore emerged in functional foods capable of modulating metabolic pathways. Plant-based fermented foods (PBFFs) represent an important category of functional foods produced through microbial fermentation of plant substrates such as cereals, legumes, vegetables, and fruits. During fermentation, microbial metabolism generates bioactive compounds including short-chain fatty acids, peptides, polyphenol derivatives, and organic acids that may influence glucose metabolism, lipid homeostasis, and inflammatory pathways. This review critically evaluates evidence from randomised controlled trials investigating the therapeutic potential of PBFFs in individuals with metabolic syndrome and type 2 diabetes. Evidence from systematic reviews and clinical trials suggests that fermented plant foods may improve glycaemic control, lipid profiles, body weight, and inflammatory biomarkers. Approximately three-quarters of clinical trials assessing botanical fermented foods report significant improvements in cardiometabolic outcomes such as fasting blood glucose, cholesterol levels, and blood pressure. These metabolic benefits are believed to arise through several mechanisms including modulation of gut microbiota diversity, improved intestinal barrier integrity, and increased production of metabolically active microbial metabolites. Despite promising findings, variability among studies—including differences in fermented food types, microbial strains, intervention duration, and sample size—limits the generalisability of current evidence. Larger and well-controlled randomised clinical trials are therefore required to establish standardised dietary recommendations and clarify mechanisms of action. Nevertheless, PBFFs represent a sustainable and accessible dietary strategy with potential to contribute to the prevention and management of metabolic disorders.

NMBCW-59

Amino acid, Proline, Cellulase and Protein composition of selected Legumes and Grains

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The growing demand for healthier diets has increased interest in foods with high nutritional and value. This study evaluated the amino acid, proline, cellulase and protein composition of selected common legumes and grains in Toru-orua, Bayelsa state. The seeds (Red and white sorghum, millet, yellow maize, popcorn, brown and white beans, soya beans and groundnut) were purchased from the market and then processed into powder for extraction. The extraction process for amino acid, proline, cellulase and protein composition were different processes ranging from the use of 10 ml 80 % ethanol, 10 ml 3% aqueous sulfosalicylic acid, and 10 ml 20 % trichloroacetic acid. Amino acid composition was evaluated using Ninhydrin test procedures while proline content by 2 ml of acid ninhydrin reagent and 2 ml of glacial acetic acid. 3,5-dinitrosalicylic acid (DNS) for cellulase assay and Lowry reagent for protein composition. All methods were measured by UV-Visible spectrophotometry at maximum wavelength. Amino acid components of the various sample ranged from 2.50 to 58.50 mg/g dwt with white beans having the highest, while proline composition ranged from 1.05 to 85.30mg/g dwt with groundnut seeds having the highest level of proline content. Groundnut seeds also had the highest amount of cellulase while white beans took the lead for the highest protein contents in the analysed seeds. The study revealed the variation in the nutrient's composition of the plant seed samples. However, the selected leguminous seeds especially white beans are strong sources of protein and amino acid stores required for healthy living.

NMBCW-60

Determination of Hydrogen Peroxide, Malondialdehyde and Proline Levels In Two Varieties Of Maize (*Zea Mays* L.) Treated With Different Concentration Of Salt

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Salinity is one of the principal abiotic stresses that affect plant productivity by inducing osmotic stress. Maize is an economically important cereal crop affected by high salinity stress. In this study two varieties of maize seedlings (Oba super 2 16-11-kd-155-159 and Sammaz 37) were subjected to the 50, 100 and 150 mM NaCl concentrations. The root, young and mature leaves were harvested after 21 days of sowing. A significant (P<0.05) increased in MDA and H2O2 concentration was observed in the NaCl treated samples (root and matured leaves) compared to the control. A significant increase of Proline levels in all salt treated regime were observed when compared with the control. These results indicates the possible role of ROS in the systemic signalling from roots to leaves, allowing leaves to activate their defence mechanism for better protection against salt stress.

NMBCW-61

Proximate Composition and Anti-Nutritional Factors of Soya Beans, Wheat and Yellow Corn

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The determination of the nutritional value and antinutrient content of staple crops is essential for optimising dietary quality and mineral bioavailability. This study assessed the proximate composition and antinutritional profiles of soybeans, wheat, and yellow corn using standard analytical techniques to determine their nutritional value and potential limitations in their bioavailability. The results showed that the highest nutritional density is obtained from soybeans which contain 36.5% crude protein and 18.5% crude lipid, together with a higher mineral profile as indicated by a 4.5% ash content. Wheat and yellow corn, on the other hand, were mainly a source of carbohydrates (73.0% and 73.8%, respectively) with significantly lower protein content (12.2% and 9.8%). However, the highest concentrations of antinutritional factors were found in soybeans including phytates (2.8 mg/100g), oxalates (2.1 mg/100g), saponins (1.7 mg/100g), tannins (1.4 mg/100g), and alkaloids (0.8 mg/100g). Although these compounds are known to impair mineral bioavailability, their effect may be mitigated through processing techniques such as soaking, fermentation, and cooking. These findings underline the high nutritional value of soybeans as a source of plant-based proteins and fats, while underlining the need for appropriate processing to optimise nutrient absorption, especially in comparison with the lower antinutrient profiles of wheat and yellow corn.

NMBCW-62

Comparative Study on the Nutritional Content of Traditional Paste (Amala) Produced From Yam and Cassava Peels

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Traditional Paste (Amala) is a gelatinised product usually produced from yam flour and other flours from fermented and sundried yam tubers.It is widely consumed in the western part of Nigeria. It has been reported that Amala produced from yam peel and cassava is more widely used than Amala made from sweet potato peel. This research work will help to enhance food security, diversify food options and improve dietary choices, especially for those relying on staple foods. Fresh tubers of yam and cassava were washed, air dried and grinded into flour. The traditional paste (Amala) was prepared following the standard method of preparation. The proximate analysis (moisture content, Ash, crude fibre, crude fat, protein, and carbohydrate), minerals and vitamins of the prepared samples were analysed. The results for proximate composition showed that Yam peel Amala had higher moisture and protein with significant difference at $P<0.05$, the Cassava peel Amala rich in fats, carbohydrate, minerals, ash and fibre contents with no significant difference at $P<0.05$. Amala produced from Yam peel had higher Vitamin C, vitamin K and vitamin B9 levels, while sweet potato Amala contained higher Vitamin A content. Yam peel is richer in protein and minerals. The study revealed that both yam and sweet potato peels are nutritionally valuable and can be processed into Amala with acceptable nutrient quality. Yam peel Amala is more proteinous, while sweet potato peel Amala provides more minerals and energy.

NMBCW-63

Nutritional Status and Biochemical Indicators of Malnutrition among Under-Five Children: Influence of Dietary Diversity and Infant Feeding Practices

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Malnutrition among children under five years of age remains one of the most critical global public health concerns, particularly in low- and middle-income countries where poverty, food insecurity, and inadequate healthcare services persist. Despite significant advances in nutrition interventions, undernutrition continues to contribute substantially to childhood morbidity, mortality, impaired physical growth, compromised cognitive development, and reduced human capital formation. This review critically examines the interrelationship between dietary diversity, infant and young child feeding practices, and biochemical alterations in the aetiology and progression of malnutrition among under-five children. Evidence from recent studies demonstrates that inadequate dietary diversity limits the intake of essential macro- and micronutrients necessary for optimal growth and development, thereby increasing the risk of stunting, wasting, and underweight. Similarly, suboptimal feeding practices, including delayed initiation of breastfeeding, non-exclusive breastfeeding, early cessation of breastfeeding, and inappropriate complementary feeding, significantly predispose children to nutritional deficiencies and poor health outcomes. Malnutrition is further associated with profound biochemical disturbances, including anaemia, hypoalbuminaemia, micronutrient deficiencies, electrolyte imbalances, oxidative stress, inflammation, and impaired immune function, all of which exacerbate disease susceptibility and growth faltering. These metabolic and physiological alterations disrupt normal carbohydrate, protein, and lipid metabolism, perpetuating a cycle of undernutrition and infection. Addressing childhood malnutrition therefore requires integrated and evidence-based interventions that promote dietary diversification, optimal infant and young child feeding practices, nutrition education, food security, and routine nutritional and biochemical assessment. Strengthening these strategies is essential for improving child survival, growth, and developmental outcomes, as well as for achieving global nutrition targets and the Sustainable Development Goals related to hunger, health, and well-being.

NMBCW-64

Anti-inflammatory Potential of Aqueous –Methanolic Extract of Soursop (*Annona muricata*) Leaves on Haematological Parameters in Formalin-Induced Inflammation and Oedema in Male Wistar Rats

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Traditionally, the leaves of *Annona muricata* have been used as anti-inflammatory, anti-rheumatic, analgesic and anti-anaemic drugs. This study was aimed to assess anti-inflammatory potentials of aqueous - methanolic extract of soursop (*Annona muricata*) leaves to verify these folkloric claims using haematological parameters. Anti-inflammatory activities were assessed on thirty (30) male wistar rats by using formalin method. The extract of *Annona muricata* leaves was used at oral doses of 100 and 300 mg/kg during experiments. Anti-inflammatory activity was determined by comparing with the standard drugs i.e. diclofenac sodium (10 mg/kg and aspirin 10 mg/kg). The haematological parameters examined were white blood cells, red blood cells, lymphocytes, granulocyte, haemoglobin, haematocrit and platelet. Potent anti-inflammatory and analgesic effects were observed during this experiment. The extract also showed anti-anaemic effect as it increased the levels of haemoglobin ($14.53 \pm 0.03^{a,b}$ and red blood cells ($8.08 \pm 0.10^{a,b}$ at 300 mg/kg, b.wt. of the extract)significantly at $p<0.000$. Increase in the platelet count was also noted (730.00 ± 1.15^{c}) though diclofenac sodium exhibited higher platelet count (989.67 ± 4.91^{a}) than 300 mg/kg, b.wt. of the extract. Anti-inflammatory activity was determined by comparing with the standard drugs i.e. diclofenac sodium (10 mg/kg and aspirin 10 mg/kg). Both doses produced significant anti-inflammatory and analgesic activities at $p<0.000$; though diclofenac sodium exhibited higher anti inflammatory potentials than aspirin in all the parameters examined. The extract at 300 mg/kg and diclofenac sodium significantly exhibited the same anti-inflammatory potentials at $p<0.000$. These activities were seemingly attributable to phytochemical contents of the leaves extract of *Annona muricata*. These results justify the folkloric claims that the extract could be used as good anti-inflammatory and anti-anaemic drug.

NMBCW-65

Protective effects of *Annona muricata* fruit juice against fluoride-induced toxicity in Wistar rats

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This study assessed the protective effects of *Annona muricata* fruit juice against fluoride-induced toxicity in Wistar rats. Twenty-four (24)healthy, male Wistar rats were randomly assigned into four (4) groups of six (6) animals and treatments were as follows: Group I served as normal control (NC), Group II-IV served as fluoride control (F-C), *A. muricata* juice (AMJ) and standard (Quercetin + Vitamin E) respectively; they were administered 20 mg/kg body weight sodium fluoride orally for thirty five (35) days; Group III and Group IV were concurrently orally administered *A. muricata* juice and binary mixture of 15 mg/kg b.w Quercetin + 100mg/kgbwtα-tocopherol, respectively. At the end of 35 days of daily intoxication and treatment with respective juices and standard, the rats were sacrificed; liver, kidney function indices, liver reduced glutathione (GSH), malondialdehyde (MDA), protein and albumin concentration were determined using standard methods. Results showed that treatment of fluoride intoxicated rats with *A. muricata* juices caused a significant ($p<0.05$) reduction in serum transaminases activity, total bilirubin concentration; and a significant ($p<0.05$) restoration ofserum urea, creatinine and electrolyte balance in exposed rats to levels comparable to Quercetin + Vitamin E treated rats and control. Also, the administration of *A. muricata* juice resulted in a significant ($p<0.05$) restoration of fluoride-induced depletion of liver GSH, protein, albumin concentration, and reduction in liver MDA concentration. The results of this study showed that *A. muricata* juice holds a viable propensity to attenuate fluoride induced toxicity in Wistar rats; and may help to suppress adverse effects associated with excessive fluoride exposure.

NMBCW-66

Comparative Evaluation of Physicochemical and Phytochemical Properties of *Cucumis melo* L. (Golden Melon) Seed Oil Extracted Using Hexane, Methanol, and Ethanol

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The growing demand for functional oils from underutilised crops has prompted investigation of solvent effects on oil quality and bioactivity. This study compared the physicochemical properties, phytochemical composition, and vitamin profile of *Cucumis melo* seed oil extracted using the soxhlet apparatus with hexane, ethanol, and methanol. Solvent polarity significantly influenced oil stability and bioactive recovery. Hexane yielded the most stable oil, exhibiting the lowest acid value (5.60–6.72 mg KOH/g), free fatty acid content (2.80–3.36 mg KOH/g), peroxide value (4.91–4.94 meq/kg), and moisture content (5.26–5.38 %). In contrast, methanol produced oil with the highest unsaturation (iodine value 53.74–53.93 g I_2/100 g), acid value (22.40–23.63 mg KOH/g), peroxide value (11.96–12.07 meq/kg), and moisture (8.04–8.17 %). Ethanol showed intermediate physicochemical properties. Phytochemical screening revealed clear polarity-dependent selectivity. Ethanol provided the broadest bioactive profile, with the highest levels of flavonoids (49.06–52.75 mg/100 g), saponins (61.57–62.91 mg/100 g), and alkaloids (58.27–58.47 mg/100 g). Methanol maximised polar antioxidants, including tannins (63.52–63.92 mg/100 g) and phenols (24.51–24.92 mg/100 g), while hexane selectively extracted non-polar compounds but lacked tannins and phenols. Vitamin recovery was also solvent-specific as methanol achieved the highest vitamin A content (364.84 µg/mL). Vitamin K was undetectable in all extracts. These results demonstrate a distinct trade-off between oxidative stability (favoured by hexane) and bioactive diversity (optimised by ethanol). Ethanol, being a Generally Recognised as Safe (GRAS) solvent, offers the best balance for developing functional foods and nutraceuticals. The findings support the valorisation of golden melon seeds as a sustainable source of high-value oils and show the importance of solvent selection tailored to the intended application.

NMBCW-67

Bioactive Phytochemicals and Antioxidant-Mediated Gastroprotection of *Carica papaya* Fruit in Ulcer Models

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Ulcer is a prevalent gastrointestinal disorder characterised by a discontinuity in the stomach mucosa that extends through the muscularis mucosa, often resulting from an imbalance between protective and aggressive factors within the gastric environment. *Carica papaya* has been widely reported to possess antioxidant, analgesic, anti-inflammatory, antibacterial, and antihistaminic properties, suggesting its potential therapeutic role in ulcer management. This study investigates the phytochemical composition, antioxidant activity, and anti-ulcer effects of aqueous extracts of *Carica papaya* fruit using Wistar rat models. Phytochemical screening was first carried out using standard methods, followed by the evaluation of antioxidant activity using the Ferric Reducing Antioxidant Power (FRAP) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays. Findings reveal that the extract contains significant levels of free reducing sugars (2,040.01 mg/100 g), phenols (5,940.01 mg/100 g), flavonoids (1,740.01 mg/100 g), saponins (2,800.01 mg/100 g), and tannins (1,310.01 mg/100 g), with antioxidant activity increasing proportionally with concentration. Additionally, treatment with the extract resulted in reduced gastric acidity and volume, alongside increased gastric pH, indicating significant anti-ulcer activity. This effect may be attributed to the presence of bioactive compounds that enhance antioxidant enzyme activity. In conclusion, *Carica papaya* fruit extract demonstrates promising gastroprotective potential and may serve as a natural therapeutic agent in ulcer management.

NMBCW-68

Chemical Composition and Phytochemical Evaluation of the Leaf of *Nuclea latifolia*

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This study focused on chemical composition of *Nauclea latifolia*, a medicinal plant widely used in traditional medicine for the treatment of various ailments. The Leaf of Nuclea latifolia was collected from Fika local government area of Yobe state, it was identified by plant taxonomy in the department of forestry Yobe state college of agriculture, science and technology Gujba. Quantitative phytochemical screening of the plant extracts revealed the presence of some important bioactive compounds such as alkaloids, flavonoids, tannins, saponins, phenolic acids, terpenoids and glycosides at concentration 12.50mg/g, 25.40mg/g, 18.23mg/g, 32.37mg/g, 15.73mg/g, 8.77mg/g and 5.53mg/g respectively. These compounds are known to possess pharmacological properties including antioxidant, antimicrobial, and anti-inflammatory activities. Using Atomic absorption spectrometry (AAS), this plant revealed the presence of some important minerals such as Calcium, Iron, Zinc, Cadmium and chromium and were found within the permissible limit. The results indicated that this plant is a potential source of natural therapeutic agents and can be utilised in the development of herbal drugs. This study therefore supports the ethnomedicinal use of this plant and recommends further investigation into its specific bioactive components and their pharmacological effects.

NMBCW-69

Chemical Characterisation of Commonly Consumed African Antimalarial Herbal Mixtures

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Traditional herbal mixtures remain a primary line of defence against malaria across African communities, often preferred due to cultural acceptance and limited access to conventional pharmaceuticals. While many of these plants have documented anecdotal efficacy, their complex chemical profiles are rarely standardised, raising queries about safety, dosage and active mechanisms. Eight commonly consumed antimalarial Herbal Mixtures (HM) across Lagos State; HM1-*Lawsonia inermis* and milk; HM2-*Azadirachta indica and Lawsonia inermis*; HM3-*Curcuma longa, paullina pinnata, Garcina kola and pap water;* HM4-*Vernonia amygdalina and Carica Papaya;* HM5-*Cymbopogon citratus and Ocimum gratissimum;* HM*6-Anacardium occidentale, Mangifera indica and Carica Papaya.;* HM*7-Morinda lucida and Vernonia amygdalina;* HM*8- Curcuma longa, paullina pinnata, Garcina kola, Khaya senegalensis, Alstonia boonei, Nauclea latifolia, and Zea mays;* were evaluated using Gas Chromatography-Mass Spectrometry (GC-MS) to identify their bioactive constituents and correlate them with reported antimalarial and biochemical effects. The mixtures had 36, 27, 34, 33, 30, 26, 6 and 42 compounds in HM1, 2, 3,4,5,6,7 and 8 respectively with Lup-20(29)-en-3-ol, acetate, (3.beta.), Hop-22(29)-en-3.beta.-ol as most dominant compound in HM 1, n-Hexadecanoic acid and Tetradecanoic acid in HM2, n-Hexadecanoic acid in HM3 and HM4, Thymol in HM5, n-Hexadecanoic acid and etradecanoic in HM6, Bis(2-ethylhexyl) phthalate in HM7 and Dodecanoic acid, methyl ester in HM8. Other compounds identified across the samples included, methyl ester, Cyclohexasiloxane, various Indole and Thiazole derivatives. The therapeutic synergy observed in these mixtures provides a biochemical baseline for validating indigenous concoctions as a vital, albeit complex, source of novel bioactive templates for future antiplasmodial drug discovery.

NMBCW-70

Assessment of heavy metal content in domestic rice varieties sold and consumed in Ebonyi State

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Heavy metal content of four domestically sold and consumed rice varieties in Ebonyi State, South-East Nigeria was assessed to ascertain how safe it is for human consumption. The four domestic rice samples; CP, MASS, 308, and R8 were analysed for heavy metal parameter such as; nickel, copper, zinc, iron, cadmium, lead, manganese, chromium, mercury and arsenic following standard digestion procedures and conducted using Atomic Absorption and UV spectrophotometers. Most parameters showed significant elevated level of heavy metal content across the rice varieties, with some exceeding permissible limits set by both national and international safety standards. Notably, MASS rice variety exhibited the highest lead and nickel levels, while the 308 rice variety showed elevated cadmium and chromium levels. The significantly elevated heavy metal contents underscores the potential health risk associated with consuming contaminated agro-products. These contaminations are not far-fetched from the solid minerals available in the state and most importantly the way and manner of exploration. The results also highlight the need for stringent monitoring and mitigation strategies by appropriate arm of the state government to ensure food safety. As a relatively agricultural community, it becomes imperative that relevant monitoring and regulatory agencies do more as regards awareness campaigns and ways of mitigating the sources of contamination for sustainable agricultural practice and health safety.

NMBCW-71

Nutritional and Biochemical Studies on the Tenderisation of Cowhide (Ponmo) using Papain from Different Parts of Papaya

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This study investigated the nutritional quality of papain treated *Ponmo* and also monitored the biochemistry of the treatment process. Papain was extracted from the peels, leaves and seeds of pawpaw and purified. The extracted papin was used to treat cowhide (*Ponmo*). Nutritional and biochemical studies were determined. The results showed that *Ponmo* treated with papain from papaya peel had highest quantity of all the essential amino acids and as well as non-essential amino acids except for glycine and proline which was high in *Ponmo* treated with papain from papaya seed and control, respectively. The animals fed with casein had highest values for all the parameters determined in the nutritional quality, while the least values were observed in the control for nitrogen retention (521.29 mg/kg BW per d), biological value (46.33 %) and true digestibility (54.00 %). The results of the lipid profile showed increase in high density lipoprotein (HDL) and decrease in low density lipoprotein (LDL). The highest values for total cholesterol (137.05 mg/dl), triglycerides (297.65 mg/dl) and HDL (90.33 mg/dl) were recorded from *Ponmo* treated with papain from the peels. The study has shown that when *Ponmo* is treated with papain, there is an increased HDL and decreased LDL, the essential amino acids become more available and quantifiable suggesting that papain treated *Ponmo* is more nutritive than the untreated one. Treating *Ponmo* with papain before cooking is recommended, as it improves the nutritional status of the meat.

NMBCW-72

Comparative Study of the *in vitro* Antioxidant Activity and Phytochemical Analysis of Aqueous Extract of Cumin and Fennel Seeds

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This study comparatively evaluated the *in vitro* antioxidant activity and phytochemical composition of aqueous extracts of cumin (*Cuminum cyminum*) and fennel (*Foeniculum vulgare*) seeds. The seeds were authenticated at Gombe state State University and voucher numbers were assigned as GSUH493 (cumin) and GSUH494 (fennel). Extraction was carried out using distilled water. Qualitative phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, phenols, terpenoids, and steroids in both extracts, while saponins were detected only in fennel. Quantitative analysis revealed that cumin possessed higher flavonoid "28.20 g" and phenolic "42.20 g" contents compared to fennel "22.21 g" and "32.80 g," respectively. Antioxidant activity was evaluated using DPPH radical scavenging, hydrogen peroxide (H2O2), scavenging, ferric reducing antioxidant power (FRAP), and phosphomolybdenum assays, with rutin as standard. Although rutin demonstrated superior antioxidant activity at lower concentrations, both extracts showed strong concentration-dependent antioxidant effects. At 1000 µg/mL, cumin and fennel extracts revealed the percentage inhibition (%) of DPPH scavenging activities of 76.38 ± 0.33 % and 76.20 ± 0.27 %, H2O2 scavenging activities of 63.75 ± 0.84 % and 63.29 ± 0.43 %, FRAP values of 74.22 ± 0.32 % and 74.25 ± 027 %, and phosphomolybdenum activities of 60.94 ± 2.30 % and 59.67 ± 0.66 %, respectively. Overall, cumin extract demonstrated slightly higher antioxidant activity than fennel, particularly in DPPH, hydrogen peroxide, and phosphomolybdenum assays, which may be attributed to its higher phenolic and flavonoid contents. It can be concluded that cumin and fennel seeds are rich sources of natural antioxidants and may have potential applications as natural preservatives or therapeutic agents.

NMBCW-73

Effectiveness of a Complementary Feeding Intervention on Infant Growth and Development in Kaura Namoda, Northwestern Nigeria: A Cross-Sectional Study

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Appropriate complementary feeding beginning at six months is essential for optimal infant growth and development. Inadequate knowledge, low income, and poor feeding practices contribute significantly to malnutrition in low-resource settings. This study assessed the effectiveness of a complementary feeding intervention on infant growth and development among mothers attending Dr. Bello Buzu Women and Children Clinic in Kaura Namoda, Zamfara State, Nigeria.

A descriptive cross-sectional survey was conducted among 100 mothers (response rate: 83.3%). Data were collected using a structured questionnaire assessing socio-demographic characteristics, complementary feeding practices, knowledge, child growth indicators, and perceived challenges. Data were analysed using descriptive statistics (frequencies and percentages).

Most respondents were aged 21–30 years (71%), married (98%), and Muslim (100%), with 63% earning less than ₦10,000 monthly and 43% having no formal education. Nearly all mothers (96%) received counselling on complementary feeding, primarily from health workers (82%). Correct knowledge of the recommended initiation age (six months) was reported by 76% of participants, and 90% introduced complementary foods at six months. Pap was the most common first food (85%), and 92% fed their children 3–4 times daily. Exclusive breastfeeding for six months was practised by 71%. Regarding growth outcomes, 62% reported recent weight gain, and 93% perceived their child's growth as better than peers. However, 64% reported episodes of diarrhoea in the previous month. Most mothers (100%) agreed that complementary feeding improved their child's growth. Major challenges included cost of food (73%) and lack of time (23%).

The complementary feeding intervention demonstrated positive effects on infant feeding practices and perceived growth outcomes. However, economic constraints remain a major barrier. Strengthened nutrition education and support for affordable complementary feeding strategies are recommended.

NMBCW-74

Comparative Study on the Nutrient Compositions of Fufu prepared with chemical Fermentation Accelerants

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Fufu is a staple food in many West African countries, traditionally prepared through fermentation of cassava tubers. The quest to reduce the fermentation period, increase yield, and whiten fufu has led producers to add harmful chemicals such as kerosene, detergent, and paracetamol into the fufu fermentation tank. The effects of kerosene and detergent on the fermentation period and nutritional compositions of fufu were investigated. Cassava tubers were fermented for 14 days, and only the softened samples were selected for nutritional analysis. The proximate, vitamins, minerals, and anti-nutrient compositions of the fufu were determined using standard biochemical techniques. The results indicate significant variations in the nutrient and anti-nutrient compositions of the samples. Cassava fermented with kerosene and water (K1 and K2) softened within 2 days while those fermented with detergent and water (D1 and D2) softened within 7 days. The control (K3), with only water, softened within 4 days. The statistical analysis shows that the ash, fibre, protein and carbohydrate contents of K1 and K2 decreased, while moisture content increased. Kerosene reduced the calcium, magnesium and potassium contents. It also decreased vitamin C and vitamin B1 levels but slightly increased vitamin E levels. Additionally, kerosene reduced the level of saponin, tannin and phytate. The findings indicate that kerosene and detergent can modify the biochemical composition of fufu, potentially impacting its nutritional value and safety. Therefore, their use in the fermentation of fufu should be discontinued.

NMBCW-75

Determination of Mineral and Vitamin Components of *Justicia carnea* Leaves

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Medicinal plants are good sources of antioxidants that prevent body cells against oxidative assaults. Minerals and Vitamins are key bioactive compounds found in medicinal plants that contribute to their therapeutic action in the treatment of diseases. They are essential for maintaining health, supporting immune function, and preventing oxidative stress. *Justicia carnea* is a medicinal plant that is used conventionally as blood tonic from time immemorial in Nigeria. The resultant liquid after boiling is usually crimson red. Local consumers of the leaves are mostly anaemic patients, women who want their blood replenished after the menstrual cycle and pregnant women. In this study the mineral and vitamin contents of *Justicia carnea* leaves were evaluated and the mineral percentage yields were as follows Potassium (6.90± 0.00%), Magnesium (5.28± 0.00%), Calcium (4.90± 0.00%), Sodium (4.90± 0.00%), Iron (1.98± 0.00%), Manganese, Zinc(0.40 ± 0.00%), Selenium (0.39 ± 0.00%), Molybdenum (0.18 ± 0.00%), Cupper (0.11 ± 0.00%), Lead (0.10 ± 0.00%), Nickel (0.09 ± 0.00%), Cobalt (0.03 ± 0.00%) and Chromium (0.02± 0.00%) in their descending order. The study also revealed high contents of vitamins C, A, E and D and revealed the percentage content of the vitamins as follows Vit. C (65.24 ± 0.00%), Vit. A (29.43 ± 0.00%), Vitamin E (15.66 ± 0.00%), vitamin D (13.65 ± 0.00%), vitamin B12 (4.42 ± 0.00%), vitamins B3 (0.52 ± 0.00%), B6 (0.24 ± 0.00%), B1 (0.16 ± 0.00%) and B2 (0.13 ± 0.00%). Recently research has shown that Vitamins and minerals possess very high antioxidant properties; boost immune system, support normal growth and development, and help cells and organs do their jobs. Hence these medicinal properties of *J. carnea* to treat anaemia, inflammation, fever and other numerous diseases could be attributed to its high contents of minerals and vitamins.

NMBCW-76

Microbial–Enzymatic Crosstalk Regulating Nutrient Bioconversion in Black Soldier Fly Larvae: A Meta Analysis Review

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Black soldier fly larvae (BSFL) represent an exemplary sustainable protein source, however, the underlying mechanisms that drive nutrient bioconversion, particularly the interaction between gut microbiota and digestive enzymes remain inadequately elucidated. This investigation quantitatively aggregates evidence pertaining to microbial–enzymatic interactions and their influence on the conversion of proteins, lipids, and minerals. A systematic PRISMA search encompassing Scopus, Web of Science, PubMed, and ScienceDirect from 2015 to 2025 identified a total of 76 pertinent studies. Effect sizes (Hedges' g) related to gut microbial diversity, enzyme activities, and nutrient outcomes were aggregated employing random-effects models. Gut microbial richness, as measured by the Shannon index, demonstrated a robust correlation with protease ($r = 0.72$, $p < 0.001$) and lipase ($r = 0.68$, $p < 0.001$) activities. The meta-analysis indicated that substrate-optimised larvae enhanced crude protein content by 18.4% (95% CI: 14.2–22.6%) and lipid content by 27.3% (95% CI: 21.5–33.1%) in comparison to standard dietary regimens. The overall effect size pertaining to nutrient bioconversion efficiency was substantial (Hedges' $g = 1.24$, 95% CI: 1.03–1.45; $I^2 = 81.2\%$). Microbial–enzymatic interactions constitute a fundamental mechanism driving BSFL nutrient bioconversion. The strategic engineering of gut microbiota and enzyme expression may augment the role of BSFL as a pivotal component in circular bioeconomy strategies for sustainable feed production.

NMBCW-77

Early Clinical Outcomes and Biochemical Responses to Pharmacological Interventions in Patients with Metabolic Syndrome Receiving Antihypertensive and Hypoglycaemic Therapies in Rural Southern Nigeria

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Metabolic syndrome represents a major public health concern due to the clustering of cardiometabolic risk factors such as hypertension and impaired glucose metabolism, which substantially increase the risk of cardiovascular disease and type 2 diabetes. This study evaluated early clinical and biochemical responses to pharmacological therapy among patients with metabolic syndrome receiving routine care at a tertiary hospital serving rural communities in Southern Nigeria. A total of 75 patients diagnosed with metabolic syndrome were included in this prospective observational study. Baseline measurements of fasting blood glucose and blood pressure were obtained before initiating pharmacological therapy, and follow-up measurements were recorded after 4 weeks of treatment. Antihypertensive and hypoglycaemic medications were prescribed according to routine clinical practice and physician discretion. Significant reductions in systolic and diastolic blood pressure were observed following treatment ($p < 0.05$). Fasting blood glucose levels also declined significantly after four weeks of pharmacological therapy ($p < 0.05$). A proportion of patients achieved improved clinical control of hypertension and glycaemia during the follow-up period. Analysis of treatment responses by pharmacological regimen showed variable outcomes, although differences among individual drug combinations were not consistently statistically significant. These findings suggest that early pharmacological intervention may produce measurable improvements in cardiometabolic parameters among patients with metabolic syndrome in resource-limited settings.

NMBCW-78

Comparative Analysis of The Proximate and Phytochemical Properties of *Solanum melongena* (Green Garden Egg) Organically and Inorganically Cultivated In Ohodo, Igbo – Etiti Local Government Area, Enugu State

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The nutritional and medicinal benefits of *Solanum melongena* cannot be over emphasised. The proximate and phytochemical compositions of organically and inorganically cultivated *S. melongena* using standard procedures were ascertained. Four plots, each measuring 60ft by 40ft were used for the study. One plot was cultivated in each of the four cardinal locations of the town. This is done based on the geographical reconnaissance of the area. All the four plots were cultivated on March 15, 2025. Proximate and phytochemical analysis were carried out on the harvested garden eggs. The carbohydrate, protein and ash contents of organically cultivated *S. melongena* are respectively 80.94 ± 4.23 mg/100g, 3.83 ± 0.58 mg/100g and 2.45 ± 8.31mg/100g while their respective contents in inorganically cultivated *S. melongena* are 79.00 ± 2.61 mg/100g, 3.02 ± 3.02 mg/100g and 2.40 ± 2.22 mg/100g. Also, the moisture, fat and fibre contents of inorganically cultivated *S. melongena* are higher when compared with the organically cultivated *S. melongena*. The concentrations of phytochemical compounds are higher in organically cultivated *S. melongena* than in inorganically cultivated *S. melongena*. For instance, alkaloids (4.78 ± 3.87 mg/100 g), phenol (6.10 ± 3.97 mg/100g) and saponins (3.09 ± 0.43 mg/100 g) were higher in organically cultivated *S. melongena* than in inorganically cultivated *S. melongena* where alkaloids (4.52 ± 4.57 mg/100g), phenol (5.96 ± 7.03 mg/100g) and saponins (3.00 ± 8.65 mg/100g) are lower. In conclusion, the result revealed that *S. melongena* is rich in nutrients and phytochemicals which must have accounted for their medicinal properties.

NMBCW-79

Biogenic Iron Nanoparticles from Mango Wastes for Biofortification of *Amaranthus cruentus* and Enhancement of Iron Status in Wistar Rats

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Iron nanoparticles (FeNPs) were green-synthesised from mango seed kernel (M_1) and peel (M_2) extracts and applied to *Amaranthus cruentus* for 38 days; biofortified biomass was fed to Wistar rats for 14 days. FeNPs exhibited 10.02-28.50 nm diameter via TEM and UV-Visible absorption peak at 311 nm; with FT-IR showing phenolic peaks. FeNPs promoted early growth: M_2 at 50 ppm (2.15 vs 1.48 cm radicle length; $F = 46.72$, $p < 0.001$, $\eta^2 = 0.892$) and greatest height at Day 20 (5.17 vs 4.15 cm). Plant tissue iron was highly significant ($F = 8.9\times10^6$, $p < 0.001$, $\eta^2 \approx 1.00$): M_1 and M_2 at 50 ppm achieved 4.10-fold increase over control (137.88 vs 33.62 ppm); M_1 at 40 ppm a 3.22-fold rise (108.24 ppm). M_1 at 60 ppm suppressed uptake below control (17.85 ppm), while M_2 at 60 ppm showed a concentration-dependent reduction relative to 50 ppm, indicating a hormetic dose-response in both fractions. Biofortified plant extracts induced antioxidant defence: M_2 at 50 ppm elicited the highest SOD and catalase (~1.43-fold above control) and lowest malondialdehyde. Hepatic iron differed significantly ($F(7,33) = 3.82$, $p = 0.0038$, $\eta^2 = 0.447$): M_2 at 60 ppm reduced liver iron (11.73 mmol/L; $p < 0.05$ vs M_1-treated and female control groups), indicating fraction- and dose- hepatic processing. No haematotoxic effects were observed. These findings suggest mango agro-waste as a viable, eco-friendly precursor for FeNP-based biofortification of *A. cruentus* (50 ppm optimal dose) for iron accumulation and antioxidant defence. This is promising for treating micronutrient deficiency.

NMBCW-80

Effects of *Cyperus esculentus* Extract on Luteinising and Follicle Stimulating Hormone Levels on Lead - Induced Toxicity In Albino Wistar

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Female infertility is a widespread condition that is common in lead mining host communities. Lead causes multiorgan toxicities and virtually all vital organs are affected. In this study, we investigated the effect of *Cyperus esculentus* (Tiger nut) extracts on luteinising and follicle stimulating hormone levels on lead acetate induced toxicity in rats. A total of thirty female rats were used for the study and were randomly placed in five groups of six animals per cage. The first group received feed and water only and served as normal control. Group B the lead controlgroup received 50 mg/kg lead acetate while groups C, D andE received50 mg/kg lead acetate and 10 mg/kg of vit E (group C) 1500 mg/kg (group D) and 1000 mg/kg body weight (group E) of *Cyperus esculentus* once daily for 28 days. The hormonal assay was carried out using Enzyme LinkedImmunosorbentAssay. A significant ($P<0.05$) decrease in luteinising and follicle stimulating hormone levels was observed in the group that received lead without treatment. However, on treatment with *Cyperus esculentus* extract and vit E a significant ($P<0.05$) increase were observed on varied concentrations administered. Our work thus showed that *Cyperus esculentus* extract could exert a positive effect on female fertility by enhancing levels of luteinising and follicle stimulating hormone

NMBCW-81

Socio-Cultural Determinants of Exclusive Breastfeeding among Mothers Attending Dr. Bello Buzu Women and Children Clinic in Kaura Namoda, Zamfara State, Nigeria

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Exclusive breastfeeding (EBF) for the first six months of life is a proven intervention for improving child survival and development. However, traditional beliefs and socio-cultural practices continue to influence infant feeding decisions in Northern Nigeria. This study assessed traditional beliefs and practices influencing exclusive breastfeeding among mothers attending Dr. Bello Buzu Women and Children Clinic in Kaura Namoda, Zamfara State. A descriptive cross-sectional study was conducted among 140 mothers (response rate: 70%) selected from clinic attendees. Data were collected using a structured questionnaire covering socio-demographic characteristics, awareness and knowledge of EBF, traditional beliefs, family influence, and breastfeeding practices. Data were analysed using descriptive statistics (frequencies and percentages). Most respondents were aged 18–25 years (34%), married (83%), Muslim (96%), and of Hausa ethnicity (74%). Awareness of EBF was high (83%), and 62% reported knowledge of its benefits, with health workers identified as the primary source of information (68%). Although 79.3% reported practising EBF, the average duration was 4.5 months, indicating suboptimal adherence to the recommended six months. Traditional beliefs persisted, with 40% acknowledging cultural practices affecting breastfeeding, 30.7% considering colostrum harmful, and 26% administering water or herbal preparations to newborns. Feeding decisions were predominantly influenced by mothers or mothers-in-law (51.3%). Family support was limited (48%), while 61.2% reported that cultural or religious leaders discouraged EBF. Major barriers included pressure from relatives (45%), work resumption (30%), and perceived insufficient milk (25%). Despite high awareness levels, socio-cultural beliefs and limited family support significantly constrain optimal EBF practice. Community-based education and inclusive family-centred interventions are recommended to improve adherence to six-month EBF guidelines.

NMBCW-82

Effects of Functional Crackers from Unripe Plantain, Tiger Nut, and Sorghum Flours on Lipid Profile in L-NAME/High-Fat Diet–Induced Wistar Rats

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Cardiovascular disease remains a leading cause of mortality worldwide, with dyslipidaemia representing a major modifiable risk factor. Diet plays a critical role in lipid metabolism and overall cardiovascular health, and functional foods rich in dietary fibre and bioactive compounds have attracted considerable interest for their lipid-modulating potential. This study investigated the effects of functional crackers formulated from nutrient-dense flours on lipid profiles in an experimental model. Dyslipidaemia was induced in rats using L-NAME in combination with a high-fat diet, resulting in elevated total cholesterol, low-density lipoprotein (LDL), and triglyceride levels, alongside reduced high-density lipoprotein (HDL) concentrations. Administration of the functional crackers significantly ameliorated these lipid abnormalities, evidenced by reductions in total cholesterol, LDL, and triglycerides, as well as an increase in HDL levels. Notably, the formulation containing 50% TN, 25% UPF, and 25% SG demonstrated the most pronounced lipid-lowering effect and a significant reduction in the atherogenic index. The observed benefits are likely attributable to the high dietary fibre and polyphenolic content of the functional ingredients. Dietary fibre may enhance cholesterol excretion through bile acid binding in the intestine, while polyphenols modulate lipid metabolism via inhibition of HMG-CoA reductase and upregulation of LDL receptor activity. These mechanisms collectively contribute to reduced oxidative stress, attenuation of vascular inflammation, and improved endothelial function. In conclusion, functional crackers formulated from nutrient-rich flours exhibit significant potential as a dietary intervention for the management of dyslipidaemia and the reduction of cardiovascular disease risk

NMBCW-83

Optimised Therapeutic Diets from Biofortified Maize, Bambara Groundnut and *Moringa oleifera* Attenuate Hyperglycaemia and Oxidative Stress in HFD/STZ-Induced Diabetic Rats

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The increasing global burden of type 2 diabetes mellitus (T2DM) and associated oxidative stress underscores the need for affordable, food-based therapeutic interventions. This study evaluated the antihyperglycaemic and antioxidant effects of an optimised therapeutic food bar formulated from biofortified maize, Bambara groundnut, and *Moringa oleifera* leaf powder in a high-fat diet/streptozotocin (HFD/STZ)-induced type 2 diabetic rat model. Diabetes was induced in male Wistar rats by feeding a high-fat diet (40% lard) for two weeks followed by intraperitoneal streptozotocin (30 mg/kg). Hyperglycaemia was confirmed (fasting blood glucose ⩾200 mg/dL), and diabetic rats received the formulated diet for 21 days alongside normal, diabetic, and metformin-treated controls. Fasting blood glucose in diabetic controls rose by 40.04% over 21 days, whereas the optimised diet reduced fasting blood glucose by -78.65%, outperforming metformin (−52.44%). Glycated haemoglobin was significantly ($p<0.05$) reduced from 6.97 ± 0.19% in diabetic controls to 3.71 ± 0.19%. Liver malondialdehyde concentration decreased from 2.89 ± 0.05 to 1.30 ± 0.16 µmol/mL, while hepatic, renal, and pancreatic superoxide dismutase activities were significantly restored relative to diabetic controls. Body weight increased by 20.83%, reversing the weight loss seen in diabetic controls. These improvements are attributed to the synergistic phenolic, flavonoid, and carotenoid content of the formulation. The findings demonstrate that the optimised diet effectively attenuates hyperglycaemia and oxidative stress in HFD/STZ-induced diabetic rats, supporting its potential as a sustainable, indigenous-crop-based functional food for dietary management of type 2 diabetes.

NMBCW-84

Parental Iron Deficiency Programs Oxidative Stress and Epigenetic Demethylase Dysregulation (TET and KDM2) in *Drosophila melanogaster* Offspring

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Iron deficiency (ID) is the most widespread micronutrient deficiency globally and has been increasingly linked to disturbances in cellular redox balance and metabolic regulation. Emerging evidence indicates that parental nutritional status can influence offspring physiology through intergenerational programming mechanisms. However, the molecular pathways through which parental ID affects oxidative stress and epigenetic regulation in subsequent generations remain poorly understood. The present study investigated whether oxidative stress and altered expression of iron-dependent epigenetic regulators contribute to these effects. ID was induced in parental (F0) flies by feeding a diet containing 200 µmol bathophenanthroline disulphonate for two weeks prior to mating. F1 and F2 offspring were maintained on either a normal diet (ND) or a high-fat diet (HFD). Antioxidant enzyme activities (SOD and GPx), were measured enzymatically, while the expression of oxidative stress markers (*Sod3*, *Gpx1*) and epigenetic demethylases (*Tet* and *Kdm2*) were quantified using RT-qPCR. Parental ID induced a sustained oxidative stress phenotype across generations. SOD activity and mRNA expression were significantly elevated in both paternal and maternal lineages, particularly under HFD conditions. In contrast, GPx activity declined in F1 and F2 offspring exposed to HFD but increased in those maintained on ND. Expression of the iron-dependent demethylases Tet and Kdm2 exhibited dynamic generational patterns, with reduced expression in later generations following parental ID. Collectively, these findings indicate that parental ID induces persistent oxidative stress and alters the expression of key epigenetic regulatory enzymes across generations. This suggests a potential mechanistic pathway linking micronutrient deficiency to inherited metabolic susceptibility.

NMBCW-85

Assessment of the Sensory, Nutritional, Antioxidant, and Glycaemic Properties of *Moringa*-enriched Tiger Nut Composite Bread

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The poor nutritional profile of refined wheat bread is a key contributor to metabolic disorders, underscoring the need for functional alternatives. This study assessed the consumer acceptability, proximate composition, mineral content, antioxidant properties, and glycaemic indices of composite breads developed from all-purpose flour (APF) with varying levels of tiger nut flour (TNF) substitution and *Moringa* leaf powder (Mo) enrichment. The composite formulations were developed and sensory properties analysed before further physicochemical analyses. In the sensory evaluation, seven formulations received acceptable scores. The seven samples exhibited improved nutritional profiles and antioxidant capacity, as well as favourable glycaemic indices compared to the control. In particular, 72.5% APF + 22.5% TNF + 5% Mo and 50% APF + 50% TNF showed the most promising antioxidant activity and glycaemic properties. The findings indicate that the co-incorporation of tiger nut and *Moringa* could be a promising approach to developing functional bread with improved nutritional, antioxidant, and glycaemic qualities.

NMBCW-86

Gastroprotective mechanism(s) of NaPherbs (a polyherbal nutraceutical) using albino Wistar rat models

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Peptic ulcer disease (PUD) is a prevalent gastrointestinal disorder associated with *Helicobacter pylori* infection; the use of non-steroidal anti-inflammatory drugs (NSAIDs); alcohol consumption, etc. Despite the availability of conventional therapies, limitations such as affordability and accessibility have prompted the need for alternatives. This study evaluated the gastroprotective activity of a polyherbal nutraceutical (NaPherbs) using indomethacin, ethanol, and pyloric ligation-induced peptic ulcer models. Acute toxicity was assessed using Lorke's method, followed by evaluation of antiulcer activity. Experimental animals were grouped into 7 (n=6) including NaPherbs (100, 200, and 400 mg/kg), standard drugs such as omeprazole (20 mg/kg) and famotidine (40 mg/kg). Ulcer induction was performed using indomethacin-induced, ethanol-induced, and pyloric ligation methods. Gastric parameters including ulcer index, pH and gastric acidity were assessed. In addition, antioxidant biomarkers such as malondialdehyde (MDA), superoxide dismutase (SOD) and histological examinations were carried out on the stomach. There was no mortality or signs of toxicity up to 5000 mg/kg, indicating a wide safety margin. NaPherbs caused a significant ($p < 0.05$) reduction in ulcer index and gastric acidity with increase in pH in treatment groups when compared to control. NaPherbs also significantly decreased MDA levels while enhancing SOD, CAT, GSH, and TP activities. The gastroprotective activity may be attributable to cytoprotecting and antioxidant properties. Histological examination also confirmed preservation of gastric mucosa integrity.NaPherbs demonstrated significant gastroprotective and antioxidant prowess *in vitro*. However, further mechanistic studies and clinical trials are recommended to validate these findings.

NMBCW-87

Formulation and Evaluation of the Antioxidant and Enzyme Inhibitory Properties of Cheese WoodBased Functional Beverages Infused With Lime and Black Seed

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Oxidative stress plays a dominant part in the development of numerous severe conditions, including disruptions in haemodynamics, glucose homeostasis, cardiovascular, and neurodegenerative disorders. In response to the universal change toward plant-based beneficial interventions, this study examined the therapeutic and antioxidant potential of formulated functional beverages from Cheese wood (*Alstonia boonei)*, black seed (*Nigella sativa)*, and lime *(Citrus aurantiifolia)*. Three beverage modifications are Cheese wood only (CB), Cheese wood containing lime (CBL), and Cheese wood with black seed and lime (CBLB), Two (2) grams of dried milled samples were transferred into tea bags and subjected to boiling water for 5, 10, and 15 minutes. Antioxidant assays, including flavonoid and total phenolic content, DPPH, ABTS, NO scavenging, Fe^{2+} chelation, and ferric reducing antioxidant power (FRAP), showed significantly advanced activities in the CBLB preparation infused for 15 minutes ($p < 0.05$). CBLB 15 min also revealed the least lipid peroxidation levels and the most potent inhibitory properties on crucial biological and metabolic enzymes, α-glucosidase (0.22%), α-amylase (0.22%), AChE (21.91%), and ACE (58.70%). These findings highlight the improved bioactivity attributed to the synergistic phytoconstituents relations among the plant components, and the influence of a higher infusion period on bioactive component extraction. The results provide scientific authentication for the ethnomedicinal use of Cheese wood, black seed, and lime, also support the growth of evidence-based, traditionally obtained functional beverages. Such preparations may serve as accessible and affordable nutraceutical interventions for managing oxidative stress-related comorbidities, mostly in resource-limited regions.

NMBCW-88

Subchronic Toxicological Evaluation of a Commonly Consumed Male Aphrodisiac (Coco Samba) in Ilorin Metropolis using Male Albino Wistar Rat Model

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The prevailing chronic misuse and abuse of herbal aphrodisiacs such as Coco samba has raised major public health concerns. This study aims to evaluate the subchronic toxicity profile of Coco samba in male albino Wistar rats. An acute toxicity study was conducted using modified Lorke's method. Twenty-eight male albino Wistar rats were randomly divided into four groups (n = 7). The control group received distilled water, while treatment groups received 0.5 ml/kg, 1.5 ml/kg, and 4.5 ml/kg of Coco samba for 45 days. Weekly body weight, daily food and water intake were monitored throughout the study. After the 45 days administration, blood samples were collected for haematological, biochemical and antioxidant assays. Histological examination of liver and kidneys were explored.No mortality was observed up to 15.8 ml/kg in the acute toxicity study. Food and water intake were significantly reduced ($p < 0.05$) at 4.5 ml/kg when compared with the control. Haematological analysis showed a significant decrease in mean cell haemoglobin concentration (MCHC) at 0.5 ml/kg, while total white blood cell count was markedly decreased at 1.5 ml/kg. There was a significant ($p < 0.05$) dose-dependent decrease in catalase activity. Histopathological findings revealed structural abnormalities in the liver and kidneys, including sinusoidal dilatation and vascular congestion in the hepatocytes. Subchronic exposure to Coco samba produced significant effects on haematological, biochemical and oxidative parameters, with corresponding structural abnormalities in liver and kidney tissues. This suggests a cautious use of these formulas, although further specific organ toxicities are recommended.

NMBCW-90

Fatty acid Profile of the Seeds of Avocado fruits, computational analyses and molecular dynamics of fatty-acid transport to the CD36 receptor

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The increasing demand for naturally derived bioactive compounds has stimulated interest in the valorisation of avocado (*Persea americana*) seeds, an underutilised by-product rich in nutritionally and pharmacologically important lipids. This study investigated the fatty acid composition of avocado fruit seeds and evaluated the molecular interactions of the identified fatty acids with the cluster of differentiation 36 (CD36) receptor through computational analyses and molecular dynamics (MD) simulations. The fatty acid composition in the seeds was determined using high performance liquid chromatography, revealing the presence of several saturated and unsaturated fatty acids, with oleic acid, linoleic acid, palmitic acid, stearic acid, and linolenic acid constituting the major components. This study used series of molecular dynamics simulations of the wild type and mutants types K164A CD36 protein interacting with one palmitic acid. The study also determine whether Lys164, mostly exposed to protein surface, played important roles in fatty acid uptake. These simulations revealed, the conformational changes induced by Lys164 residue and the altered interactions induced by the mutagenesis of surface lysine that was badly influencing the folding, utility, solubility, and stability form of the variant. MD simulations indicate that the CD36 internal cavity possesses a specific entry portal and a membrane-proximal exit gateway, allowing fatty acids (such as palmitic acid) to translocate toward the plasma membrane and it was the most preferred to CD36 structure stabilisation. The study supports the potential utilisation of avocado seed-derived fatty acids in the development of functional foods, nutraceuticals, and therapeutic agents targeting lipid metabolism and associated metabolic disorders.

NMBCW-91

Antiplasmodic, Haematoprotective, and Anti-inflammatory Properties of Polyherbal Teas in *Plasmodium berghei* Infected Mice

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Malaria remains a major global health burden, characterised by severe haematological alterations, oxidative stress and dysregulated inflammatory responses. This study investigated the antiplasmodic efficacy, haematoprotective potential, and immunomodulatory effects of three formulated polyherbal teas (PHT): PHT A (*Anacardium occidentale, Moringa oleifera, Cymbopogon citratus* leaves), PHT B (*Moringa oleifera, Cymbopogon citratus*, *Mangifera indica* leaves), and PHT C (*Anacardium occidentale, Moringa oleifera, Cymbopogon citratus*, *Mangifera indica* leaves) in *Plasmodium berghei*-infected mice. Following oral administration of the formulations for five (5) days, parasitaemia suppression, haematological parameters, and inflammatory cytokine profiles were evaluated. The polyherbal teas demonstrated significant ($p < 0.05$) dose-dependent suppression of parasitaemia levels, with PHT B exhibiting the highest activity. Malaria-induced anaemia, evidenced by reduced red blood cell count, haemoglobin concentration, and packed cell volume, was markedly ameliorated in treated groups. Pro-inflammatory cytokines (TNF-α and IL-6) were significantly ($p < 0.05$) reduced, while anti-inflammatory cytokine (IL-10) was upregulated, suggesting effective immunoregulation upon treatment. Furthermore, oxidative stress markers were attenuated alongside enhanced antioxidant enzyme activities, contributing to erythrocyte protection and reduced haemolysis. These findings demonstrate that the polyherbal formulations possess potent antiplasmodic, haematoprotective, and anti-inflammatory properties, likely mediated through synergistic phytochemical interactions.

NMBCW-92

Effects of Serum Micronutrients Status on Intravascular Haemolysis and Inflammation in Sickle Cell Anaemia

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Intravascular haemolysis and inflammation are key pathophysiological processes in sickle cell anaemia, contributing to disease severity and complications. This study investigates the relationship between serum micronutrient status, markers of intravascular haemolysis and inflammation in sickle cell anaemia (HbSS) compared to healthy controls (HbA). A cross-sectional study involving 120 young adults aged 18-45 years, comprising 60 individuals with HbSS genotype at their steady state recruited from the haematology clinic of University College Hospital (UCH) Ibadan and 60 healthy controls (HbAA genotype) recruited from the Institute of Child Health, UCH. Blood samples were collected to assess serum levels of zinc, iron, vitamin D and markers of haemolysis (lactate dehydrogenase, total bilirubin, and aspartate aminotransferase) and inflammation (C-reactive protein, interleukin-8, and nitric oxide) using standard laboratory methods. Statistical analysis was conducted to elucidate the interactions between analytes. The results revealed zinc, iron, and vitamin D were significantly lower in the HbSS compared to the HbAA group (p= 0.001). A strong positive correlation was observed between vitamin D and zinc levels (r =0.93, p= 0.001), a strong negative correlation between Vit. D vs IL-8, (r= -0.87, p=0.001) Zinc vs IL-8 levels (r = -0.80, p= 0.001), suggesting higher zinc and Vit. D concentrations may correlate with reduced inflammation in SCA. There is a need for targeted nutritional interventions to address Zinc and Vit. D deficiencies in individuals with SCA, which may contribute to improved clinical outcomes.

NMBCW-93

Effect of Mycotoxins on the Nutritional Quality of Different Sorghum Varieties Consumed In Bauchi State, Nigeria

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Sorghum, a staple food crop, is vulnerable to fungal contamination, particularly by *Aspergillus flavus*, Aspergillus niger, and Rhizoctonia, which produce mycotoxins such as aflatoxins. These mycotoxins pose significant health risks, including carcinogenic and immunosuppressing effects. This study investigates the effects of mycotoxins on the nutritional quality of different sorghum varieties consumed in Bauchi State, Nigeria. Sorghum samples (red, yellow, and white), both stored and unstored, were analysed for fungal contamination, proximate composition, mineral content, and amino acid profile. The results revealed that stored sorghum had the highest contamination, with *Aspergillus flavus* and Aspergillus Niger predominantly present, particularly in red sorghum. Aflatoxin concentrations were significantly higher in stored sorghum, with the highest concentration of AFB1 (0.497 mg/ml) and AFM1 (2.892 mg/ml) found in stored red sorghum. Proximate analysis showed significant differences in protein, fat, and carbohydrate content between stored and unstored samples. Stored red sorghum had the highest crude protein content of 14.5% compared to 12.3% in unstored samples. Mineral analysis revealed that stored red sorghum had the highest calcium content of 8.07 mg/100g, while unstored yellow sorghum had the lowest calcium value of 2.79 mg/100g. The amino acid profile indicated a decreased concentration of lysine, a key limiting amino acid, which was lower than the FAO/WHO recommended levels. These findings underscore the adverse effect of mycotoxin contamination on sorghum's nutritional value, emphasising the need for improved storage practices and regular monitoring to safeguard public health and nutritional standards in Bauchi State.

NMBCW-94

Formulation and Evaluation of Nutritional Quality of Yellow-Maize Based Ready-To-Use Complimentary Feeds

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Development of adequate complementary feeds (CFs) to improve infant and young child feeding requires crucial inclusion of animal source foods (ASFs) into plant-based foods (PBFs). This study investigated the compositional quality of CFs formulated from Nigerian yellow maize-based ready-to-use complimentary feeds. An attempt was made to formulate low-cost and nutritive complementary feeds using locally available cereals based on FAO/WHO recommendations. The formulations was made by mixing the ingredients in the appropriate percentage: yellow maize 35%, soya bean 35%, crayfish 10% and others 20%. The mixture was blended into flour and packaged for evaluation. Proximate component, essential minerals, Vitamins, anti-nutrient and heavy metals contents were evaluated. Ash, moisture and carbohydrates contents were all found to be promising. Vitamin C was found to meet the required standard. The anti-nutrient present are slightly or moderately found. The formulation was found to have significant content of Zn, Mg, Ca and Na with extreme low level of Pb, Cd, Cr, and Cu. This shows that this formulated CFs could be safe for consumption.

NMBCW-95

Effect of *Acacia nilotica* Seed Supplemented Diets on Haematological and Histological Parameters in Phenylhydrazine Induced Anaemia in Wistar Rats

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Anaemia is a major medical condition marked by shortage in red blood cells count and haemoglobin concentration, leading to impaired capacity of the blood to transport oxygen to body tissues and oxidative stress. This study evaluates the effect of *Acacia nilotica* seed supplemented diet on haematological and histological parameters of spleen in wistar rats induced anaemia with phenylhydrazine. Thirty six healthy wistar rats of 165g to 205g body weight were acclimated for 7 days. Randomly divided into six groups, comprising group I normal control fed commercial diet, group II untreated anaemic control, group III anaemic administered standard drug, and groups IV- VI anaemic fed 10%, 20%, and 40% powdered *Acacia nilotica* seed respectively for 21 days. Phenylhydrazine was use to induce anaemia intraperitoneally. Blood and spleen samples were excised for red blood cells, haemoglobin, platelet, pack cell volume, white blood cell and histopathology evaluation. Treatment groups demonstrated significant increase in haematological parameters accompanied by elevated white blood cells compared with anaemic untreated group ($p < 0.05$). Degeneration of the splenic tissues in group ll suggests phenylhydrazine induced oxidative damage while treated groups restored the pathological changes to normal. *Acacia nilotica* seed diets provided restorative effects against oxidative spleen damage and possess haematopoietic potential, thereby validating its folkloric usage in the management of anaemia.

NMBCW-97

Aqueous Extracts of Avocado Pear (*Persea americana*) Leaf and Seed Ameliorate Aluminium Chloride-Induced Neurotoxicity in *Drosophila melanogaster*

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Avocado pear (*Persea americana*) leaf and seed are used in traditional medicine for the management of several neurodegenerative diseases, including Alzheimer's disease. This study investigated the neuroprotective effects of pear (*P. Americana*) leaf and seed aqueous extracts in aluminium chloride-induced toxicity in fruit flies. The total phenol and flavonoid composition of pear leaf (PL) and pear seed (PS) were determined *in vitro*. Alkaloid compositions of PL and PS were characterised using high-performance liquid chromatography. Fruit flies were subsequently exposed to aluminium chloride (AlCl3) and the treated groups received 10 mg/g and 20 mg/g PL and PS-supplemented diets for 7 days. Survival analysis and negative geotaxis were carried out. The levels of thiobarbituric acid reactive species and total thiol and the activities of superoxide dismutase, acetylcholinesterase and monoamine oxidase were also assessed. Results show that PS had significantly ($p < 0.05$) elevated polyphenolic constituents compared to PL. Treated flies had dose-dependent mitigation of the impaired behavioural physiology, antioxidant status, and key enzymes linked to neurodegeneration observed in $AlCl_3$-induced flies. This neuroprotective effect of both PL and PS against aluminium-induced toxicity could be associated with their antioxidant, anticholinergic and antimonoaminergic properties. Therefore, PL and PS could be considered as an effective functional food with potent cognitive-promoting properties. However, the significantly ($p < 0.05$) enhanced ameliorative effects obtained in the PS could be linked to its higher phytoconstituents.

NMBCW-98

Evaluation of Nutritional Quality of *Ipomoea obscura* (Morning-Glory) Leaves

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Morning Glory (*Ipomoea obscura*) leaves are traditionally prepared as soup in some communities in northeastern Nigeria, However, there is limited information about their nutritional content. This study evaluated the nutritional quality of dried *Ipomoea obscura* leaves using standard analytical methods of the Association of Official Analytical Chemists (AOAC) and Atomic Absorption Spectrophotometry (AAS) for minerals evaluation. Proximate analysis per 100g of the sample revealed that the leaves contained appreciable amounts of 53g carbohydrate, 13g protein, 17g moisture, 10g crude fibre, and 6g ash, while lipid content was relatively low at 1g.Mineral analysis revealed 80mg calcium, and low amounts of 1.88mg iron and 0.41mg zinc per. Vitamin analysis further revealed 15mg vitamin C, 680 µg retinol activity equivalents (RAE) of vitamin A and 3.5mg vitamin B12, while vitamin B2 was not detected in the sample. All reported values represent the mean of three independent replicates. The result of this study highlight the nutritional potential of Morning Glory leaves and support their inclusion in household diets. This may help enhance food security, particularly in resource-limited communities.

NMBCW-99

Comparative *in vitro* Lipase Inhibitory Activity and Enzyme Kinetic Studies of Fresh and Dried *Carica papaya* Leaf Hydroethanolic Extracts

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Diabetes mellitus and obesity are major metabolic disorders associated with abnormal carbohydrate and lipid metabolism. Pancreatic lipase plays a crucial role in the digestion and absorption of dietary lipids, making it an important therapeutic target for the management of obesity-related diabetes. *Carica papaya* leaves contain several bioactive phytochemicals that have been reported to possess antidiabetic and antioxidant activities. This study evaluated and compared the *in vitro* lipase inhibitory activities of fresh and dried hydroethanolic leaf extracts of *Carica papaya* and investigated their mechanisms of inhibition through enzyme kinetic studies. Fresh and air-dried *Carica papaya* leaves were extracted separately by cold maceration using 70% ethanol. Lipase inhibitory activity was determined at different extract concentrations and compared with Orlistat as the standard inhibitor. IC50 values were calculated from concentration-response curves. Enzyme kinetic studies were performed using varying substrate concentrations, and Lineweaver-Burk plots were used to determine the Michaelis-Menten constant (Km), maximum reaction velocity (Vmax), and mode of inhibition. Both extracts exhibited concentration-dependent inhibition of lipase activity. At 1.0 mg/mL, the fresh extract showed higher inhibition (28.78 ± 2.87%) than the dried extract (13.36 ± 1.24%). The IC50 values were 2.295 mg/mL for the fresh extract, 7.439 mg/mL for the dried extract, and 1.008 mg/mL for Orlistat. Kinetic analysis demonstrated alterations in both Km and Vmax values for the extracts relative to the control, indicating a mixed mode of inhibition. The fresh extract exhibited stronger inhibitory activity than the dried extract. Fresh and dried hydroethanolic leaf extracts of *Carica papaya* possess lipase inhibitory activity, with the fresh extract demonstrating superior potency. The observed mixed inhibition suggests that phytochemical constituents of the extracts may interact with both free enzyme and enzyme-substrate complexes. These findings support the potential application of *Carica papaya* leaves as a natural source of bioactive compounds for the management of obesity-associated diabetes mellitus.

NMBCW-100

Evaluation of The Proximate Composition of *Chrysophyllum albidum* Whole Fruit Parts

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Chrysophyllum albidum is consumed globally, yet the nutritional profile of individual fruit parts remains under-reported. This study determined the proximate composition of whole cherry parts to evaluate their nutritional and industrial potentials. The fruit was analysed for various contents using standard AOAC procedure. From this study, it was revealed that the moisture content of the fruit was significantly (p < 0.05) highest and lowest respectively in the seed coat unripe (32.8 %) and the seed shell ripe (13.6%). The ash content was also significantly (p < 0.05) highest and lowest respectively in the seed shell unripe (7.6 %) and the cotyledon ripe (3.1 %), indicating mineral levels. Crude protein was also significantly (p < 0.05) highest and lowest in the cotyledon ripe (9.35 %) and the mesocarp ripe (4.05 %). The crude fibre content was estimated to be significantly (p < 0.05) highest and lowest respectively in the seed shell ripe (12.1 %) and the cotyledon unripe (0.7 %). Crude fat content was significantly (p < 0.05) highest and lowest in the cotyledon ripe (9.35 %) and the mesocarp ripe (4.05 %). Lastly, the carbohydrate content was significantly (p < 0.05) highest and lowest respectively in the exocarp unripe (64.97 %) and the seed coat unripe (4.05 %). This study showed marked variation in nutritional composition among cherry fruit parts. These findings suggest that cherry processing by-products, especially seed and peel, could be exploited for functional food, animal feed or nutraceutical applications, reducing waste and adding value.

NMBCW-101

Effect of Corn silk Extract on Oestrogen Level and Selected Osteoanabolic Markers in Ovariectomised Female Rats

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Oestrogen plays a crucial role in bone remodeling, and its decline during menopause is a major contributor to postmenopausal osteoporosis. This study investigated the effect of corn silk extract on oestrogen level and selected osteoanabolic markers in ovariectomised (OVX) female rats. Phytochemical analysis of corn silk extract was conducted using standard analytical methods. Three-month-old female Wistar rats weighing 170 ± 10 g were used for the study. The animals were subjected to either surgical ovariectomy (n = 25) or sham operation (n = 5). Two weeks after surgery, the rats were assigned to six groups (n = 5 per group) and treated orally for seven weeks with distilled water, corn silk extract (100, 200, or 400 mg/kg body weight), or alendronate (10 mg/kg body weight). At the end of the treatment period oestradiol level and selected osteoanabolic markers were determined. Phytochemical analysis revealed appreciable amounts of flavonoids and phenols in the corn silk extract. Treatment of OVX rats with varying doses of corn silk extract reduced body weight gain and significantly ($P < 0.05$) increased uterine weight and serum oestradiol level compared with untreated OVX rats. Furthermore, the extract significantly ($P < 0.05$) increased femoral bone calcium and phosphorus contents and attenuated the ovariectomy-induced alterations in serum ALP activity and osteocalcin levels. These findings suggest that corn silk extract is rich in bioactive phytochemicals and exhibits anti-bone-loss properties via improving bone mineral content and suppressed excessive bone remodeling associated with oestrogen deficiency.

NMBCW-102

Ameliorative Effect of Ethanol Extract of *Dialium guineense* Stem Bark on STZ-induced Diabetic Wistar Rat Blood

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Studies have shown that the diabetogenic agent streptozotocin (STZ) significantly impart the blood of mammals. The present study evaluated the ameliorative effect of ethanol extract of *Dialium guineense* (EEDG) stem bark on STZ-induced diabetic Wistar rats. Adult male rats (Wistar strain, n = 20, mean weight = 165 ± 15 g) were randomly assigned to four groups (5 rats per group): control, diabetic, metformin, and extract groups. Diabetes mellitus was induced via a single intraperitoneal injection of 50 mg/kg body weight (bwt) STZ. The diabetic rats were thereafter treated for 21 days with either 50 mg/kg bwt metformin (standard antidiabetic drug) or 1000 mg/kg bwt EEDG. Body weight, blood glucose and haematological parameters were measured on weekly basis. The results showed that STZ-induced diabetes mellitus significantly increased plasma blood glucose concentration, liver weight, and relative organ weight but these parameters were significantly and time-dependently reduced by EEDG stem bark ($p < 0.05$). In addition, there were no significant differences in the measured haematological parameters except that the plant extract significantly and time-dependently increased the levels of lymphocytes in STZ-induced diabetic rats ($p < 0.05$). These results indicate that ethanol extract of *D. guineense* stem bark contains bioactive compound(s) that could stimulate the immune system of diabetic rats.

NMBCW-103

Obu-Otoyo Brown Rock Salt Induces Rotenone-Like Striatal Neurotoxicity via Redox Imbalance, Excitotoxicity and Neurotransmitter Dysregulation in Rats

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Diet, is a primary and modifiable factor in Parkinson's disease (PD) risk and progression. Excessive salt intake has been linked to hypertension, oxidative stress, excitotoxicity, and neuro-inflammation, all of which exacerbate dopaminergic neuronal loss. *Obu-otoyo* (OBT), a brown rock salt, found in south-western Nigeria and is traditionally used as a dietary salt substitute for the managing hypertension and diabetes. However, OBT contains heavy metals implicated in neurodegeneration, raising concerns about its neurological safety. This study investigated the elemental composition, sub-chronic toxicity, and the Parkinsonian effects of OBT in male Wistar rats. Rats were divided into four groups (n=8):control; rotenone (2 mg/kg) and OBT at 500 and 1000 mg/kg for six weeks. Striatal markers of redox status (GSH, GPx and SOD), excitotoxicity (glutamine synthetase [GSn], glutaminase [GA], glutamate dehydrogenase [GDH] activities), and neurotransmitters regulation (AChE, tyrosine hydroxylase [TH], MAO, Dopamine) were assessed. Striatal histopathology was evaluated by haematoxylin and eosin (H&E) staining. OBT triggered striatal oxidative stress with reduced GSH GPx and SOD activities, alongside excitotoxic dysregulation marked by decreased GSn GA and GDH activity. Neurotransmitter metabolism disturbance were evident through suppressed AChE, and TH activities, reduced dopamine concentration and elevated MAO activity. H&E staining showed comparable striatal-cytoarchitectural disruption between OBT and rotenone groups. OBT, elicited striatal oxidative stress, excitotoxicity, and neurotransmitter dysregulation comparable to rotenone exposure, suggesting Parkinsonian-like neurotoxicity. These findings raise serious concerns about the long-term neurological safety of OBT consumption and underscore the need for public health guidance and further mechanistic investigation.

NMBCW-104

Nutritional Composition and Antioxidant Activity of an Antimalarial Drink from *Justicia carnea* and Orange Juice

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Malaria continues to be a significant public health burden, hence leading to the discovery of affordable, natural adjunct therapies. This study explored the nutritional composition and evaluated the antioxidant activity of the formulated beverage as an antimalarial, nutrient-rich, and antioxidant-rich beverage. The drink was formulated by combining various ratios of aqueous extract of *Justicia carnea* with a fixed volume of freshly squeezed orange juice and analysed for proximate composition, mineral content, and phytochemical screening using standard analytical AOAC procedures. Ascorbic acid was assessed by Titrimetry. Antioxidant activity was assessed via 2,2-Diphenyl-1-Picrylhydrazyl (DPPH), 2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) radical scavenging and Ferric Reducing Antioxidant Power (FRAP) assays. The formulated drinks exhibited high contents of carbohydrate (74.66–83.61%), protein (2–3%), vitamin C, and minerals (iron, sodium, potassium, and magnesium). It was also rich in flavonoids, alkaloids, saponins, and phenols. Antioxidant assays revealed strong DPPH scavenging and high FRAP values, correlating with total phenolic content (437–452mgGAE/100mL). The blend demonstrated synergistic effects, enhancing bioavailability and stability compared to individual formulations. This suggests the drink's capacity to attenuate oxidative stress and help mitigate anaemia in malaria management. In conclusion, the *Justicia carnea*-orange juice drink represents a promising, culturally acceptable functional antimalarial beverage with substantial nutritional and antioxidant profiles.

NMBCW-105

Impact of Bitter Leaf (*Vernonia amygdalina)* Flavoured Non-Alcoholic Beer on Haematological and Inflammatory Responses in *Plasmodium Berghei*-Infected Mice

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Malaria infection is caused by Plasmodium infestation and impairs the cells' anti-inflammatory and anti-oxidative responses. Since ancient times, bitter leaf (*Vernonia amygdalina*) has played a significant role in traditional medicine. It has also been said to possess anti-inflammatory properties and anti-oxidative qualities. A functional non-alcoholic beverage was then produced by a non-alcoholic wheat beer with bitter-leaf and hops in varying percentage inclusion. Fifty mice weighing (20-25g) were grouped into five where n=10. The conventional *P.berghei* strain NK65 (sensitive to chloroquine) was used to infect the experimental animals, and the temperature and suppression percentage of their parasitaemia levels were assessed. In the spleen of the infected mice, the impacts of the sample (bitter leaf-flavoured non-alcoholic beer) and chloroquine (CQ) were measured by observing their haematological parameters and antioxidant indicators. Additionally, the levels of inflammatory cytokines were assayed in the serum of the infected animals. The mice were also monitored for their temperature and behavioural changes. Compared to mice left untreated and animals that received chloroquine treatment, infected mice who received beer samples demonstrated a significant ($P<0.01$) decrease in parasitaemia levels. The treated groups showed a significant ($P<0.05$) suppression of pro-inflammatory cytokines and an elevation of anti-inflammatory cytokines. The study revealed that bitter-leaf flavoured non-alcoholic beer enhanced host antioxidant status and reduced parasitaemia levels by regulating some inflammatory cytokines and oxidative responses and thus could be a functional beverage in malaria management.

NMBCW-106

A Comparative Study on the Nutritional Properties of Yogurt Produced From Soybeans, Cow Milk and Commercial Yogurt

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Yoghurt is one of the most popular fermented dairy products which have a wide acceptance worldwide whereas it's nutritional and health benefits are well known for centuries. This research explores a comparative analysis of the nutritional properties of yogurts produced from soybeans, cow milk, and commercially available yogurt. Soybeans and cow milk yoghurt were prepared using a standard method with *Lactobacillus bulgaricus* as starter culture. The fermentation process was carried out under standard conditions and stored in a refrigerator at 4°C prior to analysis to preserve their integrity. The proximate, minerals and vitamins contained were determined by adopting the method described by AOAC, 1980. The crude fibre and protein content was higher in soybean yogurt (5.32 ± 0.03%) and (7.46 ± 0.04%) respectively, with adequate concentration of vitamin B9 and some minerals at (87.94 ± 0.19 mg/100g). calcium (27.55 ± 0.23 mg/L), Iron in cow milk yogurt (0.96 ± 0.02 mg/L), Potassium content was greatest in cow milk yogurt (28.20 ± 0.57 mg/L). The comparative analysis of the three yogurt types indicated that soybean yogurt exhibited superior nutritional qualities. Overall, these findings suggest that soybean yogurt represents a nutritionally balanced, plant-based alternative to traditional dairy yogurt, offering significant benefits for lactose-intolerant individuals, vegans, and consumers seeking enhanced protein and micronutrient intake.

NMBCW-107

Effect of Processing Method on the Antinutritional Factors of Sorghum, Soya beans and Cashew nuts Complementary Food Blends

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This study investigated the effect of processing methods on the anti-nutritional factors of complementary food blends formulated from Sorghum, Soya beans, and Cashew nuts. The aim of the research was to evaluate how different traditional processing techniques influence the reduction of anti-nutritional components in these locally available food materials. The specific objectives were to determine the levels of major anti-nutrients (phytate, oxalate, tannins, trypsin inhibitors, and saponins) in raw and processed samples, formulate complementary food blends from the processed ingredients, and compare the effectiveness of the processing methods in reducing anti-nutritional factors. Sorghum grains were subjected to fermentation and malting, soya beans to soaking, boiling, and roasting, while cashew nuts were processed by roasting and blanching. Standard analytical procedures were used to quantify anti-nutritional factors before and after processing. Complementary food blends were formulated in predetermined ratios and analysed using established laboratory methods. Results showed significant reductions ($p < 0.05$) in phytate, tannins, oxalate, and trypsin inhibitor activity across all processed samples compared to raw counterparts. Fermentation and malting were particularly effective in reducing phytate and tannin content in sorghum, while boiling significantly decreased trypsin inhibitors in soya bean. Roasting and blanching reduced tannins and oxalate levels in cashew nuts. The formulated complementary blends from processed ingredients exhibited markedly lower anti-nutritional contents and improved potential mineral bioavailability. In conclusion, appropriate processing methods significantly reduce anti-nutritional factors in sorghum, soya bean, and cashew nut complementary food blends. The application of fermentation, soaking, boiling, malting, roasting, and blanching enhances the nutritional quality and safety of these blends, making them more suitable for infant and young child feeding.

NMBCW-108

Nephroprotective Effects of Okra Extract-Orange Juice Mixture in Streptozotocin-Induced Diabetic Rats

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Diabetes mellitus is a complex metabolic disorder often accompanied by renal complications. This study examined the nephroprotective effects of an Okra extract-Orange juice mixture in streptozotocin-induced rats. The mixtures were prepared in four ratios: 0% okra + 100% orange, 50% o kra + 50% orange, 70% okra + 30% orange, and 90% okra + 10% orange. *In vitro* analyses were assessed on phenolic and total flavonoid contents, total antioxidant capacity (TAC), DPPH, ABTS, FRAP, reducing power, and α-amylase inhibitory activity of the mixtures. Diabetes was induced with a single dose of streptozotocin (i.p 50 mg/kg), after which rats received daily oral treatment with the mixtures or glibenclamide for 21 days. Plasma Creatinine and urea levels were also measured. Renal oxidative stress was evaluated by assessing malondialdehyde (MDA) and nitric oxide (NO) level, reduced glutathione (GSH) content and superoxide dismutase (SOD) and catalase (CAT) activities. Total flavonoid showed significant ($p < 0.05$) increase with higher okra concentrations. TAC decreased significantly as okra content increased. ABTS and DPPH radical scavenging activities, as well as α-amylase inhibition, increased significantly with higher okra extract levels. Treatment with the mixtures significantly ($p < 0.05$) reduced blood glucose as well as plasma creatinine and urea levels. Renal NO and MDA concentrations were also significantly decreased, accompanied by increased GSH levels and enhanced activities of SOD and CAT. These findings suggested that okra extract-orange juice mixture may confers a nephroprotective effect in diabetic rats.

NMBCW-109

Importance of Nigerian Medicinal Plants as Agents of Green Nanosynthesis and their Applications

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Nigeria is endowed with a vast diversity of medicinal plants long been utilised in traditional healthcare systems and are increasingly being explored for technological applications, including nanotechnology. The growing interest in sustainable nanotechnology has brought plant-mediated nanoparticles synthesis to the forefront as an environmentally friendly alternative to conventional methods. This review examines the landscape of Nigerian medicinal plants and documented therapeutic relevance, and connects these with their current and potential roles in nanoparticles synthesis. These plants possess medicinal value because of the presence of various bioactive compounds, including; tannins, alkaloids, phenolics, terpernoids etc, which serves as reducing agents and surface stabilisers in green synthesis. Relevant literatures were analysed using google scholar® and PubMed to identify plants families well-known in Nigeria, their phytochemistry and the types of nanoparticles produced from prominent species. In addition, the usefulness of Nigerian medicinal plants as agents for nanosynthesis and their multifaceted applications were evaluated. However, a large group of medicinal plants with similar phytochemical profiles alongside the subtype of non-metallic nanoparticles remains largely unstudied, suggesting that current research trends reflect selective focus rather than true limitations in plant potential. At the same time, important concerns around toxicity, biocompatibility, and scalability needs to be addressed. Beyond the use of plant-derived nanoparticles in healthcare, they are gaining attention in environmental safety, nanocatalyst in the degradation of dyes and nano-fertilisers in agriculture. Overall, this review highlights the need for more deliberate approach that links phytochemistry with nanoparticles design, while also prioritising safety and future applications.

NMBCW-110

Climate- Smart Indigenous Food Systems for Infant Nutrition: A Review of Legume- Cereal Blends in Combating Protein Energy Malnutrition

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Protein energy malnutrition (PEM) affects about 30–35% of children under five in sub-Saharan Africa, particularly during the complementary feeding stage characterised by low dietary diversity and poor protein quality. Climate change exacerbates this burden by reducing the availability of nutrient-dense foods. Climate-smart indigenous foods (CSIFs) are locally adapted, nutrient-rich, and climate-resilient crops such as legumes (cowpea, Bambara, groundnut) and cereals (millet, sorghum), which provide a sustainable, nutrition-sensitive solution. Legume-cereal blends enhance protein quality through amino acid complementation, improving lysine and methionine balance and yielding measurable gains in DIAAS and PDCAAS. (Digestible Indispensable Amino Acid Score and Protein Digestibility-Corrected Amino Acid Score, respectively). However, anti-nutritional factors limit nutrient utilisation. Processing techniques such as fermentation, germination, and enzymatic treatment improve bioavailability, digestibility, and functional properties, while also modulating gut microbiota to enhance nutrient absorption and growth outcomes. Beyond nutrition, CSIFs strengthen food system resilience, reduce environmental impact, and improve accessibility, offering a scalable strategy to address both the nutritional and climate-related drivers of PEM.

NMBCW-111

Comparative Evaluation of Artificial Neural Network and Response Surface Methodology in the Enzymatic Hydrolysis of P.conophora for Reducing Sugar Production

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Reducing sugars are monosaccharides made up of an aldehyde or ketone moiety, and are of great interest due to their role in bioethanol production. Efficient saccharification of lignocellulosic biomass into reducing sugars for bioethanol production has gained considerable attention due to the recalcitrant nature of many agricultural wastes. In this study, Artificial Neural Network (ANN) and Response Surface Methodology (RSM) were evaluated as a data driven approach in modelling reducing sugar production from *P.conophora* by *Pichia guilliermondii*. The data set comprised of 20 experimental runs using substrate concentration, incubation time, and nanoparticle concentration as input variables. The two models exhibited high goodness of fit with coefficients of determination (R^2) of 99.39%, 99.11%, for RSM, and ANN, respectively. The RSM predicted the optimal hydrolysis condition, yielding 140.86 mg/mL of reducing sugars at 20% substrate concentration, incubation time of 2 days, and nanoparticle concentration of 0.08 mg/mL, when compared to ANN which yielded a maximum of 138.23 mg/mL under the same condition. Furthermore, statistical appraisal of the bioprocess shows that RSM demonstrated superior performance with lower prediction errors (MSE = 6.11, RMSE = 2.85, HYBRID = 0.0.54, MPSED = 7.33) when compare to ANN (MSE = 9.89, RMSE = 3.15, HYBRID = 3.75, MPSED = 19.37). From our findings, both modelling approaches provided a strong predictive performance, with RSM predicting the optimum conditions for effective saccharification of *P.conophora* more accurately.

NMBCW-112

Comparative Evaluation of the glycaemic indices, Nutritional and PhytochemicalComposition of *Phoenix dactylifera* fruits against Selected Fruits used as Natural Sweeteners

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The growing need for healthier alternatives to refined sugars has fuelled interest in natural sweeteners that provide additional nutritional benefits. This study compared the glycaemic indices, nutritional and phytochemical compositions of the sayer cultivar of *Phoenix dactylifera* fruit (date fruit) to selected fruits typically used as natural sweeteners, such as mango, cashew fruit, cherry, banana, and pineapple. Proximate analysis, mineral and vitamin contents, sugar profile, phytochemical composition, antioxidant activity, and glycaemic indices were determined following standard procedures. Sayer date fruit (SDF) showed a significantly lower moisture content and significantly higher ash, protein, fibre, and total sugar contents, with glucose and fructose being the most abundant compared to the tested fruits. The concentrations of potassium, magnesium, and calcium were significantly higher in SDF compared to the tested fruits, but showed a lower vitamin content. Total phenolic content of SDF was significantly lower compared to mango, cashew and cherry, but not statistically different from banana and pineapple. Gas chromatography mass spectrometry (GC-MS) analysis showed the presence of 39 bioactive compounds with potential pharmacological applications. Antioxidant activity, mean post prandial glucose response to SDF, glycaemic index, and glycaemic load were not statistically different compared to the tested fruits, except cashew and banana. The present findings reveal that Sayer cultivar of *Phoenix dactylifera* is a viable natural sweetener with nutritional and pharmacological benefits over processed sugars and a richer source of minerals than the tested fruits. However, its low vitamin content suggests supplementing rather than replacing other fruits.

NMBCW-113

Valorisation of Pineapple (*Ananas comosus*) Crown By-product as a Bioactive Beverage: *In vitro* Antioxidant and Antidiabetic Potential

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Pineapple (*Ananas comosus*) crown is an underutilised agricultural by-product with growing ethnopharmacological relevance. Globally, the burden of type 2 diabetes mellitus and oxidative stress related diseases continues to multiply, increasing interest in plant based therapeutic options. This study evaluated the *in vitro* antioxidant and antidiabetic potential of pineapple crown tea prepared by hot water infusion for 5, 10, 15, and 20 minutes. Total phenol content (TPC), total flavonoid content (TFC), ferric reducing antioxidant power (FRAP), 2,2-azino-bis 3-ethylbenzthiazoline-6-sulphonic acid (ABTS) and 1,1–diphenyl-2 picrylhyrazyl (DPPH) radical scavenging activities, iron chelation, and alpha-amylase and alpha-glucosidase inhibitory activities were determined using standard spectrophotometric methods. TPC and TFC increased progressively with infusion time, with the extract at 15 minutes having the highest TPC (11.31 ± 0.33 mg GAE/g) and TFC peaking at 11.2 ± 0.07 mg QUE/g contents at 15 minutes. Antioxidant properties as assessed by FRAP, DPPH, and ABTS assays were concentration and infusion time-dependent, with the most pronounced radical scavenging and ferric reducing power observed at longer infusion durations and higher sample concentration. Iron chelation capacity was shown in the samples at all infusion times, as a distinct concentration pattern relative to the radical scavenging activity of the extracts was observed. Alpha-amylase inhibition was dose and time-dependent, with a peak of 74.83 ± 0.24% at 15-minute infusion. Also, alpha-glucosidase inhibition was most pronounced at 15 and 20-minute infusions (81.05 ± 0.19% and 80.95 ± 0.12% respectively), which is far better than the activity at shorter infusion times. These findings revealed that *Ananas comosus* crown tea possesses significant antioxidant and antidiabetic properties that are optimised at a 15-minute infusion time, suggesting its potential as an accessible functional beverage for diabetes management and oxidative stress related diseases.

NMBCW-114

Storage Conditions Influence on the Vitamins and Phytoestrogen Content of *Brachystegia eurycoma* (Achi) Seeds

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Storage conditions can influence the shelf life, safety, and nutritional quality of food. This study investigated the effect of storage conditions on the vitamins and phytoestrogen content of *Brachystegia eurycoma* (achi) seeds. Achi seeds were bought from mile 3 market, roasted, fermented, cleaned and ground into fine powder and preserved under three conditions—open air, zip-lock, and airtight containers for 2 weeks and analysed weekly. Vitamins were determined using spectrophotometric method while quantification of phytoestrogens was done using Gas Chromatography-FID at a weekly interval. Significant differences ($p < 0.05$) was done using SPSS version 25. The concentration of water soluble vitamins reduced significantly except for vitamin B12 which had significantly higher values at week 2 with highest concentration in zip-lock (12.204mg/kg) and vitamin C at week 1 for open air storage condition (60.430mg/kg) in comparison to the baseline (8.912 and 58.170mg/kg respectively). The concentration of fat-soluble vitamins, A, D, and E increased at weekly interval with significant increase at week 2 having the highest concentration in open air storage condition (18.537, 18.139, and 25.902mg/kg for vitamins A, D, and E respectively). For the phytoestrogens, resveratrol, secoisolariciresinol, matairesinol, and glycitein had higher concentration at week 2 in zip-lock (20.433, 196.349, 207.407, and 257.485nmol/L respectively) in comparison to other groups. In conclusion, zip-lock was able to better preserve the phytoestrogen content while fat-soluble vitamins were retained better in open air condition.

NMBCW-115

Larvicidal Activity of Essential Oil from *Cinnamon zeylanicum* against Anopheles Mosquito in Some Fadama Irrigation Areas in Bauchi Metropolis

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The use of many synthetic insecticides in mosquito control has harmful effect on human health, their non-biodegradable nature, issue of environmental sustainability and increasing insecticide resistance. One of the most effective alternative approaches is to explore the herbal biodiversity as a new weapon against the synthetic insecticides and for sustainable method of vector control. Medicinal and aromatic plants possess insecticidal properties and their essential oils exhibits strong mosquito repellent and larvicidal activities. Hence, this study determines the efficacy of cinnamon bark essential oil (EO) as larvicide against anopheles mosquito larva. Mosquito larvae were collected in a 200ml capacity capped sample bottles fron Nigerian Union of Teachers secretariat environs and Yuli Area of Bauchi Metropolis..The cinnamon bark essential oil was extracted using soxhlet extraction method with the percentage yields of 6.8% using methanol as solvent while the yield of 5.7% was recorded for cinnamon using chloroform as solvent. The physicochemical and elemental analyses of the essentials oil and the water sample hosting the larvae were carried out, all the parameters were found within the permissible limit according to WHO standard. The larvicidal bioassay revealed that the cinnamon EO has LC50 and LC95 values of 6.09 and 175.8ppm respectively at 24 hours while the LC50 and LC95 values were 5.19 and 161.10ppm respectively at 48hours. This shows that cinnamon EO has higher lethal activity which could be effectively exploited for the biological control of Mosquitoes. This study establishes that the cinnamon bark EO at concentration of 175.8ppm is capable of killing 95% of the larval population within 24 hours

NMBCW-116

Assessment of Renal Function in Normal weight and Overweight/Obese Undergraduate Students in a Nigerian University

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Adolescent obesity is a global epidemic with increasing prevalence. It appears that adolescent obesity in Nigeria is underreported. Therefore, renal function indices in normal weight as well as overweight/obese undergraduate students of Edo State University Iyamho, Nigeria were evaluated in this study. 178 students (undergraduates) of Edo State University Iyamho, Nigeria, aged 15-24 years were recruited randomly into this cross-sectional study. Participants were grouped into normal weight (109 participants) and overweight/obese (69 participants). Blood pressure and indexes of anthropometry; height, weight, BMI, waist (WC) and hip circumferences (HC) etc. were determined. Serum from 5 ml of venous fasting blood obtained from every participant was used for determination of albumin, uric acid, creatinine, gamma glutamyl transferase, cystatin C, alkaline phosphatase (ALP) and urea. Uric acid: albumin, uric acid: creatinine and creatinine: cystatin C ratios and glomerular filtration rate (GFR) were evaluated. Chi-square and student's t-test were used for comparing categorical and quantitative variables, respectively. Pearson correlation coefficient was used in determining the association among the variables. Statistical significance was at $P<0.05$. Females accounted for 76.8% of participants with overweight/obesity. Systolic blood pressure was higher in obese when compared with overweight participants ($P<0.05$). ALP was higher in overweight compared with obese individuals ($P<0.05$). Uric acid: albumin ratio was positively associated with weight in normal weight participants ($P<0.05$). There was an inverse association of creatinine with GFR in overweight/obese participants ($P<0.05$). This study suggests that uric acid: albumin ratio may be involved in obesity.

NMBCW-117

Hepatoprotective and Antioxidant Potentials of *Rauwolfia Vomitoria* Leaf Extract in *Plasmodium Berghei*-Infected Mice

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Malaria-induced liver dysfunction and oxidative stress remain major contributors to disease severity. This study aimed to evaluate the hepatoprotective and antioxidant potentials of *Rauwolfia vomitoria* leaf extract in *plasmodium berghei*-infected mice. Six groups of six mice each were used for the research. Group 1 received feed and 3% tween 80 and served as normal control, group 2 was infected with Plasmodium berghei but not treated and served as negative control and group 3 (positive control) was infected with Plasmodium berghei and treated with 2 mg/kg body weight of standard drug (Artesunate). Groups 4, 5 and 6 were also infected with Plasmodium berghei and treated with 200, 400 and 600 mg/kg body weight of ethanol leaf extract of Rauwolfia vomtoria respectively, via oral intubation for seven consecutive days. Our findings revealed that *Rauwolfia vomitoria* leaf extract was rich in phytochemicals. Infection of mice with P. berghei caused a significant ($p< 0.05$) increase in the activities of liver enzyme markers (ALT, AST and ALP) and concentrations of total bilirubin and malondialdehyde (MDA) while levels of albumin, total protein and activities of Superoxide Dismutase (SOD), reduced Glutathione (GSH) and Catalase (CAT) decreased significantly ($P<0.05$) relative to the normal control. However, treatment with the plant extract significantly decreased ($p<0.05$) the activities of liver enzymes, concentrations of total bilirubin and MDA with a corresponding increase in the activities of SOD, CAT and GSH in the parasitised mice. This study indicates that ethanol leaf extract of Rauwolfia vomitoria possess properties that may be useful in the management of liver disorders and oxidative stress elicited by Plasmodium berghei infection.

NMBCW-118

Production and Optimisation of Plastic-Degrading Enzymes from *Bacillus subtilis* CFB-09 using Response Surface Methodology

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Microplastic pollution has emerged as a major environmental challenge due to the persistence of plastic wastes and their adverse effects on environmental and human health. Enzymatic biodegradation offers a sustainable and eco-friendly alternative for plastic waste remediation however, low stability and catalytic efficiency of enzymes limit their large-scale application. This study investigated the production and statistical optimisation of plastic-degrading enzymes from bacteria isolated from plastic-contaminated soils. Bacteria isolates were screened for their ability to utilise polyethylene (PE), polyethylene terephthalate (PET), and polystyrene (PS) as sole carbon sources. Among the isolates, *Bacillus subtilis* CFB-09 exhibited superior substrate utilisation and was selected for further study. Extracellular plastic-degrading enzymes, including esterase, lipase, and PETase, were produced and characterised. Enzyme production was optimised using Response Surface Methodology (RSM) based on Box Behnken Design (BBD) in order to evaluate the interactive effects of temperature, pH, and inoculum volume. Maximum enzyme activities were obtained after 96 h of incubation. Optimum production conditions yielded esterase, lipase, and PETase activities of 666, 510, and 343.50 U/mL, respectively. Numerical optimisation predicted optimum conditions of 40 °C, pH 4, and 10% inoculum volume, with a desirability value of 0.80. Under these conditions, predicted activities increased to 758.36 U/mL, 546.54 U/mL, and 352.93 U/mL for esterase, lipase, and PETase, respectively. The developed quadratic models demonstrated high predictive accuracy and significant interactions among process variables. These findings highlight the biotechnological potential of *Bacillus subtilis* CFB-09 as a source of plastic-degrading enzymes and provide basis for developing efficient enzymatic strategies for microplastic biodegradation.

NMBCW-119

Ameliorative Effects of Aqueous and Hydroethanol Hibiscus and Polyherbal Extracts on Sperm Parameters in Paroxetine-Induced Infertile Male Wistar Rats

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Paroxetine, a selective serotonin reuptake inhibitor (SSRI), has been associated with impaired male reproductive function, including alterations in sperm quality. This study evaluated the effects of Aqueous polyherbal (AP), Aqueous Hibiscus (AH), Hydroethanol Hibiscus (HEH), and hydroethanol polyherbal (HEP) extracts on sperm parameters in paroxetine-induced infertile male albino Wistar rats. Infertility was induced by orally administering paroxetine (10 mg/kg), while sildenafil (3 mg/kg) served as the positive control. Sperm progressive motility, non-progressive motility, total motility, normal morphology, and sperm count were assessed following treatment at dose 250mg/kg of extract. Paroxetine administration resulted in marked reductions ($p<0.05$) in sperm quality, particularly sperm count ($40.00 \pm 1.00 \times 10^6$ cells/mL) and normal sperm forms ($50.00 \pm 5.00\%$), compared with the normal control group ($110.00 \pm 7.00 \times 10^6$ cells/mL and $67.50 \pm 2.50\%$, respectively). Treatment with AH demonstrated the most significant improvement in progressive motility ($65.00 \pm 2.89\%$) and total motility ($78.33 \pm 3.33\%$), exceeding values observed in both the negative and positive control groups. HEH and HEP treatments also improved motility indices, with total motility values of $71.67 \pm 4.41\%$ and $76.67 \pm 1.67\%$, respectively. AP treatment showed comparatively lower efficacy, recording the lowest progressive motility ($40.00 \pm 2.89\%$) and total motility ($56.67 \pm 1.67\%$) among the treated groups. Although all extract treated groups exhibited sperm counts lower than the normal and positive controls, significant improvements were observed compared to the paroxetine only group. These findings suggest that Hibiscus based extracts, particularly the aqueous extract, possess ameliorative effects on paroxetine-induced reproductive toxicity and may enhance sperm motility and morphology in male rats.

NMBCW-120

Investigation of the Neuroprotective and Memory-Enhancing Effect of *Thaumatococcus daniellii*--Fortified Diet in Aluminium Chloride-Induced Neurotoxicity in *Drosophila melanogaster*

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This study investigated the neuroprotective and memory-enhancing effects of *T. daniellii*-fortified diets in aluminium chloride (AlCl3)-induced neurotoxicity in *Drosophila melanogaster* (fruit flies). Total phenolic content, total flavonoid content, ferric reducing antioxidant power (FRAP), and lipid peroxidation inhibition were performed to screen the ethanolic, aqueous, and hydroethanolic (50:50 ethanol–water) extracts of *T. daniellii*. Eleven experimental groups were established for the main study: control, AlCl3 only, AlCl3 + donepezil (reference drug), ethanolic and aqueous extracts (0.1 and 1.0 mg/mL), and AlCl3 co-administered with each extract concentration. Flies were treated for seven days, with five vials per group containing forty flies each. Antioxidant, anti-inflammatory and acetylcholinesterase (AChE) inhibition assays were conducted. Ethanolic extract of *T. daniellii* exhibited significantly higher total phenolic and flavonoid contents, as well as FRAP antioxidant capacity compared to the aqueous and hydroethanolic extracts. All extracts strongly inhibited lipid peroxidation, reducing levels to approximately 72% (ethanolic), 82% (aqueous), and 85% (hydroethanolic), compared to 140% in the reference group. Ethanolic and aqueous extracts demonstrated greater antioxidant activity than hydroethanolic extract and were therefore selected for the main study. Both extracts significantly ($p < 0.05$) improved survival rate, climbing ability, and memory performance. AlCl3 exposure significantly induced oxidative stress, neurotoxicity, and inflammation ($p < 0.05$). Dietary supplementation with *T. daniellii* extracts significantly attenuated these alterations in a dose-dependent manner. *T. daniellii* exerts neuroprotective and memory-enhancing effects through antioxidant reinforcement and cholinergic modulation. *T. daniellii* is a promising natural dietary intervention for the prevention and treatment of neurotoxicity and memory decline.

NMBCW-121

Effect of *Corchorus olitorius* on Fertility Outcomes and Abortifacient Activity in Female Albino Rats

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Infertility and problems associated with fertility have been long public health issues. In this study, the fertility outcomes and abortificient effects were investigated in *Corchorus olitorius* leaf extract (COLE) treated non-pregnant and pregnant albino rats. Forty non-pregnant rats assigned to 4 groups of 10 rats each were treated such that while group 1 served as control, groups 2, 3 and 4 were administered COLE at 250, 500 and 1000 mg/kg body weight respectively. Thereafter, 5 animals from each group were sacrificed for hormonal and histological studies, while the other 5 were crossed with fertile males for pregnancy outcomes. Same protocol was adopted for the pregnant rats except that group 1 was the pregnant control and tests were carried out in both early and late stages of the pregnancy. Concentrations of FSH significantly decreased compared with control ($p<0.05$), while progesterone and oestradiol increased ($p>0.05$). Results of uterine and ovarian histology showed improved histological structures when compared with controls, as photomicrographs in groups 2-3 showed gland density of up to 17 and group 4 had up to 26 compared with 12 per HPF obtained for the control. On the ovarian photomicrograph, there was no significant pathology found in groups 2-4, compared to control. In the fertility study, all treated rats were pregnant without any mortality and no abortions were observed at all stages of the abortifacient study. The study concluded that consumption of *Corchorus olitorius* may enhance reproductive functions in females where they are found to have high potential fertility indice

NMBCW-122

Anti-Inflammatory and Organ-Protective Effects of *Musa paradisiaca* Extract in Streptozotocin induced Type 1 Diabetic Rats

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Diabetes mellitus is a chronic metabolic disorder characterised by persistent hyperglycaemia, systemic inflammation, metabolic dysregulation, and progressive organ damage. Chronic inflammation, dyslipidaemia, and structural injury to vital organs such as the liver and kidneys are major contributors to diabetic complications. This study evaluated the therapeutic effects of *Musa paradisiaca* extract on inflammatory biomarkers, renal function indices, lipid profile, and histopathological alterations in streptozotocin (STZ)-induced Type 1 diabetic rats. Diabetes was induced by a single intraperitoneal injection of STZ, followed by oral administration of graded doses of *Musa paradisiaca* extract for 28 days. Plasma levels of pro-inflammatory cytokines, including tumour necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6), were quantified. Renal function parameters, lipid profile indices, and histopathological changes in hepatic and renal tissues were also assessed using standard biochemical and histological techniques. Untreated diabetic rats showed significant elevations in inflammatory biomarkers, renal dysfunction indices, lipid abnormalities, and marked tissue damage. In contrast, treatment with *Musa paradisiaca* extract significantly reduced inflammatory marker levels, improved renal function and lipid profile, and preserved tissue architecture in a dose-dependent manner. These findings suggest that *Musa paradisiaca* extract possesses significant anti-inflammatory, organ-protective, and metabolic regulatory properties, indicating its therapeutic potential in the management of diabetes and its associated complications.

NMBCW-123

Effects of Feeding High Protein Diets on Selected Biochemical and Haematological Indices of Kwashiorkor-Induced Albino Rats

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Protein–Energy Malnutrition (PEM), particularly kwashiorkor, remains a major public health challenge in developing countries, Nigeria is no exception, necessitating the development of affordable and nutritionally adequate dietary interventions. This study was designed to formulate and evaluate high-protein food blends derived from locally available raw materials such as yellow maize, soybean, pumpkin seed, and fish meal; for the management of kwashiorkor using albino rat models. Yellow maize was fermented, soybean and pumpkin seeds were roasted, and fish was dried prior to formulation. The processed ingredients were blended in varying proportions to produce six experimental diets: Blend 1 (70% yellow maize: 30% soybean), Blend 2 (70% yellow maize: 30% pumpkin seed), Blend 3 (70% yellow maize: 30% fish meal), Blend 4 (70% yellow maize: 20% soybean: 10% pumpkin seed), Blend 5 (70% yellow maize: 15% soybean: 15% fish meal), and Blend 6 (60% yellow maize: 20% pumpkin seed: 20% fish meal). Therapeutic milk (F-100) served as the control diet. Kwashiorkor was induced in albino rats during the first phase of the study using cassava flour containing less than 2% protein. In the recovery phase, the experimental and control diets were administered to the rats. At the end of the feeding trial, blood samples were collected and analysed for biochemical and haematological parameters. Results indicated significant alterations ($P < 0.05$) in white blood cell count, liver enzymes (alanine transaminase, aspartate transaminase, and alkaline phosphatase), kidney function indices (urea and creatinine), serum albumin, total protein, red blood cell count, packed cell volume, haemoglobin concentration, and electrolytes (sodium and potassium). The formulated diets, particularly Blends 5 and 6, demonstrated superior recovery patterns across most biochemical and haematological indices, attributable to their higher protein quality, improved biological value, and lower antinutritional factors. The inclusion of fish meal also contributed essential nutrients such as docosahexaenoic acid (DHA) and fat-soluble vitamins. The findings demonstrate that high-protein composite diets formulated from locally available ingredients can effectively improve biochemical and haematological disturbances associated with kwashiorkor. Blends 5 and 6 showed the most promising therapeutic potential. It is therefore recommended that similar composite formulations be further optimised and subjected to clinical evaluation for possible application in community-based management of Protein–Energy Malnutrition. Additionally, scaling up production using cost-effective local resources could enhance accessibility and sustainability in resource-limited settings.

NMBCW-124

Hepatoprotective Effects of *Curcuma longa* and *Curcuma zedoaria* in Manganese-Induced Hepatotoxicity in Male Wistar Rats

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Manganese (Mn) is a vital trace element that plays a key role in various enzymatic processes, but too much of it can lead to liver toxicity and oxidative stress. This study looked into how *Curcuma longa* and *Curcuma zedoaria* can protect the liver from manganese-induced damage, using male Wistar rats for the experiments. A total of twelve groups of rats were utilised, which included a control group, a group exposed to manganese without treatment, and several treatment groups that received either *Curcuma longa*, *Curcuma zedoaria*, or *para-aminosalicylic acid* (PAS) at doses of 200 and 400 mg/kg body weight over periods of 1, 3, and 7 days. Additional groups received treatments without manganese exposure to see the baseline effects. The manganese exposure led to significant liver damage, as shown by increased levels of nitric oxide (NO), aspartate aminotransferase (AST), alanine aminotransferase (ALT), and total bilirubin (BIL). There was a significant drop in antioxidant markers like ferric reducing antioxidant power (FRAP), glutathione (GSH), and superoxide dismutase (SOD), while lipid peroxidation (LPO) levels rose. Changes were also seen in alkaline phosphatase (ALP), lactate dehydrogenase (LDH), and gamma-glutamyl transferase (GGT). Treatment with *Curcuma longa* and *Curcuma zedoaria* notably improved these biochemical changes, bringing liver enzyme levels back to normal and enhancing antioxidant status. These results indicate that both plant extracts have strong protective and antioxidant effects against manganese-induced liver damage. *Curcuma longa* and *Curcuma zedoaria* could be promising therapeutic options for managing manganese-induced liver toxicity by influencing oxidative stress mechanisms.

NMBCW-125

Synergistic Modulation of Oxidative Stress Markers by *Curcuma longa* and *Piper nigrum* in Indomethacin-Induced Gastric Ulceration

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Peptic ulcer disease remains a significant public health concern in Nigeria, largely driven by the widespread use of non-steroidal anti-inflammatory drugs (NSAIDs) such as indomethacin, which promote oxidative stress and gastric mucosal injury. Concerns associated with long-term use of conventional anti-ulcer medications have stimulated growing interest in safer, food-derived therapeutic alternatives. Although turmeric (*Curcuma longa*) and black pepper (*Piper nigrum*), possess antiulcer properties, evidence regarding their combined antioxidant effect is limited. This study investigated the antioxidant effects of the individual and combined extracts of these spices, in an indomethacin-induced gastric ulcer model in Wistar rats. Sixty rats were assigned into six groups (n=10): normal control, ulcerated control, standard control (omeprazole 20mg/kg), turmeric (200mg/kg), black pepper (100mg/kg), and a combined extract group. Treatments were given orally for 21 days prior ulcer induction (50mg/kg indomethacin). Serum catalase (CAT), superoxide dismutase (SOD), and malondiahyde (MDA) levels were assessed using standard spectrophotometric methods. Indomethacin significantly elevated MDA levels ($p<0.05$), indicating increased lipid peroxidation and oxidative imbalance. Both individual and combined extract treatments significantly reduced MDA levels compared with the ulcerated control. Notably, the combined extract effectively restored CAT activity toward normal values than either extract alone, suggesting potential phytochemical synergy between curcumin and piperine, although no additional benefit was observed in lipid peroxidation indices. These findings suggest that commonly consumed spices may serve as accessible antioxidant-based interventions against NSAID-induced gastric injury. Further molecular and computational investigations may clarify the mechanisms underlying this interaction.

NMBCW-126

The Roles of Medicinal Plants in the Management of Benign Prostatic Hyperplasia (BPH)

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In recent times, medicinal plants have gained significant attention in the field of medicine due to their natural composition of phytochemicals that have been shown to possess various medicinal properties. Benign prostatic hyperplasia (BPH) is a common medical condition that affects elderly males, characterised by the histological proliferation of epithelial cells in the prostate's transitional zone, leading to lower urinary tract symptoms (LUTS). This disease significantly affects the quality of life of those affected, causing discomfort, pain, and decreased physical and sexual function. The cause of BPH is not well elucidated and no definite information on risk factors exists. Factors chiefly age, genetics, lifestyle, hypertension, obesity, diabetes and insulin resistance have been linked to the development of BPH. The androgen-testosterones, its metabolite, dihydroxytestosterone (DHT) and oestrogen are believed to play a role in the development of BPH. BPH in most cases is treated with surgical procedures that allow normal voluntary expression of urine. Medications such as alpha- blockers and 5–alpha reductase among others which target the reduction of prostate gland or relaxation of the muscle tone are used to manage BPH. The use of medicinal plants in management and treatment of BPH has been reported and has shown some promises. This research therefore reviewed some common medicinal plants used by traditional medicinal practitioners in Nigeria for management of BPH.

NMBCW-127

Inhibitory Potentials of Phytochemicals in Formulated Diets against Alpha-Amylase and AlphaGlucosidase Activities

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Starch which is the most important plant derivative used by man, is one of the most abundant substances in nature and a polymer of alpha glucose. This study investigated the inhibitory effects of phytochemicals derived from formulated diets against Alpha- amylase and Alphaglucosidase activities. The diets were formulated with tiger nut (*Cyperus esculentus)*, date fibre (*Phoenix dactylifera)*, and coconut meat (*Cocos nucifera)* at different ratios. The A samples were in the ratios of40:30:30, 30:30:40, 30:40:30 while the B samples were in the ratios of70:20:10, 10:70:20, 20:70:10 respectively. The enzymes were analysed with standard methods, values were statistically analysed and significance noted at $P<0.05$. The result of the A samples showed that the percentage inhibitory activities of amylase was significantly higher in A1 at concentrations of 5 and 50 mg/ml. While its activity for A2 was higher at concentration of 100mg/ml and the inhibitory activity for A3 was significantly higher at concentration of 10mg/ml. For the B samples, the inhibitory activity of amylase for B1 sample was significantly higher than others at concentrations of 5, 50 and 100 mg/ml. The result of the alpha-glucosidase activity of A samples showed that the inhibitory activity of alpha-glucosidase for A2 was significantly higher than others at concentrations of 5 and 10 mg/ml. While B3 recorded the highest alpha-glucosidase inhibitory activity at 50 and 100 mg/ml. This study showed that the superior and consistent inhibitory activity of B1 for amylase activitymay suggest a synergistic effect among the phytochemicals. Also this study showed that B3 diet had better inhibitory potentials to alpha-glucosidase, making it a potentially effective blend which could be used for managing hyperglycaemia.

NMBCW-128

Ameliorating Effects of Kolaviron on Obesity Related Metabolic Disruptions in Female Albino Rats Fed with Lard Based High Fat Diet

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Obesity, a global health concern poses serious health risks. This study investigated the effects of kolaviron from *Garcinia kola*, alone and in combination with zinc on markers of obesity in female Wistar albino rats fed with lard-based high fat diet (LHFD). Kolaviron was extracted from bitter kola as elaborated in the method of Iwu (1985). Fifty (50) female rats were divided into five groups of ten (10) rats each. Group 1 was fed standard rodent chow, while Groups 2 to 5 were fed lard-based high-fat diet for eight weeks. Afterwards, six rats with the highest weight in each group were considered obese prone and were selected for treatment as follows: (i) normal saline (basal group); (ii) LHFD (untreated); (iii) LHFD + 200mg/kg kolaviron; (iv) LHFD + 200mg/kg + 30mg/kg zinc; (v) LHFD + 30mg/kg orlistat (standard drug). The treatment lasted for 28 days. From results, significant decreases were recorded in body mass index (BMI), waist circumference WC. Marked improvements were also recorded in hepatic antioxidant profile and markers of dyslipidaemia in the treatment groups compared to the negative control. Significant decreases were also recorded in the levels of fasting blood glucose, leptin, markers of inflammation, and in lipase activities in the treatment groups compared to group 2. No significant change was recorded in the adiponectin levels of the experimental animals. These findings suggest that kolaviron has potential as a natural therapeutic agent for managing obesity. The study concludes that kolaviron offers a promising alternative for natural obesity management interventions.

NMBCW-129

Exploring the Nutritional and Therapeutic Potential of *Mangifera indica* and *Irvingia gabonensis* kernels Enriched bread on Animal Model of Metabolic Syndrome.

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Fruit kernels are rich in phenolic compounds known to mitigate metabolic syndrome. This study evaluated the nutritional and therapeutic potential of *Mangifera indica* and *Irvingia gabonensis* kernels to mitigate metabolic syndrome through functional bread supplemented with the kernels. Kernels were processed (either blanched or defatted) and substituted for wheat flour at 50% and 75% levels in bread formulations. To simulate metabolic syndrome, *wistar* rats were divided into ten groups, based on bread-type and fed 20% fructose solution alongside kernel-enriched bread *ad-libitum* for 8 weeks; control group was fed conventional wheat bread. Analyses included phenolic determination, nutrient profiling, sensory evaluation, and an assessment of biochemical markers and adipose tissue histomorphology. Results showed that kernel enrichment significantly increased fibre, mineral, and phenolic content of bread. Specifically, *Irvingia*-based breads showed superior protein and ash levels, while *Mangifera* samples offered higher essential amino acids. Blanching significantly boosted the K/Na ratio of kernel-based bread while 50% kernel-enrichment were sensory-preferred. Biochemically, rats fed 50% kernel-based bread and 75% *Irvingia*-based bread exhibited optimal fasting glucose, insulin, and lipid profiles, in contrast to the metabolic strain observed in control group. Furthermore, liver marker enzymes remained within desirable ranges. Histomorphological examination revealed that the kernel-enriched bread prevented adipocyte hypertrophy; rats fed with these samples maintained smaller abdominal fat deposits and adipocytes (< 69 µm) compared to the control's enlarged adipocytes observed in the control group. This highlights the anti-lipogenic properties of the kernels. Consequently, incorporating processed kernels into staple food offers a promising dietary strategy against metabolic syndrome.

NMBCW-130

Ocimum basilicum Protects Against Charcoal-Smoked Fish Induced Toxicity via the Upregulation of Ahr Gene and Suppression of Inflammatory Cytokines in Fed Rats

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Charcoal-smoked fish is commonly consumed in many developing countries because of its distinct taste and ability to preserve food for longer periods. However, the smoking process can produce harmful compounds that may trigger oxidative stress and damage vital organs. This study evaluated the protective role of aqueous leaf extract of *Ocimum basilicum* against toxicity caused by charcoal-smoked fish and its effects on xenobiotic metabolism in Wistar rats. The animals were exposed to washed charcoal-smoked fish (WCS), unwashed charcoal-smoked fish (CS), and co-treatment with *Ocimum basilicum* extract at a dose of 200 mg/kg. Biochemical markers of liver function, body weight changes, and aryl hydrocarbon receptor (AhR) gene expression in liver and kidney tissues were assessed. The results showed that consumption of charcoal-smoked fish significantly reduced weight gain and increased serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), and bilirubin levels, indicating liver damage. In addition, exposure to smoked fish markedly decreased AhR gene expression in both liver and kidney tissues, suggesting disruption of normal xenobiotic metabolic processes. However, treatment with *Ocimum basilicum* extract improved body weight gain, normalised liver enzyme levels, and restored AhR gene expression in the examined tissues. Overall, the findings suggest that *Ocimum basilicum* possesses significant hepatoprotective and metabolic regulatory properties against smoke-related toxicity. These beneficial effects are likely linked to the plant's antioxidant and bioactive phytochemical constituents, which may help reduce oxidative stress and support normal cellular function. This study therefore supports the potential use of *Ocimum basilicum* as a natural dietary intervention for reducing the health risks associated with charcoal-smoked foods.

NMBCW-131

Formulation and Evaluation Of Zobo Drink (*Hibiscus sabdariffa*) Supplemented With Fluted Pumpkin Leaves (*Telfairia occidentalis*), *Moringa* (*Moringa oleifera*) and Ginger (*Zingiber officinale Roscoe*)

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Zobo drink (*Hibiscus sabdariffa* drink) is a nonalcoholic local beverage made from different varieties of flower *Hibiscus sabdariffa* by boiling and filtration. Zobo is consumed due to its medicinal advantages. In view of the current study, formulated zobo beverage by blending zobo, *Moringa* leaves, fluted pumpkin leaves and ginger. Three composite blends designed Z1, Z2 and Z3 were formulated. Nutritional composition, functional properties and sensorial attributes of the blends were investigated using standard analytical methods of AOAC. Date obtained were subjected to ANOVA and results expressed as means and standard deviation of triplicate determination. Results of proximate composition were within the codex recommendation. Results of the qualitative phytochemistry revealed that all the phytoconstituents determined were all present. Functional properties revealed that reconstitution index ranged from 5.40 to 6.00, wettabiliy ranged from 0.57 to 0.63, sensory evaluation revealed that sample Z3 was more preffered by the panellists. Therefore, the current study have revealed that by supplementing zobo with proper amount of ingredient, it is possible to produce a beverage that is rich in micro and macro nutrients and used as a traditional medicine.

NMBCW-132

Modulatory Effects of "Cocoa" Enriched Crackers on *Plasmodium* load, Haemodynamic and Antioxidant Properties of *Plasmodium- berghei* Infected Mice

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Malaria continues to pose a significant public health burden, particularly in Sub-Saharan Africa, where the disease remains associated with high morbidity and mortality. In addition to parasitaemia, malaria infection is characterised by oxidative stress, haemodynamic alterations, anaemia, metabolic disturbances, and organ dysfunction. Nutritional interventions enriched with bioactive compounds have attracted increasing interest as complementary approaches for improving host resilience during infection. This study investigated the effects of cocoa (*Theobroma cacao*) powder-enriched crackers on parasitaemia, haemodynamic parameters, and antioxidant status in *Plasmodium berghei* infected mice. Functional crackers fortified with cocoa powder were formulated and administered to infected animals, while comparison groups included chloroquine-treated and control groups. Evaluations included parasitaemia, blood pressure, body temperature, haematological indices, lipid profile, liver function markers, oxidative stress biomarkers, nitric oxide levels, and arginase activity. Infection produced significant physiological alterations, including hypotension, hyperthermia, anaemia, dyslipidaemia, hepatic dysfunction, and oxidative imbalance. Administration of cocoa-enriched crackers resulted in a marked reduction in parasite load and improvement in cardiovascular, haematological, metabolic, hepatic, and antioxidant parameters. Enhanced nitric oxide bioavailability and improved redox status were also observed among treated animals. The findings suggest that cocoa-enriched crackers possess functional and nutraceutical properties capable of supporting physiological stability during malaria infection and may serve as a valuable dietary adjunct in malaria management.

NMBCW-133

Evaluation of Phytochemical Constituent, Nutritional Composition, and *in vitro* Antioxidant Capacity of *Dennettia tripetala* Aqueous Leaf Extract

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Dennettia tripetala (DT) leaves are commonly used as decoction in traditional medicine for the management of certain health conditions including fevers, asthma, diarrhoea, anaemia, pain, diabetes andbacterial infections, due to its bioactive compounds. In this study, the aqueous extract was investigated for its phytochemical, nutritional and antioxidant potential. Fresh leaves of *Dennettia tripetala* were collected, air-dried, pulverised, macerated in distilled water and thereafter, concentrated with a rotary evaporator. Using standard methods, nutritional composition, qualitative phytochemical and *in vitro* antioxidant capacity were evaluated. Results of the proximate analysis show that DT contains moisture content (11.9%), crude fibre (48.5 %), crude protein (6.21%), fat content (7.3%) and ash content (8.65%). Mineral analysis indicates phosphorus (100.5mg/100g) as the predominant mineral, followed by calcium (24.5mg/100g), potassium (24.3mg/100g), sodium (19.04mg/100g), magnesium (9.22mg/100g), iron (5.3mg/100g) and zinc (1.97mg/100g). Qualitative phytochemical analysis revealed the presence of cardiac glycosides, saponins, terpenoids and reducing sugars, while flavonoids, tannins, alkaloids, steroids and coumarins were not detected. In addition, DT effectively scavenged DPPH radical in a concentration-dependent manner. In the same vein, the extract demonstrated ferric reducing power and total antioxidant capacity. The findings of this study portray the rich contents of phytochemicals and nutrients in *Dennettia tripetala*, giving credence to its effectiveness in health management.

NMBCW-134

Antioxidant Properties of Neem (*Azadirachta indica*) Leaf-Based Beverage: A Comparative Study

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The increasing incidence of oxidative stress-related diseases highlights the need to develop functional foods abundant in natural antioxidants. This study explored the antioxidant capabilities of beverages made from neem (*Azadirachta indica*) leaves, concentrating on the impact of different infusion times (5, 10, and 15 minutes) with the addition of citrus fruits- lemon (*Citrus limon*) and lime (*Citrus aurantiifolia*). The prepared beverages were analysed for total phenolic and flavonoid content, 1,1-diphenyl-2-picrylhydrazyl (DPPH), 2,2′-azino-bis(-3-ethylbenzthiazoline-6-sulphonate)-ABTS and hydroxyl (OH) radical scavenging abilities, Fe^{2+} chelation efficiency, and inhibition of lipid peroxidation in mouse spleen homogenates. Findings revealed that longer infusion times improved antioxidant properties considerably, with the 15-minute infusions providing the highest levels of total phenolic (up to 56.30 ± 1.26 mg GAE/g) and flavonoid (up to 26.05 ± 0.65 mg QUE/g) content. Adding citrus, especially with lemon, boosted antioxidant activity. The neem-lemon beverage infused for 15 minutes exhibited highest DPPH (60.27 ± 6.42%) and ABTS (2.35 ± 0.16 mmol TEAC) scavenging rates, Fe^{2+} chelation (78.21 ± 7.81%), and hydroxyl radical inhibition (63.17 ± 5.31%). It also significantly lowered malondialdehyde (MDA) levels in assays involving Fe^{2+}-induced lipid peroxidation. These results highlight the potential of neem-citrus beverages, particularly the neem-lemon combinations, as potent antioxidant functional drinks. Addition of citrus fruits to neem as functional beverages, the optimisation of infusion times for maximum bioactive retention and formulation techniques could improve their acceptance and health benefits, facilitating their role in preventive nutrition.

NMBCW-135

From Wild to Farm: A Stage-Based Meta-Analysis of *Protopterus annectens* Culture in Nigeria

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Diversification of species is required beyond a few production systems for global aquaculture intensification. The situation in Nigeria is very critical as the locals are very dependent on catfish so that it is necessary to assess Nigeria native candidates. The West African lungfish is a candidate for climate resilient farming due to its ability of obligate air breathing and drought aestivation, as well as low oxygen tolerance. This study conducted a stage- based Meta analysis with quantitative evaluation of the feasibility of domestication of *Protopterus annectens* from wild catch to complete domestication in aquaculture in Nigeria. The studies identified through the systematic search using the PRISMA framework spanned the period 2000 to 2025, which resulted in 34 studies being included, each of which had a dataset categorised based on the four Domestication Stages outlined in the PRISMA. It was developed, a novel Stage Feasibility Index (SFI; 0–1 scale) that incorporates a combination of survival, growth and reproduction scores. The growth performance (SFI = 0.84) was moderately achievable, the survival at capture (SFI = 0.78) was quite achievable with high variation, and the acclimatisation (SFI = 0.71) was quite achievable but with high variation, and the reproduction (SFI = 0.15) was low and there was no recorded spawning in the hatchery. The random effects model gave an overall SFI of 0.57 (95% CI: 0.42–0.72; $I^2 = 84.3\%$, $p < 0.001$). There is incomplete systematic transition from wild to farm, reproduction being the limiting factor. This framework offers a quantitative path to follow for domestication research with rare species.

NMBCW-136

Influence of Domestic Preparation Methods on Xenobiotic and Pesticide Residues in *Phaseolus vulgaris*

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Phaseolus vulgaris is a major global dietary protein source; however, pesticide residues from cultivation and postharvest preservation may persist along the food chain. Household cooking practices such as soaking, boiling, and filtrate handling can reduce, redistribute, or transform these residues. This study evaluated the influence of domestic preparation methods on the persistence, reduction, and transformation of pesticide-derived residues in *Phaseolus vulgaris* using Gas Chromatography-Mass Spectrometry. Eight representative preparations (A–H) were designed to simulate household conditions. Samples (173g beans and 50cl water) were extracted using a modified QuEChERS method and analysed on an Agilent 7890A GC coupled with a 5675C inert MSD fitted with a 30 m × 0.25 mm × 0.25 µm HP-5MS column. Compound identification was performed using the NIST 2017 spectral library and validated in accordance with AOAC (2023) guidelines, with quantification based on relative peak areas. Seventy-seven xenobiotics were detected across all preparations, with marked variability. Filtrate-retained samples exhibited higher compound diversity, whereas filtrate-discarded or dry-boiled samples (C, D) contained fewer residues, although some semi-volatile aromatics were elevated, including 4-dibenzofuranamine (21.93%) and 4-nitrophenyl laurate (11.12%). Boiled filtrate (F) contained 25 residues (0.1–0.9%, up to 6.33%), indicating partitioning of water-soluble xenobiotics. Persistent compounds included di-(2-ethylhexyl) phthalate, 1-octadecanesulphonyl chloride (0.37–4.83%), 1-chlorooctadecane (3.09–4.83%), and carbonic acid esters such as eicosyl vinyl ester (0.26–27.4%). Thermal processing promoted partial transformation and esterification of nitrogen- and halogen-containing residues. This finding opines that soaking followed by filtrate discard most effectively minimised residue burden.

NMBCW-137

Modulatory Effect of Hesperetin on Basal Inflammation and Cellular Stress in Unstimulated 3T3-L1 Cells

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The 3T3-L1 cell line is a widely used *in vitro* model for investigating adipocyte differentiation and obesity. The cells exhibit baseline inflammatory activity that resembles dysfunctional hypertrophied adipocytes. Hesperetin is a plant-derived bioactive compound reported to promote cell survival and possess anti-inflammatory properties. This study evaluated the modulatory effects of hesperetin on inflammation and cellular stress in unstimulated differentiated 3T3-L1 cells. Cells were cultured in Dulbecco's Modified Eagle Medium (DMEM) supplemented with 10% foetal bovine serum and 1% streptomycin/penicillin. Differentiation was induced using 0.5 mM IBMX, 1 µM dexamethasone, and 10 µg/mL insulin. Differentiated 3T3-L1 cells were treated with 112.4 µg/mL hesperetin or 54.33 µg/mL metformin for 24 h. Standard methods were used to determine interleukin-1β (IL-1β), interleukin-6 (IL-6), caspase-3, nitric oxide (NO), and mitochondrial membrane potential (MMP), while cell viability was assessed using the MTT assay. Results showed that hesperetin was not cytotoxic to the cells. However, it significantly increased NO, IL6, and MMP levels, whereas IL-1β and caspase-3 activity were not significantly altered. The effects of hesperetin were comparable to those observed with metformin, a standard antidiabetic drug. These findings suggest that hesperetin modulates basal inflammatory and stress-related responses in differentiated adipocytes, with effects that appear context-dependent rather than strictly antiinflammatory. Its comparable effects to those of metformin indicate possible relevance in the regulation of adipocyte function.

NMBCW-138

Alkaloid Leaf Extract of *Centella asiatica* Mitigates Aluminium-Induced Alzheimer-Like Oxidative Stress in Fruit Fly (*Drosophila melanogaster)* Model

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Oxidative stress leads to various neurodegenerative diseases, including Alzheimer's disease. This is because the central nervous system is highly susceptible to oxidative stress due to its high oxygen consumption, limited antioxidant defence and presence of terminally differentiated neurons. This study investigated the effect of *Centella asiatica* leaves alkaloid extract on oxidative stress in aluminium-induced Alzheimer's disease in wild Oregon strain of *Drosophila melanogaster*. Adult flies were grouped into 5 with treatment added to fly diet as follows: Group 1 (Control) – 1ml of distilled water; Group 2 – 1ml of 40mM $AlCl_3$; Group 3 – 1ml of 40mM $AlCl_3$ + 1ml of 10mg/ml *Centella asiatica*; Group 4 – 1ml of 10mg/ml *Centella asiatica*; Group 5 – 1ml of 40mM $AlCl_3$ + 1ml of 20µM Donepezil (standard drug). Treatment was administered for 7 days after which flies were anaesthetised and homogenised. Thereafter, activities of reactive oxygen species (ROS) and catalase were determined. When compared with the control group, there was no significant difference in the activities of ROS of normal flies fed with the extract, induced flies treated with the extract and induced flies treated with Donepezil. However, there was a significant increase in the ROS level of induced-untreated flies. A significant increase in catalase activity was observed in normal flies fed with the extract. However, no significant difference was seen in induced flies treated with the extract and induced flies treated with Donepezil when compared with control. *Centella asiatica* leaves can serve as a source of phytochemicals for mitigating oxidative stress in Alzheimer's disease.

NMBCW-139

Effects of Processing Methods (Boiling & Frying) on the Antinutrient Contents ofYellow and White Varieties of Sweet Potatoes (*Ipomea Batatas*)

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The antinutritional contents in food reduce the nutritional utilisation thus, the bioavailability. Sweet potatoes are widely consumed due to itsnutritional value. However, this tuber contains antinutritional which reduces its bioavailability, hence the need for proper processing to enhance the nutritional potential of this tuber plant. This study, therefore aims at studying the effects of processing (Boiling and Frying) on the antinutritional contents of sweet potato. The samples were obtained from Birnin Kebbi central market, cleaned and washed. The samples were then processed by boiling and frying and analysis was done using standard analytical methods. Results indicates that the Boiled yellow samples, showed reduction in antinutritional content when compared to the raw Yellow samples; Tannin 0.023g% to 0.001g%, Cyanide; 0.08 to 0.04, Nitrate, 0.24g% to 0.04g%, Oxalate 2.25g% to 1.68g% and phytate, 297.33 to283.33g%. The fried Yellow sample as well, showed reduction; Tanin 0.023g% to o.0.013g%, Cyanide, 0.02g% to 0.01 g%, Nitrate,0.02g% to 0.007g%,Oxalate,2.25g% to 1.85g%,Phytate, 297.23g% to 266.00g%.The boiled white sample showed: Tannin, 0.016 to 0.018g%, Cyanide, 0.015 to 0.001g%, Nitrate, 0.243to 0.166g%, Oxalate, 2.062 to 1.162g%, Phytate, 298.833 to 198.500g%. The white fried showed; Tanin, 0.016 to 0.018g%, Cyanide, 0.015 to 0.001g%, Nitrate, 0.24 to 0.030g%, Oxalate, 2.06g% to 1.64g%. This study showed that, the antinutritional contents of the two varieties of sweet potatoes could be reduced through these processing methods (Boiling and Frying) and hence bioavailability of nutrients when consumed for nutritional purposes.

NMBCW-140

Proximate Composition, Phytochemical Screening, and Gc-Ms Profiling Of *Citrullus lanatus* (Seeds) and *Citrullus colocynthis* (Husk) Wastes

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Agricultural wastes are generated from farm products, such as seed, husk, and peels. They are often abandoned on farms or disposed of indiscriminately, causing environmental hazards. In view of the improper management of these wastes, this study investigated the proximate components of the discarded seeds and husks of *Citrullus lanatus* and *Citrullus colocynthis*, respectively, and characterised their essential oils. The proximate constituents of the crude samples were evaluated using conventional methods, and their essential oils were extracted by hydrodistillation. Additionally, the physicochemical properties of the oil were examined using standard laboratory techniques before they were characterised by Gas Chromatography-Mass Spectrometry. The data obtained were statistically analysed, and the significance levels were set at $p \leqslant 0.05$. Crude fat (36.22±0.29%) and protein (38.35±0.07%) formed the major proximate components of *Citrullus lanatus* seed and *Citrullus colocynthis* husk, respectively. *Citrullus colocynthis* (husk) had a higher specific gravity, acid value, iodine value, and peroxide value than *Citrullus lanatus* (seeds) ($p < 0.05$). Specifically, *C. colocynthis (husk)* showed high iodine values in the range of those for drying oil [153.91±0.035 g/I/100 g]. Furthermore, GC-MC showed that the samples contain high amounts of monoterpene and sesquiterpene hydrocarbons. The seeds and husks of *Citrullus lanatus* and *Citrullus colocynthis*, respectively, discarded as waste, contain useful nutrients that can be recycled to supplement animal feed. More so, the essential oil could be used as an additive in the pharmaceutical and paint industries.

NMBCW-141

Protective Effects of Polyphenol-Rich *Spondias mombin* Leaf Extract Against Cadmium- and Mercury-Induced Hepatorenal Oxidative Damage in Wistar Rats

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Cadmium (Cd) and mercury (Hg) are persistent environmental pollutants capable of inducing severe hepatic and renal toxicity through oxidative stress-mediated mechanisms. The search for effective natural antioxidants has highlighted *Spondias mombin* as a promising medicinal plant due to its rich polyphenolic composition. This study investigated the protective effects of polyphenol-rich *Spondias mombin* leaf extract (SME) against cadmium- and mercury-induced hepatorenal oxidative damage in Wistar rats. Fifty healthy male Wistar rats (120–150 g) were acclimatised for two weeks and randomly assigned into ten experimental groups (n = 5). Animals received distilled water (control), cadmium chloride (1.5 mg/kg), mercuric chloride (1.2 mg/kg), combined cadmium and mercury, or corresponding treatments with polyphenol-rich *Spondias mombin* extract (500 mg/kg body weight) or silymarin (100 mg/kg body weight) as the reference standard. All treatments were administered orally by gavage once daily for 28 consecutive days. At the end of the experimental period, blood and tissue samples were collected for the evaluation of liver and kidney function biomarkers, oxidative stress indices, antioxidant enzyme activities, and histopathological alterations using standard analytical procedures. Exposure to cadmium and mercury, either individually or in combination, produced significant hepatorenal injury characterised by elevated biochemical markers of liver and kidney dysfunction, increased lipid peroxidation, depletion of endogenous antioxidant enzymes, and marked histopathological lesions. Treatment with polyphenol-rich *Spondias mombin* extract significantly ameliorated these toxic effects, restoring antioxidant status, reducing oxidative damage, improving hepatic and renal function parameters, and preserving normal tissue architecture. The protective effects of the extract were comparable to those observed with silymarin treatment. Polyphenol-rich *Spondias mombin* leaf extract demonstrates potent antioxidant, hepatoprotective, and nephroprotective activities against cadmium- and mercury-induced oxidative damage in Wistar rats. Its protective efficacy appears to be mediated through attenuation of oxidative stress and reinforcement of endogenous antioxidant defence systems, suggesting its potential as a natural therapeutic agent for the prevention and management of heavy metal-induced hepatorenal toxicity.

NMBCW-142

Evaluation of *Plasmodium falciparum* Parasitaemia and Associated Inflammatory Cytokines among Pregnant Women in Gombe State, Nigeria

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The balance between absolute levels of inflammatory cytokines may be important in malaria presentation and its outcome. In malaria-infected pregnant women, the relationships between, plasma components, development of immunocompetence and disease severity is poorly understood. A total 725 consented volunteer's Pregnant women within the age range of 15-50, attending Antenatal care at the six selected hospitals were enrolled for the study. Venus blood was collected. Malaria examination was carried out using microscopy and blood plasma was analysed using commercial cytokines assay kit (Elabscience®, USA) following the manufacturers manual instruction. Pregnant women within the age of 21-25 years had the highest infection rate of 38.1% with the mean parasitaemia levels of 5872.29±3079.29 parasites/µl while those within the age group 46-50 years had the lowest infection rate of 0.43% with parasitaemia levels of 143.00±0.00 parasites/µl. The difference between infection and age range were not statistically significant ($F = 0.435$, $P = 0.86$), but there was a significant difference between age range and parasitaemia levels ($F = 691.90$, $P = 0.00$). The concentrations of IFN-γ, TNF-α, IL-6 and IL-10 were elevated among *P. falciparum* infected pregnant women than the uninfected counterparts but the difference were not statistically significant ($P > 0.05$). Correlations between malaria parasitaemia and cytokines were very low. The increased levels of cytokines observed, represent a normal level response to *P. falciparum* infection, even though excessive production of inflammatory cytokines such as IL-6 and IL-10 may lead to severe malaria and fatal outcome. Therefore, evaluation of these cytokines could serve as diagnostic markers in malaria infected pregnant women.

NMBCW-143

Aqueous Leaf Extract of *Cananga odorata* (Lam.) Ameliorate Hyperglycaemia and Its Associated Complications in Stz-Induced Diabetic Rats

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This study investigated the antidiabetic and antioxidant effects of *Cananga odorata* aqueous leaf extract in streptozotocin (STZ)-induced diabetic rats. Forty-two rats (180–200 g) were divided into seven groups (n = 6), including normal controls, diabetic controls, a standard drug group (acarbose, 25 mg/kg), and treatment groups receiving 200 mg/kg and 400 mg/kg of the extract (both diabetic and non-diabetic). Diabetes was induced using STZ (50 mg/kg), and treatment lasted 14 days. Diabetic rats showed significant increases in blood glucose, insulin, glycated haemoglobin, and carbohydrate-metabolising enzymes, along with decreased antioxidant enzyme activity. Treatment with *C. odorata* extract significantly reversed these changes, improving glycaemic control and enhancing antioxidant status across tissues (pancreas, intestine, kidney, and liver). The extract also demonstrated stronger inhibitory effects on α-amylase and α-glucosidase compared to acarbose. Additionally, *C. odorata* improved kidney and liver function markers. High-performance liquid chromatography (HPLC) analysis identified bioactive compounds such as geranyl-acetate, thymol, limonene, beta-caryophyllene, and liriodenine, which may contribute to its therapeutic effects. In conclusion, *C. odorata* leaf extract exhibits potent hypoglycaemic, antioxidant, and enzyme inhibitory properties, suggesting its potential as a natural therapeutic agent for managing diabetes and its complications.

NMBCW-144

Assessment of Nutritional Status and Emotional-Behavioural Difficulties of Internally Displaced Children Aged 3 to 5 Years in Gusau, Zamfara State, Nigeria

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Nigeria has been a hotbed of conflicts including farmer-herder clashes and widespread kidnappings, among others. The frequency and intensity of terrorism in Zamfara have increased between August and September 2021, leading to continuous displacement of mostly the rural population. Denied access to farms and other means of livelihood has caused a significant increase in malnutrition, especially among children and women. A mixed-methods approach, incorporating both quantitative and qualitative data, was employed to assess 433 children using five assessments: anthropometry, biochemical, dietary diversity, the Strengths and Difficulties Questionnaire, and in-depth interviews with the children's caregivers. Severe stunting (32.6%), severe wasting (6.0%), and underweight (10.9%) were observed. Anaemia (84.3%) and low food consumption diversity (79.2%) were also observed in the children. On the emotional-behavioural difficulties front, 26.8%, 24.9%, and 48.3% were abnormal, within the borderline, and normal, respectively. Prosocial behaviours were moderately maintained, with a mean score of 4.35. A positive significant correlation between height and emotional-behavioural difficulties, while a negative significant correlation was observed between haemoglobin level and emotional-behavioural difficulties, and PCV and emotional-behavioural difficulties. A negative significant correlation was observed between weight and displacement duration, MUAC and displacement duration. A Positive significant correlation was observed between weight and displacement severity, and negative significant correlation was observed between height and displacement severity. In conclusion, conflict-driven displacement harms both the nutritional and emotional-behavioural well-being of internally displaced children aged 3-5 years in Gusau.

NMBCW-145

Evaluation of Antidiabetic Effects of Ethanol Extracts of Rice Bran (*Oryza sativa* Linn.)On Alloxan-Induced Diabetic Rats

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The study was carried out to evaluate the *in vitro* and *in vivo* antiglycaemic potential of ethanolic rice (*Oryza sativa* Linn.) bran extract against alloxan-induced Wistar strain rats. Diabetes mellitus is a metabolic disease caused by the inability of the body to produce or use insulin. Its symptoms are high blood sugar, excessive thirst, frequent urination, fatigue, vision irregularities among others. It is a major cause of unforeseen illness and death around the world. This study investigates the phytochemical profile, nutritional composition, and potential therapeutic effects of ethanol extracts from rice bran (*Oryza sativa*) in a diabetic rat model. The *Oryza sativa* L. bran was obtained from a rice milling facility in Zabarmari, Jere Local Government of Borno State. The extract was subjected to qualitative and quantitative phytochemical analysis and biochemical analysis using standard laboratory procedures, while the proximate composition was assessed according to the method of AOAC. The phytochemical screening revealed the presence of various bioactive compounds, including tannins, phenolics, flavonoids, anthocyanins, and terpenoids, all of which are associated with antioxidant, anti-inflammatory, and anticancer properties. The ethanol extract exhibited a high concentration of phenolic compounds (21.22 ± 0.19 mg GAE/g) and flavonoids (17.31 ± 0.26 mg QE/g), highlighting rice bran's significant antioxidant potential. The presence of cyanidin-3-O-glucoside further suggests its contribution to health promotion. Nutritional analysis revealed rice bran's rich content of dietary fibre (29.18 ± 0.06 g/100g), minerals (23.41 ± 0.06 g/100g ash), and moderate levels of protein (3.40 ± 0.58 g/100g) and fat (2.43 ± 0.06 g/100g), supporting its value as a functional food ingredient. The therapeutic effects of rice bran extract on blood glucose levels (BGL) were evaluated in alloxan-induced diabetic rats, with varying doses (100, 200, and 400 mg/kg) demonstrating significant fluctuations in BGL, suggesting a potential but inconsistent antidiabetic effect. The highest dose showed a reduction in liver enzyme levels (AST, ALT, and ALP), indicating hepatoprotective activity. Moreover, renal function assessments revealed that rice bran extract, particularly at higher doses, offered significant nephroprotection, as evidenced by normalised creatinine, urea, and albumin levels. These findings suggest that rice bran extract, rich in antioxidants such as phenolics and vitamin E, may mitigate oxidative stress and inflammation associated with diabetes, providing both hepatoprotective and nephroprotective benefits. This research underscores rice bran's potential as a functional food with therapeutic applications for managing diabetes and its complications.

NMBCW-146

Quantitative Production of Protease from *Klebsiella terrigena*, *Serratia marcescens*, and *Bacillus thuringiensis* in a Medium containing Snail Shell-Fortified Bean Pod Powder

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Proteases catalyse the total hydrolysis of proteins and are valuable commercial enzymes due to their wide applications in industrial processes. This study evaluated the quantitative production of protease from *Klebsiella terrigena*, *Serratia marcescens*, and *Bacillus thuringiensis* in a medium containing appropriate snail shell-fortified bean pod powder. The production of protease was measured in a medium supplemented with bean pod powder(B) and snail shell powder(S) in the ratio of 1:4, 2:3, 3:2 and 4:1, and at varying pH and temperature. Crude enzyme from the production medium was obtained by filtration and centrifugation. The selected bacteria produced protease at varying levels in the different ratios of bean pod to snail shell powder. *Serratia marcescens* produced maximum protease at 30^{th} hour of incubation in 3:2 BS supplemented medium. Similarly, a progressive increase in protease production at pH 8 was observed for *Serratia marcescens* in 3:2 BS supplemented medium. The production of protease by *Serratia marcescens* in a medium of 3:2 BS supplemented medium was optimum at pH 9 and 45°C. This study indicated the possible alternative use of bean pod powder and snail shell powder as sources of nutrient and mineral requirements for bacterial growth.

NMBCW-147

Antiobesity Antioxidant and Phytochemical Profile of African Ebony (*Diospyros mespiliformis*) Leaf Extract

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Obesity is becoming a worldwide epidemic, resulting in a major risk factor for several cardio-metabolic disorders including high blood pressure, high blood glucose, insulin resistance, high blood cholesterol, coronary heart disease, stroke and cancers. Obesity prevalence increases because most people stay indoors, eats highly processed foods, decreased intakes of high fibre foods, and decrease physical activity. *Diospyros mespiliformis* was dominant in northern Nigeria. This work aimed to evaluate the antiobesity and antioxidant potentials of *Diospyros mespiliformis* leaf extracts. The leaves were air dried, grounded in to fine powder and extracts of 100% ethanol, 70%, 60%, 50% and aqueous were prepared. The total phenolics content (TPC) and total flavonoids content (TFC), α-glucosidase, α-amylase inhibition, *in vitro* pancreatic lipase, DPPH radical scavenging and metal chelating activity assays were evaluated using standard methods. The result indicated that 100% ethanolic leaf extract presented the highest total phenolics content (TPC) and total flavonoids contents (TFC) with the values 503.68±7.53 mg GAE/g and 47.61±15.72 mg QE/g respectively. 50% ethanol leaf extract gave the highest α-amylase and α-glucosidase inhibition with the IC50 values of 8.02 ± 0.53 µg/mL and 0.77±0.15 µg/mL respectively. 100% ethanol leaf extract produced the strongest metal chelating activity with the IC50 value of 10.97 ± 0.52 µg/mL while DPPH radical inhibition for the 100% ethanol leaf extract was the highest with the IC50 value of 28.95±0.42 µg/mL. Pancreatic lipase inhibition of 100% ethanolic leaf extract was the highest with IC50 value of 109.95±1.09 µg/mL. Metabolites of the most active extract (100% ethanolic leaf extract) was profiled by liquid chromatographic mass spectrometry. *Diospyros mespiliformis* leaf extract could effectively decrease complications associated with obesity and oxidative stress.

NMBCW-148

Determination of Antimicrobial, Antioxidant and Anti-inflammatory Activities of Methanol Root Extract of *Acacia greggii*

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This study investigated the activity of methanol root extract of *Acacia greggii* with focus on identifying its phytochemical constituents, evaluating antimicrobial properties, assessing antioxidant capacity, and determining anti-inflammatory potential. Qualitative screening revealed the presence of most phytochemicals except saponins, and quantitative analysis showed phenols (21.41 ± 0.04 mg GAE/g) and flavonoids (12.01 ± 0.03 mg QE/g) as most abundant. Antimicrobial assays demonstrated that the extract exhibited concentration-dependent inhibition against Gram-positive and Gram-negative bacteria as well as fungi, with strong effects against *Staphylococcus aureus*, *Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa,* and *Candida albicans*. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) confirmed broad-spectrum antimicrobial efficacy, particularly with low MIC values against *E. coli* (0.25 mg/ml), *P. aeruginosa* (0.25 mg/ml), and *C. albicans* (0.0625 mg/ml). Antioxidant assay indicated a concentration-dependent increase in activity, with 87.53% inhibition at 400 µg/ml, comparable to ascorbic acid (88.59% at 25 µg/ml). Similarly, the anti-inflammatory assay revealed a strong dose-dependent effect, with the extract at 200 µg/ml (0.510 ± 0.039) out performing both aspirin (control) and the standard drug. These findings suggest that the pharmacological activities of *Acacia greggii* may be attributed to the synergistic actions of its polyphenolic and flavonoid constituents. Conclusively, the methanol root extract of *Acacia greggii* exhibits promising antimicrobial, antioxidant, and anti-inflammatory activities, justifying its ethnomedicinal applications. It is recommended that, further studies be conducted to isolate, characterise, and evaluate the specific bioactive compounds responsible for these effects as well as to validate their efficacy *in vivo*.

NMBCW-149

Metabolomic Characterisation of Hydro-Ethanolic Leaf Extract of *Annona muricata*

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Anona muricata is commonly called soursop and grows predominantly in the rain forest regions of Nigeria. The fruits, leaves, and stem bark are used locally for several ethno-medicinal purposes. There is a paucity of detailed characterisation of the phytochemicals and volatile bioactive compounds of *Anona muricata* leaf. The present study assessed the metabolomic profile of hydro-ethanolic leaf extract of *Annona muricata.* The leaves of *Anona muricata* were collected at University of Agriculture and Environmental Sciences, Umuagwo, Imo State; and extracted in 80% ethanol using standard method. The phytochemical composition of the extract was determined using gas chromatography-flame ionisation detector (GC-FID) system, and the volatile bioactive component of the extract was quantified using gas chromatography-mass spectrometry (GC-MS). The mass spectra peaks of these compounds were matched with those found in the National Institute of Standard and Technology (NIST) spectral database. Phytochemical screening of hydro-ethanolic extract of *Anona muricata* leaf revealed the abundance of phyto-compounds such as spartein 16.76 µg/mL, flavones 9.03 µg/mL, cyanogenic glycosides 8.96µg/mL, cardiac glycoside 7.4 µg/mL, steroid 8.68 µg/mL, phytate 6.86 µg/mL, naringenin 6.10 µg/mL, dihydrocytisine 6.0 µg/mL, proanthocyanidin 5.60 µg/mL, anthocyanin 5.58 µg/mL, kaempferol 5.55 µg/mL, ribalinidine 3.71 µg/mL, tannin 3.67 µg/mL, and oxalate 2.29 µg/mL. There were 61 volatile bioactive compounds tentatively identified in the GC-MS chromatogram of the hydro-ethanolic leaf extract of *Anona muricata*. The compounds dodecane, 2,6,11-trimethyl- (7.22%), oxalic acid, isobutyl nonyl ester (6.42%), 2,4-di-tert-butylphenol (6.67%), diethylmalonic acid, 4-bromophenyl decyl ester(5.58%), piperine (4.94%), and decane,3,6-dimethyl- (4.02%) were identified as the major bioactive compounds present in *Anona muricata* leaf hydro-ethanolic extract. The results also revealed that the least abundant volatile compounds were trans-2-chlorovinylacetate (0.18%), benzene, 1,2,3-trimethyl- (0.32%) and 1,8-nonadien-3-ol (0.41%). The findings provide a comprehensive metabolomic fingerprint of *Anona muricata* leaf hydro-ethanolic extract and support its ethno-medicinal relevance; these metabolites may be harnessed for their industrial and therapeutic applications.

NMBCW-150

Aqueous Extract of *Costus spicatus* Rhizome Ameliorates Metabolic, Hepatic and Renal Dysfunction in Streptozotocin-Induced Diabetic Pregnant Rats

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Gestational diabetes is associated with severe metabolic dysfunction characterised by hyperglycaemia, dyslipidaemia, and multi-organ impairment. This study investigated the modulatory effects of aqueous extract of *Costus spicatus* rhizome on metabolic, hepatic, and renal dysfunction in streptozotocin (STZ)-induced diabetic pregnant rats. Twenty-four rats were assigned to four groups: untreated diabetic control, distilled water-treated, metformin-treated (6.43 mg/kg bw), and aqueous extract-treated (100 mg/kg bw). Fasting blood glucose (FBS), lipid profile, urinalysis parameters, organ-body weight ratios, and hepatic and renal biochemical markers were evaluated. Data were analysed using ANOVA, mixed ANOVA, and Kruskal-Wallis tests. The aqueous extract significantly reduced FBS levels ($p < 0.001$), producing the greatest glycaemic reduction among all groups (mean decrease = 260 mg/dL). Lipid analysis showed a significant reduction in total cholesterol ($p = 0.046$), whereas HDL, LDL, and triglyceride concentrations remained unchanged. Urinalysis revealed marked reductions in glycosuria following treatment. Hepatic and renal function analyses demonstrated significant treatment effects on serum ALT ($p = 0.002$), liver ALT ($p = 0.0025$), serum AST ($p = 0.007$), direct bilirubin ($p = 0.005$), uric acid ($p = 0.004$), creatinine ($p = 0.016$), urea ($p = 0.023$), serum albumin ($p = 0.022$), total bilirubin ($p = 0.021$), and globulin ($p = 0.024$). Post hoc analyses indicated that the extract-treated group consistently improved biochemical indices of liver and kidney function compared with untreated diabetic rats and, in several parameters, performed comparably to metformin. These findings demonstrate the antihyperglycaemic, hepatoprotective, and renoprotective potential of aqueous *Costus spicatus* rhizome extract in diabetic pregnancy.

NMBCW-151

Assessment of The Nephroprotective Properties on *Musa paradisiaca* (plantain) Leaf Extract in Cadmium-Induced Kidney Damage

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Cadmium chloride is a widely recognised environmental toxicant associated with oxidative stress-mediated injury of vital organs, particularly kidneys. Excessive cadmium exposure promotes reactive oxygen species (ROS) generation, lipid peroxidation, and causes cellular dysfunction leading to renal impairment. *Musa paradisiaca* (plantain) leaves has been reported to contain several bioactive compounds which exert protective effects against oxidative damage. This study investigated the nephroprotective effects of aqueous leaf extract of *Musa paradisiaca* against cadmium chloride–induced toxicity in Wistar rats. Fresh mature leaves were collected from the Federal University of Technology, Akure, and authenticated at the FUTA Herbarium, CERAD. Aqueous extracts were prepared and subjected to *in vitro* antioxidant assays, including nitric oxide, metal chelating, cupric and ferric reducing power. *In vivo* assay were also carried out using cadmium chloride as the toxicant, Cadmium chloride were administered twice weekly for two weeks at dose of 2 mg/kg body weight, followed by twenty-eight days of treatment with plantain leaf extract at doses of 200 and 400 mg/kg body weight. Biochemical evaluation, haematological, and histological assessments were carried out. Result indicates that cadmium chloride exposure significantly reduced antioxidant enzymes such as GSH and SOD while increasing MDA levels. It also elevated kidney indices urea and creatinine causing impairment. Treatment with the extract reversed these changes in a dose-related manner and improved blood parameters bring restoration potential of enzyme activity. Histological examination on the renal tissue depicted by photomicrograph showing the histoarchitecture of the kidney tissue due to cadmium chloride toxicity and treatment administration of *Musa paradisiaca* aqueous leaf extract. Cadmium is known to disrupt haematopoiesis through oxidative damage, inflammatory activation, and interference with cellular metabolism treatment with the extract significantly improved significantly improved all parameters hereby suggest plantain (*Musa paradisiaca)* as medicinal plants to exhibit nephroprotective activities for potential role in protecting kidney from oxidative stress–induced damage.

NMBCW-152

Comparative Evaluation of the Antioxidant Potential, Phytochemical Profile, and Mineral Composition of Ethanolic and Methanolic Extracts of Copperleaf (*Acalypha wilkesiana*)

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The growing interest in plant derived antioxidants has intensified the rationale for medicinal plants with promising therapeutic and nutritional value. *Acalypha wilkesiana* (Copperleaf) is widely used in traditional medicine; however, information comparing the influence of solvents extraction on its phytochemical, antioxidant, and mineral composition remains limited. This study comparatively investigated the phytoconstituents, antioxidant potential, and mineral composition of ethanolic and methanolic leaf extracts of *A. wilkesiana*. Phytochemical screening revealed the presence of bioactive secondary metabolites, including flavonoids, phenolics, tannins, saponins, alkaloids, terpenoids, and glycosides, indicating the plant's rich phytochemical profile. The antioxidant assessment demonstrated that both extracts possessed appreciable free radical scavenging activity, with the methanolic extract exhibiting higher antioxidant potential than the ethanolic extract, suggesting a greater ability to scavenge reactive oxygen species. Mineral analysis further revealed that both extracts contained essential minerals of nutritional importance. The methanolic extract exhibited slightly higher concentrations of iron (3.084 mg/L), copper (0.34 mg/L), magnesium (0.085 wt%), phosphorus (0.009 wt%), and zinc (2.250 mg/L), whereas the ethanolic extract contained relatively higher levels of calcium (0.036 wt%), potassium (0.019 wt%), sodium (0.018 wt%), and selenium (0.027 mg/L). These findings suggest that solvent selection significantly influences the recovery of bioactive constituents from *A. wilkesiana*. Overall, both extracts represent promising natural sources of antioxidant phytochemicals and essential minerals with potential applications in nutraceutical and pharmaceutical development. Further *in vivo* studies are recommended to validate their therapeutic efficacy and safety.

NMBCW-153

Comparative Evaluation and Biological Implications of Self-Coping Strategies in the Management of Depression and Anxiety Disorders

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Self- individuals with depression and anxiety increasingly use coping strategies as supplementary methods for managing symptoms. However, evidence on their perceived effectiveness, biological basis, potential risks, and overall usefulness remains limited and scattered. This study examined the range of self-coping techniques used by adults with clinically significant depressive symptoms and ranked them by effectiveness, benefits, and adverse effects. A quantitative cross-sectional approach was employed among individuals identified with depressive symptoms using the Hamilton Depression Rating Scale (HDRS) as the primary inclusion criterion. A structured questionnaire was used to assess depression severity, knowledge, perceptions of self- coping methods, frequency of use, and participants' assessments of safety and effectiveness. Descriptive and inferential statistical analyses were performed to examine relationships between depression severity, coping preferences, and perceived therapeutic outcomes, with statistical significance set at $p<0.05$. Participants exhibited varying degrees of depressive symptom severity, with moderate- to severe depression the predominant clinical category. Knowledge of self-coping strategies was generally high, although perceptions of efficacy differed significantly across demographic and clinical subgroups ($p<0.05$). Lifestyle-based interventions, including regular physical activity, structured sleep hygiene, mindfulness practices, spiritual engagement, and social support, received the highest effectiveness rankings and were associated with fewer reported adverse effects than maladaptive coping behaviours. Significant positive associations were observed between higher knowledge scores and the adoption of evidence-informed self-management practices ($p<0.05$). In contrast, greater depression severity was associated with increased reliance on less effective coping mechanisms ($p<0.05$). Comparative ranking showed substantial variability in perceived therapeutic benefits and tolerability across the identified strategies. In conclusion, self- coping strategies play a crucial role in managing depression and anxiety. Evidence-based behavioural and psychosocial treatments are more effective and safer, supporting their inclusion in patient-centred mental health care. However, there is a need for clinical guidance to prevent the adoption of maladaptive self- management habits.

NMBCW-154

Nutritional Composition, Antioxidant Properties, and *in vitro* Alpha-Glucosidase Inhibitory Effects of Functional Biscuits Fortified with *Ficus exasperata* and *Sphenostylis stenocarpa*

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Oxidative stress and postprandial hyperglycaemia are critical factors in the pathogenesis and progression of diabetes mellitus. Developing functional foods with bioactive ingredients offers a promising dietary approach to managing this condition. This study evaluated the *in vitro* antioxidant capacity, α-glucosidase inhibitory effects, nutritional composition, and sensory acceptability of functional biscuits fortified with *Sphenostylis stenocarpa* and *Ficus exasperata*. Four biscuit formulations (varying ratios of *S. stenocarpa* and fermented/unfermented *F. exasperata*) were prepared. The samples were evaluated for total phenolic content (TPC), total flavonoid content (TFC), ABTS radical scavenging, Fe^{2+} chelation, ferric reducing antioxidant power (FRAP), and α-glucosidase inhibition. The two optimal formulations with 40g *F. exasperata* inclusion (B-SS20-fFE40 and B-SS20-uFE40) were further subjected to proximate and sensory analyses. All formulations demonstrated appreciable TPC, Fe^{2+} chelating ability, and ABTS radical scavenging activity with no significant differences ($p > 0.05$) among the groups. However, B-SS20-fFE40 exhibited significantly higher TFC and FRAP. All extracts demonstrated moderate α-glucosidase inhibitory activity. Proximate analysis revealed that the fermented formulation (B-SS20-fFE40) possessed the highest crude protein (10.51 ± 0.717%), whereas the unfermented formulation (B-SS20-uFE40) had higher crude fibre (6.89 ± 0.065%). Sensory evaluation indicated that the B-SS20-uFE40 received the highest overall consumer acceptability score. Fortification with *S. stenocarpa* and *F. exasperata* successfully enhances the nutritional and antioxidant profiles of biscuits. While fermentation optimises flavonoid extractability and protein content, the unfermented formulation offers superior dietary fibre and sensory qualities. These functional biscuits demonstrate promising potential as supportive dietary snacks for mitigating oxidative stress and managing postprandial blood glucose levels.

NMBCW-155

Phytochemical Profiling and Therapeutic Potential of Methanol Extract of *Vitex doniana* Stem Bark on Biochemical Parameters in Castor Oil-Induced Diarrhoeal Wistar Rats

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Diarrhoeal diseases remain one of the most pressing health challenges in developing countries, particularly among children, where poor sanitation and limited access to clean water amplify the risks. In these settings, medicinal plants such as *Vitex doniana* (black plum) are widely used, yet their therapeutic claims require careful scientific validation. In this study, we examined the methanol extract of *Vitex doniana* stem bark, focusing on its phytochemical profile, mineral composition, and biochemical effects in castor oil-induced diarrhoea in Wistar rats. Screening revealed the presence of flavonoids, tannins, saponins, alkaloids, and terpenoids compounds known for antimicrobial and anti-diarrhoeal activity. Mineral analysis showed notable levels of calcium (1.215±0.006), potassium (1.920±0.035), magnesium (0.619±0.006), sodium (0.702±0.001), and Phosphorus (275.7±3.340), underscoring its nutritional relevance. Biochemical assays demonstrated significant improvements in hepatic indices: ALT and AST levels dropped markedly, ALP activity decreased, albumin concentration rose, and bilirubin levels normalised compared to untreated diarrhoeal rats. These results not only confirm the anti-diarrhoeal potential of *Vitex doniana* but also suggest hepatoprotective effects. Taken together, the findings provide a solid scientific basis for its traditional use and highlight the value of bridging ethnomedicine with modern biochemical research. Such integration can pave the way for affordable, standardised phytotherapeutics in resource-limited communities.

NMBCW-156

Virgin Avocado Oil Attenuates Benzene-Induced Liver and Kidney Damage in Wistar Rats

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Benzene is a widely recognised environmental toxicant with harmful effects on vital organs, particularly the liver and kidneys. This study evaluated the protective effects of virgin avocado oil (VAO) against benzene-induced hepatorenal toxicity in male Wistar rats. Thirty-two rats were randomly assigned to four groups (n = 8): control, benzene-treated, benzene plus VAO-treated, and VAO-only. Benzene was administered intraperitoneally at 0.1 mL/kg body weight for seven days, while VAO was given at 2 mL/kg. Benzene exposure caused marked liver and kidney injury, as shown by elevated serum hepatic enzymes (AST, ALT, and ALP), increased malondialdehyde (MDA) levels in hepatic and renal tissues, reduced catalase activity, and increased inflammatory markers, including COX-2, iNOS, and TNF-α. Histopathological examination also revealed substantial structural damage in both organs. Concurrent administration of VAO significantly attenuated these alterations by reducing oxidative stress, restoring antioxidant activity, suppressing inflammatory responses, and preserving tissue architecture. These findings shows that virgin avocado oil exerts hepatoprotective and nephroprotective effects against benzene-induced toxicity, likely through antioxidant and anti-inflammatory mechanisms. VAO therefore shows potential as a natural protective agent against chemically induced liver and kidney injury

NMBCW-157

Dietary Aluminium Chloride Exposure Elicits Alterations in Cholinergic and Oxidative Stress Markers in the Head of *Drosophila melanogaster*

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Aluminium Chloride ($AlCl_3$) is a well-studied neurotoxicant associated with oxidative stress and cholinergic dysfunction. Donepezil, a clinically approved acetylcholinesterase inhibitor, is routinely employed in the management of Alzheimer's disease. In this study, the neurotoxic effect of $AlCl_3$ and the modulatory effect of Donepezil on the biochemical markers in the heads of male and female *Drosophila melanogaster* were studied. Flies were treated with $AlCl_3$, Donepezil, and a combination of both; then the activities of acetylcholinesterase (AChE), thiols and malondialdehyde (MDA) levels were assessed. The results showed that $AlCl_3$ exposure significantly increased AChE activity relative to control, and Donepezil treatment was observed to have reversed this, indicating a possible synergistic inhibitory effect. Similarly, $AlCl_3$ exposure increased the levels of total and non-protein thiols, which was moderately reduced when treated with Donepezil. The lipid peroxidation levels also showed a similar pattern to AChE, where $AlCl_3$ caused a significant increase, and the co-treatment with Donepezil revealed a decrease in these levels. The findings indicate that Donepezil can modulate redox balance as well as counteracting cholinergic dysfunction in $AlCl_3$-induced neurotoxicity. Differential changes of AChE, thiol and MDA levels reveal the interaction between oxidative stress and cholinergic regulation in *D. melanogaster*.

NMBCW-158

Phytochemical Composition, Antioxidant Potential, and *in vitro* Modulation of Sperm Quality by Selected Tropical Fruits and Carrot

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Fruits and vegetable consumption have been attributed with several health benefits due to high bioactive phytochemical and antioxidants content. On the other hand, the impact of fruits and vegetables on the male reproduction health has not been well investigated. In this study, the characteristics of phytochemical, antioxidant properties and effects of extracts of twelve tropical fruits and carrot on sperm quality parameters was determined. Phytochemical screening and antioxidant testing was done in three replicates, while fruit extracts preparation was done at a concentration of 20 mg/mL. Epididymal sperm was extracted from thirteen adult rats and incubated with the extracts for five minutes before evaluating their concentration, motility and morphology in duplicates compared to control. There were large differences between the examined extracts. The extract of avocado had the highest content of flavonoids (4.70 ± 0.27 mg QUE/g) while that of tomato had the highest content of total phenols (8.50 ± 0.51 mg GAE/g). Guava showed good antioxidant activity having the highest value of ABTS (8.58 ± 0.57 M TEAC/g) and the highest DPPH activity (70.94 ± 5.07%). Similarly, it is observed that the greatest effect was recorded on the concentration (616 ± 32.53 × 10^3/mL), motility (75.00 ± 4.24%) and normal morphology (78.00 ± 4.24%) of the sperm cells by the guava extract. Positive effects of antioxidant status and sperm quality by the tomato, cashew and carrot extracts have been observed. However, it was discovered that the extracts from lime and lemon had very significant negative effects on the concentrations (126-176 × 10^3/mL) and motilities (38-42%) of the sperm cells due to their toxic nature resulting from high content of their alkaloids and terpenoids. There were clear relationships established between the phytochemical compositions, antioxidant activities and the reproductive outcomes through the multivariate analysis. This study reveals that the guava fruit can act as a good source of antioxidants and sperm activators whereas there might be negative effects on reproduction associated with certain citrus fruits. Further studies are recommended.

NMBCW-159

Assessment of the Neuroprotective Activity of *Croton zambesicus* in a Rat Model ofL-NAME-Induced Hypertension

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Neurological impairment is increasingly recognised as a major complication of hypertension, necessitating the development of effective neuroprotective interventions. This study investigated the neuroprotective effects and possible biochemical mechanisms of the aqueous extract of *Croton zambesicus* (CRZ) in Nω-nitro-L-arginine methyl ester (L-NAME)-induced hypertensive rats. The aqueous extract was prepared using distilled water. Forty male Wistar rats weighing 160–180 g were randomly assigned to five groups (n = 8). Hypertension was induced in all groups except the normal control by intraperitoneal administration of L-NAME (35 mg/kg). Group I served as the normal control, Group II untreated (negative) control, Group III received the standard antihypertensive drug lisinopril, while Groups IV and V were treated with 200 and 400 mg/kg body weight of CRZ, respectively, for 14 days. The animals were sacrificed, and the brains were excised, homogenised in cold phosphate buffer (pH 7.4). Biochemical analyses were performed to determine brain dopamine concentration, acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) activities, antioxidant enzyme activities including superoxide dismutase (SOD) and catalase (CAT), as well as lipid peroxidation (LPO) levels. The untreated hypertensive rats exhibited significantly increased ($p < 0.05$) AChE and BChE activities and elevated LPO levels, accompanied by significant reductions ($p < 0.05$) in SOD and CAT activities and dopamine concentration compared with the normal control. Treatment with *C. zambesicus* significantly ($p < 0.05$) reversed these alterations in a dose-dependent manner, restoring antioxidant status, reducing oxidative damage, inhibiting cholinesterase activities, and increasing dopamine levels relative to the untreated hypertensive group. These findings suggest that the aqueous extract of *Croton zambesicus* exerts neuroprotective effects against hypertension-induced neuronal dysfunction, possibly through its antioxidant, anti-lipid peroxidative, and cholinesterase-inhibitory properties. The plant therefore shows promise as a potential therapeutic agent for the management of hypertension-associated neurological disorders.

NMBCW-160

Mistletoe Tea Improves Glucose Homeostasis and Carbohydrate Metabolism in *Plasmodium berghei*-Infected Mice

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Malaria is often associated with metabolic disturbances, particularly hypoglycaemia, which contributes significantly to disease severity and mortality. Although *Viscum* spp. (mistletoe) has traditionally been used in the management of malaria, scientific evidence supporting its role in glucose homeostasis remains limited. This study investigated the effect of mistletoe tea on glucose homeostasis, carbohydrate-hydrolysing enzymes, and selected biochemical markers in *Plasmodium berghei*-infected mice. Phytochemical composition and antioxidant activities were evaluated using standard methods. Thirty-two mice were assigned to four groups: uninfected control, infected untreated, infected treated with artemether-lumefantrine, and infected treated with mistletoe tea (100 mg/kg). Blood glucose level, parasitaemia, and the activities of α-amylase and α-glucosidase were determined. Mistletoe tea contained appreciable levels of phenolic compounds (8.70 ± 0.04 mg GAE/g) and flavonoids (8.92 ± 0.08 mg QUE/g), alongside marked antioxidant activity. *Plasmodium berghei* infection caused hypoglycaemia (112.000 ± 9.899 mg/dL), increased parasitaemia (4.305 ± 0.455%), altered biochemical parameters, and reduced the activities of carbohydrate-hydrolysing enzymes. Treatment with mistletoe tea significantly improved blood glucose levels (136.333 ± 11.150 mg/dL), reduced parasitaemia (2.860 ± 0.050%) with a suppression rate of 64.051 ± 2.372%, and restored the activities of α-amylase and α-glucosidase toward normal, with effects comparable to artemether-lumefantrine. These findings support the ethnomedicinal use of mistletoe tea and suggest its potential as a complementary intervention for mitigating metabolic disturbances and improving physiological outcomes during malaria infection.

NMBCW-161

Assessment of Almond Nuts (*Prunus dulcis*) and Cashew Nuts (*Anacardium occidentale)* on Biochemical Parameters in Scopolamine-Induced Amnesic Rats

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Almond (*Prunus dulcis*) is a nutrient-rich tree nut recognised for its abundance of bioactive phytochemicals with promising antioxidant and neuroprotective properties. This study investigated the *in vitro* phytochemical composition, antioxidant capacity, and enzyme inhibitory activities of aqueous almond extract as a potential functional food for the management of oxidative stress-associated neurodegenerative disorders. Total phenolic and flavonoid contents of the extract were 6.27 mg GAE/g and 0.69 mg QE/g, respectively. Antioxidant activities were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2′-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), ferric reducing antioxidant power (FRAP), ferrous ion chelation, and lipid peroxidation assays, with values of 60.99%, 15.43%, 1.06, 73.64%, and 100.58%, respectively. The extract also demonstrated inhibitory activities against arginase (12.18%), acetylcholinesterase (33.33%), and butyrylcholinesterase, indicating its potential to modulate cholinergic dysfunction associated with neurodegeneration. The observed antioxidant and enzyme inhibitory properties suggest that almond possesses considerable nutraceutical potential and may serve as a functional dietary intervention for mitigating oxidative stress and biochemical alterations implicated in Alzheimer's disease.

NMBCW-162

Proximate Composition and *in vitro* Antioxidant Activities of Boiled and Fermented Zobo Drink (*Hibiscus sabdariffa*)

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Oxidative stress contributes to the onset of many chronic diseases, with dietary antioxidants playing a protective role. *Hibiscus sabdariffa* (zobo), a widely consumed beverage, is a potential source of natural antioxidants; however, processing methods may influence its bioactivity. This study investigated the proximate composition and *in vitro* antioxidant activities of boiled and fermented zobo drink (*Hibiscus sabdariffa*). Proximate analysis was conducted using standard procedures, while antioxidant activity was evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, nitric oxide (NO), and hydrogen peroxide (HPx) inhibition assays. Two separate portions of *Hibiscus sabdariffa* were processed by boiling and fermentation methods. The boiled *Hibiscus sabdariffa* drink showed significant antioxidant activity in the NO scavenging assay, with an IC_{50} value of 62.51 ± 7.37 µg/mL, indicating moderate free radical scavenging capacity. In contrast, the fermented sample demonstrated stronger activity, with an IC_{50} value of 42.16 ± 5.41 µg/mL. Similarly, HPx scavenging assay, the boiled drink exhibited strong antioxidant activity (IC_{50} = 42.59 ± 6.49 µg/mL), while the fermented drink showed even greater potency (IC_{50} = 27.89 ± 5.47 µg/mL). For the DPPH assay, the boiled sample had an IC_{50} value of 34.39 ± 0.89 µg/mL, indicating strong scavenging activity, whereas the fermented sample displayed superior activity with an IC_{50} value of 24.05 ± 0.63 µg/mL. The fermented *Hibiscus sabdariffa* drink consistently exhibited higher antioxidant potential than the boiled counterpart across all assays, signifying that fermentation enhances the antioxidant potential of *Hibiscus sabdariffa,* thus supporting its use as a potential functional beverage for mitigating oxidative stress.

TRACK 6 · MTDDI

Molecular Therapeutics, Drug Discovery, and Diagnostic Innovations

135 abstracts · MTDDI-01 to MTDDI-143

MTDDI-01

Inhibition of NADPH Oxidase and Restoration of Antioxidant Enzyme Networks by Combined extract of *Piper guineense* and *Zingiber officinale* in Aluminium-Induced Neurotoxicity

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Neurodegenerative disorders such as Alzheimer's disease are increasingly linked to enzymatic dysregulation of oxidative and inflammatory pathways. NADPH oxidase serves as a major upstream generator of reactive oxygen species that initiates antioxidant enzyme collapse, nitrosative imbalance, and neuroinflammation. This study investigated the capacity of combined ethanol extract of *Piper guineense* leaves and *Zingiber officinale* rhizomes to modulate NADPH oxidase activity and restore antioxidant enzyme systems in an aluminium chloride ($AlCl_3$)-induced rat model of neurotoxicity, with preliminary evaluation of its acute oral toxicity. Acute toxicity was assessed using a modified Lorke's method in Wistar rats, revealing no mortality up to 6000 mg/kg, partial mortality (33.3%) at 7000 mg/kg, and 100% mortality at 10,000 mg/kg, yielding an LD_{50} of 7745.97 mg/kg, indicating a wide safety margin. Thirty male Wistar rats were divided into six groups (n=5). Dementia was induced via oral administration of AlCl3 (120 mg/kg). Treatment groups received combined extracts (400 and 800 mg/kg) or the standard drug Donepezil (5 mg/kg). Brain homogenates were analysed for NADPH oxidase activity, nitric oxide metabolites (NOx), nitrate levels, lipid peroxidation (MDA), endogenous antioxidants (GSH, GPx, SOD, CAT), and pro-inflammatory cytokines (TNF-α, IL-6, IL-1beta). AlCl3 administration induced significant enzymatic disruption, characterised by a pathological upregulation of NADPH Oxidase activity (73.66±1.17 pg/mg) and total NOx, alongside a significant depletion of physiological nitrates and antioxidant enzymes (SOD, CAT, GPx). This imbalance facilitated a three-fold increase in Malondialdehyde (MDA) levels (0.60±0.03 mmol/g) and a robust surge in pro-inflammatory cytokines. Conversely, treatment with the combined extract, particularly at 800 mg/kg, significantly inhibited NADPH oxidase activity (50.00±0.26 pg/mg) and restored nitrate bioavailability. The extract effectively boosted the brain's antioxidant buffering capacity and dose-dependently suppressed the neuroinflammatory markers TNF-α, IL-6, and IL-1beta, showing therapeutic efficacy statistically comparable to Donepezil. The findings demonstrate that the polyherbal combination mitigates aluminium-induced dementia by inhibiting the NADPH Oxidase-mediated oxidative burst and restoring the brain's catalytic balance. This polyherbal approach offers a promising strategy for the management of neurodegenerative disorders.

MTDDI-02

Computer-guided identification of novel inhibitors of apoptosis-signalling kinase 1 from *Spondia mombin* bioactive compounds against colorectal cancer

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Apoptosis-signalling kinase 1 is a MAPKKK (mitogen-activated protein kinase) overexpressed in various types of human cancer including colorectal cancer. It mediates inflammation and apoptosis and promotes cell proliferation through the transcription of cyclin D1. 5-Fluorouracil remains one of the primary recommended drugs to manage colorectal cancer. However, this drug often causes various adverse effects, notably diarrhoea, vomiting, nausea, and leucopenia. Therefore, a novel treatment is required to eradicate these problems. The clinical implication of apoptosis-signalling kinase 1 in the pathogenicity of colorectal cancer makes it an important drug target in the treatment of colorectal cancer. The use of natural compounds in human cancer treatment continues to gain significant attention in the scientific community due to their therapeutic efficacy. In this study, computational models such as flexible docking, induced fit docking, and binding free energy calculation were employed to identify small molecule inhibitors from known bioactive compounds of *Spondias mombin* in reference to 5-fluorouracil (Colorectal cancer standard drug) targeting apoptosis-signalling kinase 1. Molecular docking studies identified 10 promising candidates which include uvaretin, rutin, isoquercitrin, ellagic acid, quercetin, linalool, acetyl eugenol, tangeretin (-)-catechin, and d-sorbitol based on their favourable binding affinity, with uvaretin having the best score (– 11.328 kcal/mol). The results were further validated with more dependable analysis such as induced fit docking and binding free energy calculation. These compounds showed modest indices for ADMET parameters. Molecular dynamic simulation validated ellagic acid and (-)-catechin with greater binding stability as leading compounds. These compounds showed improved flexible docking results and formed considerable stable interaction with the protein than 5-fluorouracil. They are non-carcinogenic. The oral bioavailability and toxicities of these compounds are promising as compounds obeyed the Lipinski rule of five. The constructed quantitative structure–activity relationship model with a trustworthy R2 coefficient value supports the inhibition prowess of these compounds. The findings from this research confer that these compounds could be considered potent apoptosis-signalling kinase 1 inhibitors, and these could be confirmed experimentally as lead compounds of apoptosis-signalling kinase 1 inhibitors in colorectal cancer.

MTDDI-03

Hydro-ethanolic Extract of *Garcinia kola* Ameliorates Testosterone Propionate-Induced Reproductive Dysfunction through Redox Homeostasis and Immunomodulatory Mechanisms in Experimental Benign Prostatic Hyperplasia

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Benign prostatic hyperplasia (BPH) is a prevalent age-related disorder characterised by prostatic enlargement, oxidative stress, chronic inflammation, and progressive male reproductive dysfunction. Although pharmacological agents such as dutasteride are effective, their long-term use is associated with adverse reproductive effects, necessitating safer therapeutic alternatives. *Garcinia kola*, a medicinal plant rich in bioactive phytochemicals, possesses antioxidant and anti-inflammatory properties; however, its role in BPH-associated reproductive dysfunction remains poorly understood. This study investigated the protective effects of the hydroethanolic extract of *Garcinia kola* (HEGK) against testosterone propionate-induced BPH, focusing on reproductive function, oxidative stress, and inflammatory responses. Male rats were assigned to five groups: normal control, HEGK control, testosterone-induced BPH, dutasteride-treated BPH, and HEGK-treated BPH. Phytochemical profiling of HEGK was conducted before treatment. Semen quality, antioxidant biomarkers (superoxide dismutase, catalase, reduced glutathione, and malondialdehyde), and inflammatory mediators (C-reactive protein, tumour necrosis factor-α, and interleukin-10) were evaluated. HEGK contained abundant alkaloids, saponins, flavonoids, tannins, terpenoids, phenolics, and cardiac glycosides. Testosterone-induced BPH significantly increased prostate index, oxidative stress, and inflammatory dysregulation while impairing semen quality. HEGK treatment significantly restored endogenous antioxidant defences by increasing reduced glutathione and superoxide dismutase activities, reduced lipid peroxidation, attenuated C-reactive protein levels, modulated cytokine responses, and improved reproductive parameters compared with untreated BPH animals. These effects were comparable to, and in some parameters complemented, those of dutasteride, suggesting multitarget biological activity beyond androgen inhibition. Overall, HEGK mitigated testosterone-induced BPH by restoring redox homeostasis, suppressing inflammatory pathways, and preserving reproductive function, highlighting its promise as a phytotherapeutic candidate for managing BPH-associated reproductive complications.

MTDDI-04

Effects of Red Frangipani (*Plumeria rubra*) on Biochemical, Antimicrobial, Characterisation of Three Metallic Nanoparticles, and Molecular Docking for Medicinal Target Prediction

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Red frangipani (*Plumeria rubra*) is a flowering species abundant in bioactive compounds with anti-inflammatory, antioxidant, antimicrobial, and anticancer effects. The bioactive components, including alkaloids, tannins, phenols, and flavonoids, have been associated with its diverse medicinal potentials. This study investigated the biochemical, antimicrobial, nanoparticle characterisation, and molecular docking properties of *Plumeria rubra* for predicting medicinal targets. The leaves were collected from Ekiti State University, Ado-Ekiti, and processed to obtain the aqueous extract. Various analytical procedures were employed to determine nutritional, antinutritional, mineral, phytochemical, antioxidant, antimicrobial, and nanoparticle properties. The analyses revealed relatively high levels of nutrients, low levels of antinutrients, and the presence of flavonoids, alkaloids, saponins, tannins, and phenolic compounds. The extract exhibited strong antioxidant activity against DPPH and NO radicals, high ferric reducing antioxidant power (FRAP), and appreciable phenolic and flavonoid contents. Furthermore, characterisation of three metallic nanoparticles (silver, copper, zinc) was achieved with UV-vis and FT-IR spectroscopies. Based on the amount of light absorbed, the functional groups of some organic compounds were identified, and increased antimicrobial activity against various pathogens (bacteria and fungi) was observed. Molecular docking revealed that 2-methoxy-4-vinylphenol showed the strongest binding affinity (−7.5 kcal/mol) with Dipeptidyl Peptidase-4 (DPP-4) inhibitors, suggesting potential antidiabetic activity. It can be deduced from the results of these analyses that the leaves of *Plumeria rubra* contain various bioactive compounds and is a promising source of natural antioxidants, antimicrobial agents, and compounds for diabetes-related drug development for therapeutic effects.

MTDDI-05

Bioactive Compounds Identification and Inhibitory Effect of Methanol Fraction of *Ocimum sanctum* (Tulsi) Leaves on Breast Cancer Cell Line – MCF-7

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Breast cancer remains a leading cause of cancer-related morbidity in women worldwide. Conventional chemotherapeutics often induce toxicity, highlighting the need for plant-derived alternatives with lower side effects. *Ocimum sanctum* (Tulsi), a traditional medicinal herb, exhibits antioxidant and cytotoxic potential, but its fraction-specific activity against oestrogen receptor-positive breast cancer remains underexplored. This study aimed to identify the bioactive compounds in the methanol fraction of *O. sanctum* leaves and evaluate their inhibitory effect on the human breast adenocarcinoma cell line - MCF-7. Leaves were extracted in methanol and fractionated via silica gel column chromatography using the dry slurry method. Cytotoxic activity was assessed using the WST-8 (CCK-8) assay. The most active fraction was subjected to GC–MS analysis for identification of bioactive constituents. The methanol fraction exhibited moderate, dose-dependent inhibition of MCF-7 cell proliferation. GC–MS profiling identified 43 compounds, including 2,4-di-tert-butylphenol (9.65%), dodecane, 2,6,10-trimethyl- (10.12%), and hexadecane (5.95%). Phenolic constituents like 2,4-di-tert-butylphenol may induce cell cycle arrest through p53-mediated pathways, contributing to the observed antiproliferative effect. The methanol fraction of *Ocimum sanctum* leaves contains bioactive compounds capable of moderating breast cancer (MCF-7) cell growth through redox modulation and cell cycle regulation. These findings provide a foundation for isolating and characterising plant-derived anticancer molecules.

MTDDI-06

In vitro Antioxidant and Cytotoxic Effects of Crude Extract and Solvent Fractions of African Walnut *Tetracarpidium conophorum* Seeds

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Medicinal plants remain important sources of bioactive compounds for drug discovery, as they produce a wide range of chemically diverse secondary metabolites valuable for treating diverse ailments including inflammation, infections and even cancers. This study evaluated the phytochemical constituents, as well as the *in vitro* antioxidant and cytotoxic activities, of the crude extract and solvent-partitioned fractions of African walnut (*Tetracarpidium conophorum*) seeds. Phytochemical screening and antioxidant assays were conducted using standard analytical methods, while cytotoxicity was assessed using the Brine Shrimp Lethality Assay (BSLA). The results indicated the presence of flavonoids, phenolics, tannins, saponins, and alkaloids in the crude extract, with alkaloids having the highest concentration (22.58 µg/g), while tannins had the lowest concentration (15.28 µg/g). These bioactive compounds were detected in comparatively lower amounts in the solvent-partitioned fractions than in the crude extract. The crude extract exhibited significantly ($p < 0.05$) higher antioxidant activity than the solvent-partitioned fractions. Similarly, BSLA results revealed that the crude extract had significantly ($p < 0.05$) higher cytotoxic activity (with an LC_{50} value of 499.07 µg/mL) against brine shrimp larvae when compared with the solvent fractions - the LC_{50} values for the methanol, ethyl acetate and *n*-hexane fractions were calculated to be; 512.39, 547.74, and 725.48 µg/mL respectively. The findings from this study imply that *T. conophorum* possesses bioactive compounds with anticancer potential and may serve as a valuable source for the development of novel anticancer agents.

MTDDI-07

Green synthesis of characterised Zinc oxide nanoparticles from aqueous extract of *Allium sativum* (garlic) and their potential cytotoxicity and antibacterial properties

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Synthesis of Zinc oxide nanoparticles (ZnO-NPs) using different plant extracts have been suggested as an environmentally friendly process. In this study, ZnO-NPs were synthesised using aqueous *Allium sativum* (garlic) extract and Zn(CH3COO)2.6H2O as precursors. The ZnO-NPs were characterised by using analytical techniques such as: Fourier transform infrared (FTIR) spectroscopy, UV-visible spectroscopy, X-ray diffraction (XRD) analysis, Dynamic Light Scattering (DLS), Transmission electron microscopy (TEM), and Scanning electron microscopy- Energy dispersive X-ray (SEM-EDX). The phytochemical analysis, antioxidant, cytotoxicity against brine shrimps, and antibacterial activities were determined using standard methods. The phytochemical screening of the aqueous extract of garlic shows that it contains phytochemicals like: tannins, flavonoids, alkaloids, etc. The UV–vis analysis has absorption peaks at 375 nm. The FTIR spectroscopy shows organic moieties serving as reducing and capping agents. The surface morphology and the elemental composition of the ZnO-NPs were established by SEM, TEM, and EDX analyses. The crystalline size of the NP was determined using XRD. The ZnO-NPs possess antioxidant, cytotoxicity, and antibacterial activities. The results of this study validate that ZnO-NPs derived via green synthesis demonstrated antioxidant, cytotoxicity, and antibacterial properties.

MTDDI-08

Influence of Diphenyl Diselenide on Thiol Redox Homeostasis and Electrogenic Membrane Transport in Rotenone-Induced Parkinson's Disease

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The modulation of redox homeostasis in the aetiology of Parkinson's disease highlights the vulnerability of redox-sensitive proteins, such as the Na^+/K^+-ATPase, as well as the key therapeutic role of antioxidant compounds in managing the disease. The present study aimed to investigate the role of diphenyl diselenide (DPDSe) in ameliorating disturbed redox homeostasis and enzyme inactivation caused by rotenone administration in Wistar albino rat models. Animals were grouped into four groups, namely: control, DPDSe alone (10 mg/kg p. o.), Rotenone alone (3 mg/kg i. p.), and Rotenone (3 mg/kg i. p.) plus DPDSe (10 mg/kg p. o.), with controls receiving the vehicle (2% DMSO + 98% normal saline (0.85%)). The effect of treatment was evaluated after seven days for cellular thiol levels, lipid peroxidation, and Na^+/K^+-ATPase activity. The result demonstrated the antioxidant potential of DPDSe in attenuating thiol depletion and lipid peroxidation caused by rotenone. It is apparent that DPDSe is a promising therapeutic agent in the management of PD, hence further investigations into its impact on different pathways is expedient in the search for an effective treatment for PD.

MTDDI-09

Neuroprotective Effects of Naringin in combination with Polyphenolic-rich Extract of *Heliotropium indicum* against Aluminium Chloride-induced Neurotoxicity in Rats

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Aluminium (Al) exposure is a growing environmental health concern due to its neurotoxic effects, primarily mediated through oxidative stress and neurotransmitter disruption. This study evaluated the neuroprotective potential of naringin and a polyphenolic-rich extract of *Heliotropium indicum* against aluminium chloride ($AlCl_3$)-induced neurotoxicity in adult male albino rats. Thirty-six rats were randomly divided into six groups (n=6 each): control, $AlCl_3$-only (100 mg/kg b.wt.), $AlCl_3$ + donepezil (5 mg/kg, standard drug), $AlCl_3$ + naringin (80 mg/kg), $AlCl_3$ + *H. indicum* extract (200 mg/kg), and $AlCl_3$ + naringin + *H. indicum*. All treatments were administered orally for 14 consecutive days. After the treatment, brain tissue homogenates were analysed for dopamine, serotonin, gamma-aminobutyric acid (GABA), and acetylcholinesterase (AChE) activity using ELISA and spectrophotometric methods. The results showed that $AlCl_3$ exposure significantly increased AChE activity ($p < 0.05$) while reducing dopamine, serotonin, and GABA levels ($p < 0.05$), indicating impaired cholinergic and monoaminergic neurotransmission. Treatment with naringin or *H. indicum* alone partially reversed these alterations. However, the combination therapy restored neurotransmitter levels to near-normal values and significantly lowered AChE activity. These neuroprotective effects could be attributed to the synergistic antioxidant and anti-inflammatory actions of naringin and *H. indicum* polyphenols, by scavenging reactive oxygen species, inhibiting lipid peroxidation, and modulating neuronal signalling pathways. Conclusively, this study provides experimental evidence that combination of naringin and *Heliotropium indicum* extract effectively mitigated aluminium-induced neurotoxicity. This combination can be further investigated as a possible therapy for stress-linked neurodegenerative disorders.

MTDDI-10

Effect of *Carpolobia lutea* leaf extract on erectile dysfunction induced by Paroxetine in rats

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Erectile dysfunction (ERDF) has been implicated as an adverse effect of Paroxetine. Sildenafil (Viagra) is a conventional currently used in the management of this ailment but with side effects. *Carpolobia lutea* (CL) is a medicinal plant, traditionally explored and established for its aphrodisiac potential. The study aims to investigate the effect of *Carpolobia lutea* Extract (CLE) on ERDF rats induced by paroxetine at the molecular level and its phytocompounds interaction with proteins linked to the erection pathway. Forty-eight adult male Wistar rats were randomly grouped into six experimental groups: normal control, (20mg/kg PI – ERDF + 1ml distilled water) and treated groups (10mg/kg Sildenafil, 50mg/kg of CLE, 100 mg/kg of CLE and 200 mg/kg of CLE). Rats were administered paroxetine for five days before their sexual behaviour was examined through mounting frequency and latency when introduced to female rats. Antioxidants assays (DPPH, FRAP and TBARS) were performed over the 21-day experiment, and molecular investigations (*In vivo* and *in silico*) on ERDF-linked genes were conducted. CLE has good *in vitro* antioxidant content. Paroxetine upregulated the expressions of phosphodiesterase 5, arginase, acetylcholinesterase, AMP deaminase and interleukin-6 relative to control. However, CLE down regulated these proteins and upregulated Nrf2, androgen receptor, and Lutenising hormone compared to PI – ERDF. CLE-phytocompounds like quercetin favourably interacted with phosphodiesterase-5 and nitric oxide synthase. The findings suggest that *Carpolobia lutea* leaf's phytocompounds show potential as a therapeutic agent in ERDF management.

MTDDI-11

Isolation and purification of quercetin from onion (*Allium cepa* L.) skin and its antioxidative effect against neocarzinostatin-induced varicocele infertility

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Quercetin, a flavonoid antioxidant with potent anti-inflammatory properties, has shown therapeutic potential in preventing oxidative stress-related diseases. This study extracted and purified quercetin from onion peels and evaluated its ameliorative effects against neocarzinostatin (NCS)-induced varicocele infertility in rats. Onion bulbs (*Allium cepa* L.) were obtained from Sabo Market, Ikere Ekiti, Nigeria. Onion peels were washed, sun-dried, powdered, and quercetin was isolated and purified using a 1:1 ethyl acetate–ethanol solvent system through Soxhlet extraction, rotary evaporation, column chromatography, and thin-layer chromatography.

All animal procedures complied with institutional ethical guidelines. Thirty rats were divided into three groups (n = 10): control, NCS-treated (5 mg/kg body weight), and co-treated with NCS (5 mg/kg body weight) and quercetin. Oxidative stress markers, antioxidant enzyme activities, thiol biomarkers, sperm parameters, reproductive hormones, and testicular histology were assessed.

Results demonstrated a substantial yield of high-purity quercetin, confirming onion peels as a rich natural source of this bioactive compound. Quercetin co-treatment ameliorated NCS-induced oxidative stress and varicocele-associated infertility, evidenced by reversal of enlarged testicular veins, improved sperm count, increased antioxidant enzyme activities (SOD and CAT), and reduced malondialdehyde (MDA) and reactive oxygen species (ROS) levels ($P < 0.05$) compared with NCS treatment alone. In conclusion, quercetin-rich onion peels may offer therapeutic potential in managing varicocele infertility by enhancing spermatogenesis and reducing oxidative stress.

MTDDI-12

Molecular Docking, ADMET Evaluation and Antihyperlipidaemic Property of Methanol Fraction of *Hibiscus sabdariffa* (L.) Calyx in Poloxamer-407 Induced Models

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Hyperlipidaemia is a leading global health burden, an increasing modifiable risk factor for cardiovascular disease (CVD) as well as the primary cause of disability and mortality worldwide. *Hibiscus sabdariffa* calyx is used by locals in Nigeria for the treatment of hyperlipidaemia. The efficacy of the plant extract had been validated without information on the possible mechanism of action of its fraction, hence this study. In this work, thirty rats were distributed into six groups (n=5). Animals in Group I received distilled water (DW). Group II-VI which were induced into hyperlipidaemia using poloxamer-407 (300 mg/kg body weight [BW]), were administered DW, fluvastatin (standard medication), 25, 50 and 100 mg/kg BW of methanol fraction of *Hibiscus sabdariffa* calyx (MFHSC) separately. Treatment occurred for 14 days followed by the determination of related biomarkers, phytochemistry, HPLC, molecular docking and ADMET analysis using appropriate standard techniques. The poloxamer-407 induced hyperlipidaemic alterations in serum lipid and antioxidant biomarkers were normalised by MFHSC. Phytochemical analysis of MFHSC revealed nine phytoconstituents. HPLC analysis identified thirteen phytocompounds in the MFHSC. Induced fit molecular docking of the three-most-relevant compounds with HMG-CoA reductase (HMGCR) indicated that apigenin had the highest docking score (-5.467) and PubChem CID (2221945). Amino acids on the enzyme binding pockets involved in the interaction include ARG496 and GLN510. ADMET prediction of the docked ligands/phytocompounds revealed that they are relatively bioavailable, less-toxic, exhibit drug-likeness characteristics and did not violate the Lipinski's Rule of Five. Phytocompounds docked with HMGCR via strong interaction, acting as a potential lipid-lowering drug lead.

MTDDI-13

Elucidation of *Achyranthes aspera*–derived Rotundioside B as a multitarget inhibitor of haemoglobin-degrading proteases in *Plasmodium falciparum*

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The progressive emergence of drug-resistant *Plasmodium falciparum* strains continues to undermine the efficacy of current antimalarial therapies, necessitating the identification of novel compounds that target essential parasite metabolic pathways. Haemoglobin degradation within the parasite digestive vacuole is a critical process for intra-erythrocytic survival and is mediated primarily by aspartic proteases (plasmepsins) and cysteine proteases (falcipains), making these enzymes attractive targets for antimalarial drug discovery. We investigated the antiplasmodial activities of the crude aqueous and methanol extracts and four fractions of *Achyranthes aspera;* identified the active botanicals; and employed an integratedin silico approach combining molecular docking, molecular dynamics (MD) simulations, MM-PBSA binding free-energy calculations, and ADMET profiling to investigate the inhibitory potential of Rotundioside B against falcipain-2, falcipain-3, and plasmepsins I, II, and IV of *P. falciparum*. The methanol extract and chloroform fraction presented most antiplasmodial effects. Rotundioside B, a triterpenoid saponin, was a prominent molecule identified. Docking analysis using Rotundioside B revealed strong binding affinities across all targets, with particularly favourable interactions for falcipain-2 and plasmepsin IV. Detailed interaction profiling showed that Rotundioside B engages key catalytic and substrate-recognition residues through a network of hydrogen bonds, hydrophobic contacts, and π-interactions. Subsequent 100 ns MD simulations demonstrated high structural stability of the protein–ligand complexes, with low RMSD and RMSF values, maintained compactness, and consistently favourable MM-PBSA binding energies, especially for plasmepsins I, II, and IV. ADMET predictions indicated acceptable pharmacokinetic properties consistent with a natural product lead. Collectively, these findings suggest that *Achyranthes aspera* is a promising alternative antimalarial therapy and the *Achyranthes aspera*-derived Rotundioside B is a stable, multitarget inhibitor of haemoglobin-degrading proteases in *P. falciparum*, highlighting its promise as a lead scaffold for further antimalarial drug development and experimental validation.

MTDDI-14

"Phytochemical Composition and *in vitro* Antioxidant Activity of Gargling Polyherbal extract (Akurkura)"

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Gargling polyherbal extract (known as akurkura in hausa) is the traditional polyherbal formulation with the combination of four leaves extracts; *Xylopia aethiopica*, *Zingiber officinale*, *Terapleura teraptera*, and *Nicotiana tabacum* commonly used in the management of hypertension, high blood pressure, and stroke. The study aimed to determine the phytochemical composition and *in vitro* antioxidant potential of gargling polyherbal extract (akurkura). The qualitative phytochemical screening for the presence of bioactive compounds and In vitroantioxidant potentials of the gargling polyherbal extract (akurkura) were assessed by evaluating2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging and Ferricreducing antioxidant power (FRAP), The result revealed the presence of flavonoids, phenols, terpenoids, tannins, steroids, and alkaloids, saponins were absence. The extract revealed antioxidant activity in a concentration dependent manner in both DPPH and FRAP, and has lower inhibition (activity) when compared with the standard (i.e Ascorbic acid). Gargling polyherbal extract (akurkura) exhibited antioxidant activity but its potency was lower than that of ascorbic acid, the finding suggest that Akurkura possesses antioxidant properties due to its phytochemical constituents and may help to reduce oxidative stress. There is need for further research to isolate the active constituents and evaluate their pharmacological efficacy and safety.

MTDDI-15

Regulation of GLP-1 and Insulin Secretion via TGR5 Pathway: Therapeutic Potential of *Alstonia boonei* Aqueous Extract in Diabetes

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Diabetes mellitus is a metabolic disorder characterised by persistent hyperglycaemia resulting from impaired insulin secretion or action. The glucagon-like peptide-1 (GLP-1)/TGR5 signalling pathway plays a critical role in regulating glucose metabolism and insulin sensitivity. This study investigated the molecular effects of *Alstonia boonei* aqueous leaf extract on GLP-1/TGR5 signalling in streptozotocin-induced diabetic rats. Thirty-six male albino rats were divided into six groups: a normal control group, a diabetic control group, and three treatment groups receiving oral doses of *A. boonei* extract (50, 100, and 200 mg/kg) for 21 days. Fasting blood glucose, serum insulin, and lipid profile were assessed using standard methods. The expression of TGR5 and GLP-1 was evaluated at the molecular level. Compared to diabetic controls, *A. boonei* extract significantly reduced blood glucose levels and improved lipid profiles. Additionally, it markedly upregulated GLP-1 and TGR5 expression, indicating enhanced incretin signalling. These findings suggest that *Alstonia boonei* aqueous extract exerts antihyperglycaemic effects through activation of the GLP-1/TGR5 pathway, highlighting its potential as a natural therapeutic agent for diabetes management.

MTDDI-16

Phytochemical and Nutraceutical Evaluation of *Musa paradisiaca* (Plantain) Pseudo-stem Fibre and Exudate

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Musa paradisiaca (plantain) remains an important tropical crop widely exploited for food, nutrition, and its pseudo-stem fibre and exudate have been used as traditional medicine. This study investigated the phytochemical and nutraceutical evaluation of plantain pseudo-stem fibre and exudate to establish their nutritional and pharmacological relevance. Fresh pseudo-stems were collected, shade-dried, oven-dried, pulverised, and the exudate collected for laboratory analyses. Proximate parameters were determined using standard methods. Mineral elements were quantified using Flame Atomic Absorption Spectrophotometry, while phytochemicals were identified through Gas Chromatography–Mass Spectrometry. Amino acid composition was determined using HPLC. Results revealed that Plantain Exudate (PEX) had moisture content (88.46%), fibre (4.14%), carbohydrate (2.59%), lipid (1.50%), and ash (0.93%), while the Plantain Pseudo-Stem (PPS) contains carbohydrate (62.59%), moisture (21.06%), fibre (10.68%), ash (2.43%), and lipid (0.79%). The most abundant bioactive compounds present in PEX are resveratrol (51.46 nmol/l) and tangeretin (45.09 nmol/l), while kaempferol (91.34 nmol/l) and vanillic acid (117.06 nmol/l) are present in PPS. Mineral analysis showed that PPS contained higher levels of potassium (12.2893 mg/l) and calcium (11.894 mg/l), while PEX had higher zinc (1.6161 mg/l) and phosphorus (12.278 mg/l). Amino acid composition revealed serine as the most abundant in both PEX (499.82 µmol/l) and PPS (568.55 µmol/l), with PPS generally showing higher amino acid concentrations. Overall, PPS demonstrated higher nutrient density, mineral richness, and bioactive potency, while PEX contained moderate amino acids and distinct phytochemicals with therapeutic potentials. These findings show that the pseudo-stem and exudate of *Musa paradisiaca* can be explored for nutraceutical values.

MTDDI-17

Antioxidant Properties of *Bryophyllum pinnatum* Leaves On Dpp-4 and Its Influence on Longevity of *Drosophila melanogaster*

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Bryophyllum pinnatum also known as Miracle Plant, a very accessible yet mostly unused plant. It known for its rich content of flavonoids, alkaloids, and phenolics, exhibits anti-inflammatory, antimicrobial, and antioxidant properties. This study assessed its effects on mortality, protein levels, oxidative stress markers (Catalase, Nitric Oxide, DPPH, Total Thiol, and Glutathione Transferase activities), and antioxidant activity in *Drosophila melanogaster*. One to three-day-old flies of both sexes were divided into four groups and the first group were fed with the normal diet while the rest of the groups were fed with diet supplemented with 50, 100, or 200 mg/kg of blended *B. pinnatum* leaves. Phytochemicals from *B. pinnatum* were sourced from databases and docked against the protein Dipeptidyl Peptidase-4 (DPP-4) using PyRx. Compounds such as Ergotamine, Epicatechin, Tubocurarine, Poncirin, and Didymin showed stronger binding affinities than metformin, indicating potential antidiabetic activity. Flies fed 50 mg/kg showed reduced mortality and extended lifespan, while higher doses (100 and 200 mg/kg) increased mortality, indicating toxicity. Protein levels dropped significantly at 50 and 200 mg/kg. Nitric oxide and catalase activities decreased across all supplemented groups, while total thiols and glutathione transferase activities increased, suggesting enhanced antioxidant defence. DPPH radical scavenging activity showed dose-dependent improvement, outperforming quercetin at ⩾60 µg/mL. These results suggest that *B. pinnatum* modulates oxidative stress and exhibits potent antioxidant effects at moderate doses, but may be toxic at higher concentrations.

MTDDI-18

Anti-nociceptive and Anti-inflammatory Potential of *Phyllantus amarus* Methanolic Leaf Extract in a Rat Model

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The conventional painkillers often trigger side effects. This necessitated the search for cost-effective, affordable alternatives to eliminate complications. This study investigated the anti-nociceptive and anti-inflammatory activity of *P. amarus* methanolic leaf extract (*PAME*) in formalin-induced paw oedema in Wistar rats. Phytochemical characterisation and *in vitro* free radical scavenging capacity of *PAME* were evaluated using standard procedures. Oedema was induced in rats' right hind paws using 0.05 mL of 2.5% formalin. After seven days of *P. amarus* treatment, rats were sacrificed. Serum, liver, and paw tissues were biochemically analysed. Anti-nociceptive effects of PAME at 100 and 200 mg/kg were evaluated on day 7 post-administration, alongside redox markers, inflammatory markers, paw oedema inhibition, and mRNA expression of pain-related inflammatory genes. HPLC analysis revealed the abundance of ellagic acid and amarin in PAME. The extract also exhibited a concentration-dependent free radical scavenging activity. Total flavonoid and phenolic contents were 57.74±0.58 mg quercetin equivalent/g and 255.96±9.91 mg gallic acid equivalent/g, respectively. Formalin-induced paw oedema significantly ($P<0.05$) elevated serum cyclooxygenase-2 (COX-2), prostaglandin-E2 (PGE-2), malondialdehyde, protein-carbonyl, and pro-inflammatory cytokines, but lowered the antioxidant enzymes and anti-inflammatory cytokines, compared to control and treated groups. PAME treatments significantly lowered serum COX-2, PGE-2, oxidative-stress markers, and pro-inflammatory cytokines, improved antioxidant enzymes and anti-inflammatory cytokines, inhibited paw oedema formation, and modulated mRNA expression of TNF-α, IL-6, and ICAM, and up-regulated IL-10 and TGFβ1 compared to untreated rats. These results revealed that *P. amarus* possesses antioxidant properties, potent analgesic and anti-inflammatory potentials, which could be useful in controlling peripheral and central pains.

MTDDI-19

Insilico Multi-target Inhibition of Breast (MCF-7) and Colon (HCT116) Cancer Proteins Using *Petiveria alliacea* Leaf Phytochemicals: Molecular Docking and Dynamics Simulation Approach

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Cancer remains a major global health burden driven by uncontrolled cell growth and rising incidence rates. Conventional treatments are often hindered by drug resistance and toxic side effects, creating a need for safer, plant-based alternatives. *Petiveria alliacea* (Anamu) is an ethnomedicinal plant with increasing scientific interest due to its anticancer properties. It contains bioactive organosulfur compounds such as dibenzyl trisulfide and dibenzyl disulfide, which have demonstrated cytotoxic and anti-proliferative effects in cancer cells. This study investigates the interaction of *P. alliacea* leaf phytochemicals with five cancer-associated proteins (BCL-2, EGFR, HER2, KRAS, and VEGF) using computational methods. Thirteen compounds were screened for drug-likeness based on Lipinski's criteria and subjected to molecular docking and dynamics simulations. Results showed that dibenzyl trisulfide and dibenzyl disulfide exhibited strong binding affinities (−8.1 to −9.4 kcal/mol), while benzyl isothiocyanate showed moderate affinity (−7.2 to −8.0 kcal/mol). These findings are consistent with previous reports highlighting dibenzyl trisulfide as a potent anticancer agent capable of inhibiting cancer cell proliferation and inducing cell death. Molecular dynamics analysis revealed stable ligand–protein interactions, with certain compounds showing enhanced structural stability and compactness. Pharmacokinetic profiling indicated favourable ADME properties, with most compounds complying with Lipinski's Rule of Five. The observed multi-target binding supports modern anticancer strategies aimed at overcoming tumour complexity and resistance. Overall, *P. alliacea* demonstrates strong potential as a source of bioactive compounds for breast and colon cancer therapy. These computational insights provide a basis for further experimental validation and drug development.

MTDDI-20

Momordica charantia Aqueous Leaf Extract Suppresses Inflammation in Male BALB/c Mice with High-Fat Diet, Azoxymethane and Dextran Sulphate Sodium-Induced Dysplasia

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Colon cancer represents nearly one in ten cancer diagnoses worldwide and is marked by early onset and high mortality. Lifestyle, heredity, environmental exposure, and inflammatory bowel disease contribute significantly to risk. Conventional therapies remain invasive, costly, and limited in efficacy, driving interest in plant-based chemopreventive agents. *Momordica charantia* (bitter melon) is traditionally valued for diverse pharmacological properties, yet its influence on high-fat diet (HFD)-enhanced, azoxymethane (AOM)/dextran sulphate sodium (DSS)-induced colonic injury is not well defined.

Twenty-eight male BALB/c mice were acclimatised and randomised into four groups (n=7). Colonic lesions were induced with single 12.5mg/kg AOM *intraperitoneal* injection and 2.5% DSS (orally administered through their drinking water in three cycles). Aqueous leaf extract of *Momordica charantia* (AqE) (200 mg/kg daily) was administered orally from week four to ten. The mice apart from control, were fed HFD (normal diet fortified with 45% corn oil) for ten weeks. Histological and biochemical parameters were assessed, with statistical significance set at $p < 0.05$. AOM/DSS exposure caused colonic dysplasia, shortened colons, reduced antioxidant defences, and elevated inflammatory mediators [inducible nitric oxide synthase (iNOS), cyclooxygenase-2 (COX-2), tumour necrosis factor-alpha (TNF-α), interleukin-3 (IL-3), and interleukin-6 (IL-6)] compared to control. AqE treatment reinstated mucosal integrity and significantly attenuated inflammatory responses, approaching control values. These findings suggest AqE mitigates oxidative stress and inflammation, central drivers of tumorigenesis, with promising chemopreventive activity against colon cancer. This positions the extract as a potential natural, cost-effective therapeutic candidate, with further studies recommended.

MTDDI-21

Phytochemical Screening, Toxicity Evaluation and Antioxidant Activity of Stem Bark Extracts of *Chrysophyllum albidum* (G. Don)

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Chrysophyllum albidum is an important tropical plant found in different parts of Sub-Saharan Africa. It is widely employed for its economic and medicinal values. This study investigated the phytochemical constituents, toxicity profile and antioxidant activity of the aqueous, ethanol and methanol extracts of *C. albidum* stem bark. The extracts were obtained via cold maceration and the presence of phytochemicals was quantitatively investigated using Gas Chromatography-Mass Spectrometry (GC-MS) and High-Performance Liquid Chromatography (HPLC). The toxicity profile, *in vitro* (DPPH, H2O2, NO scavenging activity, LPO and TAC) and *in vivo* (GSH, SOD, CAT, MDA, GPx) antioxidant activities of the extracts were investigated. All three extracts contained alkaloids, flavonoids, tannins, saponins and cardiac glycosides, with the aqueous extract having gallic acid and caffeic acid which are absent in the other extracts. Oral administration of the extracts up to 2000mg/kg body weight showed no mortality or adverse behavioural effect and no significant difference at ($p > 0.05$) in organ weights, haematological and biochemical indices compared to control. *In vitro* antioxidant activity revealed that ethanol extract of the stem bark had the lowest IC50. However, the aqueous extract had the highest *in vivo* antioxidant activity in the liver, kidney and serum, followed by the ethanol extract. The extracts did not show alteration in the liver function. This study showed that the extracts of the stem bark are relatively safe and further studies need to be done to prove the efficacy of the antioxidant and anti-inflammatory activities *in vivo* in disease management.

MTDDI-22

Modulation of Advanced Glycation End Products Formation and Cytotoxicity: A Plant-Based Approach

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Hyperglycaemia, a hallmark of type 2 diabetes, generates advanced glycation end products (AGEs), which is implicated in diabetic complications and other age-related diseases. AGEs are also present in food and contribute to inflammation. This study investigated the effects of *Vernonia amygdalina* (VLE), *Ocimum gratissimum* (OLE), and *Ficus exasperata* (FLE) leaf extracts on *in vitro* models of glycation and cytotoxicity. The spectrophotometric technique was used to determine the ability of the extracts to inhibit glucosamine and fructosamine formation in the BSA-glucose and BSA-fructose models, respectively. Cytotoxicity was assessed using the brine shrimp lethality assay to determine the lethal concentration (LC50). FLE demonstrated the highest LC50, indicating the lowest cytotoxicity. Conversely, OLE exhibited the strongest cytotoxic effect, reflected by the lowest LC50 value. Regarding antiglycation activity, FLE showed the most promising results in the BSA-glucose model, with an IC50 of 2.060 ± 0.031. At the same time, OLE exhibited the highest antiglycation activity with IC50 2.035± 0.234, which was not significantly different from FLE with IC50 of 2.380 ± 0.182 in the BSA-fructose model. However, VLE possessed the lowest inhibitory effect in both models. The standard inhibitor aminoguanidine, however, exhibited significantly higher antiglycation activity than the extracts in both models. This study highlights the differential antiglycation activities of these plant extracts and their potential as a therapeutic strategy to mitigate AGE formation. FLE with the least toxicity emerged as the most promising extract for preventing antiglycation and diabetes-associated complications, as glucose levels mostly control AGE concentration.

MTDDI-23

Turmeric extract (*Curcuma longa*) Downregulates HER1 and HER4 through inhibition of NRF2 signalling pathway in ovarian cancer cells

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Turmeric extract (*Curcuma longa*) is a natural product of cucumin that has many health benefits. It has been shown to inhibit cancer cell migration and invasion in *in vitro* cancer cells and *in vivo* animal models. NRF2 and HER family regulate the normal cellular and are determinants of cancer initiation and progression. Both NRF2 and HER family are implicated in resistance of numerous cancers to chemotherapeutic agents and therefore the use of natural products such turmeric extract (*Curcuma longa*) could overcome the resistance. Human ovarian cancer cell lines, OVCAR3 and OVCAR4 were maintained in RPMI 1640 media supplemented with 10% foetal bovine serum (FBS) and 1% pen/strep in 5% CO2 and incubated at 37°C. Before experimental treatments, cells were grown for 24 h in RPMI 1640 media and then treated with either tert-Butylhydroquinone (tBHQ; Sigma) or turmeric extract (*Curcuma longa*) to a final concentration as required with media. Following this, Dual luciferase assay, cytotoxicity assay, ROS detection, Glutathione assay and immunoblotting were performed in this study. It demonstrated that turmeric extract (*Curcuma longa*) inhibited the NRF2 activity, which led to downregulation of HER1 and HER4 protein expression and decreased cell growth of OVCAR3 and OVCAR4 cells. Furthermore, inhibition of NRF2 led to increase in ROS level and depletion of total glutathione in all the cell lines. Taken together, these data suggest that garlic may inhibit the cell growth of ovarian cancer cells through NRF2-mediated downregulation of HER 1 and HER4 expression

MTDDI-24

Hepatoprotective Effect of *Anogeissus leiocarpus* Bark Extract Fractions in Carbon tetrachloride-induced Hepatic Fibrosis: *In vivo* and *in silico* Approach

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Anogeissus leiocarpus is a promising herbal medicine, as demonstrated by the traditional recognition of its antidiabetic and hepatoprotective benefits. The present study evaluated the antifibrotic potential of the solvent fractions of *A. leiocarpus* against CCl4-induced hepatic fibrosis in rats and explored its possible underlying molecular mechanisms. Forty rats were equally divided into eight groups: Control, CCl4, Silymarin (100 mg/kg) + CCl4, and groups treated with fractions, *n*-hexane (39.59 mg/kg) + CCl4, ethyl acetate (3.13 mg/kg) + CCl4, *n*-butanol (1.04 mg/kg) + CCl4, aqueous (71.74 mg/kg) + CCl4, and 0.2% dimethylsulfoxide for 8 weeks. Plasma biochemistry, histopathology, immunohistochemistry and *in silico* analysis were performed. The CCl4 exposure significantly increased liver index, liver function indices (aspartate transaminase and alanine transaminase) and oxido-inflammatory markers (malondialdehyde, tumour necrosis factor-alpha, and interleukin-6). However, *A. leiocarpus* fractions mitigated these effects by improving antioxidant defences, including superoxide dismutase, glutathione peroxidase, and reduced glutathione. Histopathology show that the extract fractions reduced hepatocyte ballooning and expression of α-smooth muscle actin (α-SMA) and transforming growth factor-β (TGF-β). Among the fractions, the *n*-hexane extract exhibited the most potent antifibrotic activity, significantly reducing inflammation and fibrosis-related damage. Molecular docking shows promising binding affinity of ellagic acid (-9.7 kcal/mol) and vescalagin (-16.7 kcal/mol) with CXC chemokine receptor 1 and TGF-β respectively, protein targets implicated in hepatic inflammation and fibrosis. Overall, our findings show that the *n*-hexane fraction of *A. leiocarpus* had the best antifibrotic effect with the potential its bioactive compounds to serve as drug candidate.

MTDDI-25

Effects of flavonoid-rich leaf fraction of *Jatropha tanjorensis* on Na^+/K^+-ATPase for anti-obesity therapeutics

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Obesity is a global health challenge, often associated with metabolic disturbances and impaired cellular ion transport mechanisms, including the downregulation of Na^+/K^+-ATPase activity. *Jatropha tanjorensis* is traditionally used in Nigerian folk medicine, with promising bioactive compounds with potential anti-obesity properties. In this study, we investigated the activating effects of methanol-acetone flavonoid-rich leaf fraction (MAF) of *Jatropha tanjorensis* on Na^+/K^+-ATPase to unravel MAF's anti-obesity therapeutics. *In vitro* inhibitory effect of MAF on Na^+/K^+-ATPase was studied following standard methods. *In vivo* study used 30 albino Wistar rats of 6 groups (A to F), 5 rats in each. Monosodium glutamate was used to induce obesity. Results revealed that MAF (23.63±0.06 µg/ml) had similar inhibitory activity (IC50) to ascorbic acid (21.96±0.42) and orlistat (22.27±0.40). MAF significantly ($p < 0.05$) increased serum HDL level and Na^+/K^+-ATPase activity, decreased LDL, TC, TAG and VLDL, and significantly ($p < 0.05$) improved electrolytes balance in all treated groups when compared with normal control. This suggests the potential of MAF as therapeutic activators of ion transport and energy metabolism in Na^+/K^+-ATPase in managing obesity-related disorders.

MTDDI-26

Ageratum conyzoides Aqueous Leaf Extract Reverses Cadmium-Induced Prostate Damage via Modulation of Redox Status and Lipid Profile

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Prostate diseases remain a leading cause of cancer-related mortality in men, with oxidative stress playing a pivotal role in their pathogenesis. *Ageratum conyzoides* L. is a medicinal plant used traditionally for various ailments, but its potential against prostate damage is not fully elucidated. This study investigated the antioxidant and modulatory effects of the aqueous leaf extract of *Ageratum conyzoides* (AEAC) on cadmium-induced prostate damage in male albino rats, focusing on antioxidant enzymes, lipid profile, and prostate-specific antigen (PSA). *In vitro* antioxidant activities were assessed via DPPH, ABTS, nitric oxide scavenging, iron chelation assays and hydrogen peroxide radicals. *In vivo*, thirty-six rats were divided into six groups: normal control, cadmium-induced untreated (1.2 mg/kg cadmium sulphate), cadmium-induced + flutamide (5 mg/kg), and cadmium-induced + AEAC (100, 200, and 400 mg/kg). AEAC showed concentration-dependent radical scavenging activity. In cadmium-induced rats, AEAC treatment significantly ($p < 0.05$) increased serum, liver, and prostate activities of SOD, catalase, GPx, GST, and GR, as well as GSH levels, compared to untreated controls. Lipid peroxidation (MDA) was significantly reduced. AEAC also improved lipid profile by reducing total cholesterol, triglycerides, and LDL-cholesterol while increasing HDL-cholesterol. Elevated PSA levels in cadmium-induced rats (serum: 4.33 ± 0.15 ng/mL; prostate: 5.23 ± 0.01 ng/mL) were significantly reduced by AEAC, with the 200 mg/kg dose showing optimal effects (serum: 1.84 ± 0.02 ng/mL; prostate: 1.72 ± 0.01 ng/mL). AEAC possesses significant antioxidant and anti-prostate damage properties, validating its traditional use and suggesting therapeutic potential in managing prostate diseases.

MTDDI-28

Testicular Gene Expression Response to *Icacina trichantha* Root Ethanol Extract Therapy in Paroxetine-Induced Reproductive Dysfunction in Male Wistar Rats

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We investigated the effects of paroxetine on the expression of key spermatogenic genes, cyclic AMP response element modulator (CREM), protamine I (PRM I), and protamine II (PRM II) in male Wistar rats and evaluated the remedial potential of *Icacina trichantha* root ethanol extract (ITREE) in comparison with tadalafil and clomiphene citrate. Twenty-five rats were randomly assigned to five groups: control (Group A), paroxetine only (Group B), paroxetine + ITREE (Group C), paroxetine + tadalafil (Group D), and paroxetine + clomiphene (Group E). The oral treatment regimen spans through 56 days. Paroxetine significantly increased CREM (92.64 ± 2.35 vs. 28.80 ± 2.94), PRM I (58.17 ± 1.73 vs. 21.64 ± 1.29), and PRM II (66.08 ± 3.25 vs. 42.74 ± 1.91) compared with control, and elevated the PRM I/PRM II ratio from 0.51 in control to 0.88. Co-administration of ITREE partially restored expression levels (CREM 68.87 ± 1.46, PRM I 42.15 ± 1.63, PRM II 55.71 ± 3.28) and attenuated the PRM I/PRM II ratio to 0.76. Tadalafil and clomiphene produced varying degrees of modulation, with CREM expression of 66.96 ± 2.07 and 105.12 ± 3.85, respectively. These findings indicate that paroxetine disrupted spermatid differentiation and chromatin remodeling, while ITREE effectively mitigates these molecular alterations. The study highlights the therapeutic potential of *I. trichantha* roots in preventing SSRI-induced male reproductive toxicity and provides a molecular basis for plant-based interventions.

MTDDI-29

Phytochemicals and Antibacterial Analysis of Aqueous Extract of Fresh *Zingiber officinale* and Its Effect on Human Saliva Ph

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Zingiber officinale (ginger) is widely used in traditional medicine for the management of various ailments due to its therapeutic properties. However, the antibacterial activity of its aqueous extract and its influence on salivary pH have received limited scientific attention. This study investigated the phytochemical constituents, antibacterial activity, and effect of aqueous extract of fresh *Zingiber officinale* on human saliva pH. Fresh ginger rhizomes were extracted by maceration using distilled water, and the extract was subjected to qualitative phytochemical screening. Antibacterial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, and *Salmonella typhi* was evaluated using the agar well diffusion method, while Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were determined by broth dilution techniques. The effect of the extract on salivary pH was assessed among 30 healthy volunteers using a paired pre- and post-rinse design. Phytochemical analysis revealed the presence of alkaloids, cardiac glycosides, saponins, tannins, flavonoids, and carbohydrates, while steroids, terpenoids, phenols, and anthraquinones were absent. The extract exhibited antibacterial activity against all tested isolates, with the highest inhibition zone observed against *Escherichia coli* (37 mm) and the lowest against *Bacillus subtilis* (28 mm). The MIC value for all isolates was 1.56 mg/mL, while an MBC value of 3.125 mg/mL was observed for *Salmonella typhi*. Mean salivary pH increased from 6.34 ± 0.06 to 6.96 ± 0.07 following rinsing with the extract. These findings suggest that aqueous extract of fresh *Zingiber officinale* possesses bioactive constituents associated with antibacterial activity and increased salivary alkalinity, indicating its potential application in oral health management.

MTDDI-30

Assessment of Acute Oral Toxicity and Safety Profile of Ethanolic Seed Extract of *Carica papaya* in Albino Rats

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The growing popularity of herbal remedies calls for a thorough assessment of their safety. This study assessed the acute oral toxicity and safety profile of the ethanolic seed extract of *Carica papaya* in albino rats. Ten female rats were randomly divided into five groups (n=2) and given a single oral dose of the extract at varying amounts (30, 300, 1000, and 6000 mg/kg body weight), while the control group received distilled water. The rats were monitored for 14 days to check for any signs of toxicity or mortality. No mortality or noticeable signs of toxicity was observed at all tested doses suggesting that the median lethal dose (LD_{50}) is higher than 6000 mg/kg body weight. Biochemical analysis of the liver and kidney function parameters showed no significant difference ($P<0.05$) between treated and control groups although slight dose related variations were observed. Antioxidant enzyme activities (superoxide dismutase, catalase and glutathione-S-transferase) showed no significant alteration across the groups. However, histopathological examination showed some mild changes, such as liver degeneration, alterations in the kidneys, and vacuolations in the heart tissue at higher doses, suggesting possible potential tissue-level responses. In conclusion, the ethanolic seed extract of *Carica papaya* appears to have low acute toxicity, but the subtle histological changes observed at higher doses suggest that caution is needed with the excessive use. Future research with larger sample sizes and longer exposure times is needed to better understand its safety profile.

MTDDI-31

In vitro Antioxidant and Anti-diabetic Properties of Oil Extract of *Cyperus esculentus*

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This study determined the antioxidant and anti-diabetic properties of oil extract of *Cyperus esculentus in vitro*. The biochemical constituents of the crude leaves of *C. esculentus* were determined using standard analytical methods. Spectral studies were carried out on the oil extract by gas chromatography-mass spectrometry (GC-MS). The *in vitro* antioxidant inhibitory parameters like 2,2-Diphenyl-1-Picrylhydrazyl (DPPH), nitric oxide, metal chelating, hydroxyl radical, radical scavenging assays at 0.5mg/ml, using silimarin as control and anti-diabetic inhibitory (α-amylase and α-glucosidase) assays at 0.5mg/ml using acarbose as control, were determined. Results showed that the crude leaves of *C. esculentus* contains tannins, flavonoids, alkaloids, phytate, oxalates and cyanogenic glycosides in proportionate amount. Meanwhile, mineral contents include Ca^{2+}, K^{+}, Na^{+}, Fe^{2+} and Zn^{2+}. A large number of peaks with good area percentage indicating functional groups were found with over 16 different compounds identified. Some of the compounds found in the oil extract of *C. esculentus* are 2-Piperidinone, N-(4-bromo-n-butyi)-, Octacosyl trifluoroacetate, 17-Pentatriacontene, Hexacosyl heptafluorobutyrate, Eugenol, Dotriacontyl heptafluorobutyrate, Dodecanoic acid, Tetradecanoic acid, n-Hexadecanoic acid, Octadecanoic acid and Oleic acid. The oil extract showed a significantly higher ($p < 0.05$) radical scavenging activity IC50 with nitric oxide (50.63 ± 0.19^{a}µg/mL), DPPH (67.3 ± 0.28^{a}µg/mL), Hydroxyl (21.72 ± 0.93^{a}µg/mL) and metal chelating (22.45 ± 0.25^{a}µg/mL) properties, when compared with the control, silymarin. The oil extract of *C. esculentus* extract showed significant increase ($p<0.05$) radical scavenging activity IC50 values for α-amylase inhibitory activities (6.32 ± 0.58^{a}µg/mL) compared to the acarbose (4.93 ± 0.95^{a}µg/mL) and α-glucosidase inhibitory activities (51.35 ± 0.99^{b}µg/mL) when compared with the control, acarbose (45.27 ± 1.14^{a}µg/mL). Results showed that *C. esculentus* oil extract exhibited significant antioxidant and antidiabetic activities due to the various bioactive compounds present in them and thus can be adopted in the prevention of oxidative stress and treatment of diabetes and other diseases.

MTDDI-32

Analysis of Concoctions from Different Herbal Preparation Sold in Kaura Namoda Metropolis

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The medical and general public should be alerted for the potential of toxicity of herbal preparation these promotes traditional/herbal preparation to a safer and healthy preparation, with the ever, increase use of herbal medicine worldwide and rapid expansion of the global market for those products, the safety and quality of medicinal plants material and finished herbal medicines product have become major concerned for the health authorities. The aims of the research was to evaluates potential of the different concoction from different herbalist in Kaura metropolis, from the study heavy metals are evaluated from different sample of herbal preparation obtained from market using the AAS methods to determined the concentrations of those heavy metals from different sample such as Cr,Fe,Ni,Zn and Pb. The Fe is found in the sample with higher concentration of 3.7±0.84 which was compared to the standard of world health organisation (WHO), Pb was also determined with the concentration of 2.99±1.94, and also the Cr was found to have the concentration of the 3.04±1.27, equally the concentration of the Ni was found to be 3.01±1.3and finally the Zn was found to Have the concentration of 3.07±1.23 as compared to the standard of the world health organisation(WHO). In conclusion the result of the research indicates that the samples contain Cr, Zn, Pb, Ni and Fe respect. From the experiments it indicates that Fe has higher concentration followed by Zn this indicates the health risk awaits the consumer, for the periods of time due to the tendency of gradual accumulation in the body system.

MTDDI-34

Modulatory Effects of Artemether on Pro-inflammatory Mediators, Endocrine Balance and Antioxidant Biomarkers in Proestrus rats

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Artemether, an antimalarial medication, shows potential therapeutic applications beyond malaria treatment. This study investigated its effects on antioxidant biomarkers, endocrine balance, and pro-inflammatory mediators in proestrus Wistar rats. Twenty rats were divided into four groups: control, artemether (1.143mg/kg, twice daily for 3 days; A), artemether (1.143mg/kg, once daily for 3 days; B), and artemether (1.143mg/kg, once daily for 6 days; C). Artemether treatment didn't significantly alter serum antioxidant biomarkers (MDA, GPx, GSH, NO, CAT, and SOD) or reproductive hormone levels (LH, FSH, Progesterone, and Oestradiol). However, it suppressed TNF-alpha production at doses A and C. NF-Kb levels were elevated with once daily treatment, while IL-1B levels remained unaffected. Artemether exhibits selective anti-inflammatory properties in proestrus rats, suggesting potential therapeutic applications for inflammatory conditions.

MTDDI-35

Anti-fibroid Activity of Hydroethanol Extract of *Uvaria chamae* Roots in Oestradiol Benzoate-induced Uterine Fibroid in Female Wistar Rats

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Uterine fibroid is a widespread gynaecological disorder of public health concern affecting quality of life of women in their reproductive age. The increasing prevalence of uterine fibroid (UF) and dissatisfaction with orthodox treatment options have necessitated the current investigation. This study evaluated anti-fibroid activity of hydroethanol extract of *Uvaria chamae* roots (HEUCR) in oestradiol benzoate (EB)-induced UF in female rats. Thirty virgin female Wistar (200.57 ± 3.00 g; n = 5/group) rats, assigned into 6 groups. Group 1 received distilled water (DW, Naïve Control, NC) only while EB-treated (administered for 8 weeks to induce UF) rats in Groups 2, 3, 4, 5, and 6 orally received 1ml each of DW, 0.2 mg/kg body weight of Anastrozole (Positive Control, PC), 0.71, 1.41 and 2.83 mg/kg body weight of HEUCR, respectively, once daily for 30 days. The EB-treatment related evidence of hypoechoic foci, increases ($p < 0.05$) in other uterine/uterine horn parameters (weight, coefficient, anteroposterior diameter, posterior wall thickness and collagen deposition), oestrogen, prolactin, aromatase, 17-β hydroxy-steroid dehydrogenase, nitric oxide synthase, nitric oxide, acid phosphatase, 8-hydroxy-2-deoxyguanosine and advanced oxidation protein products as well as decreases ($p < 0.05$) in progesterone, testosterone, gonadotropin releasing hormone, FSH and LH were reversed/ameliorated by HEUCR to levels that compared favourably ($p > 0.05$) with those of NC and PC. The 2.83 mg/kg body weight produced the most potent effects. The study conferred anti-fibroid activity on *Uvaria chamae* notably at the highest dose investigated and may be employed for the management of fibroid, after clinical trials.

MTDDI-36

Hepatoprotective and Antioxidant Potential of Faforon Herbal Mixture against Cyanide-Induced Toxicity and Oxidative Stress in Male Wistar Rats

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Potassium cyanide (KCN) is a rapid-acting toxin that inhibits cellular respiration by binding to cytochrome c oxidase, leading to fatal histotoxic hypoxia. This study evaluates the potential of Faforon (FAF), a multi-nutrient herbal mixture, to mitigate cyanide-induced oxidative stress and organ damage in male Wistar rats. Male Wistar rats were exposed to cyanide-contaminated water, treatment group received the Faforon herbal mixture (KCN+FAF), while others served as control, KCN-only, and FAF-only groups. Key parameters measured included haematological indices (white blood cells, platelet), liver function markers (alanine aminotransferase (ALT), aspartate aminotransferase (AST), albumin, bilirubin), and oxidative stress indicators (glutathione (GSH), malondialdehyde (MDA), superoxide dismutase (SOD), glutathione transferase (GST), and myelpoperoxidase (MPO)) in the liver. Cyanide exposure significantly elevated liver enzymes ALT (15.27 ± 1.44) and AST (219.72 ± 24.14) and increased oxidative stress, evidenced by high MDA levels and depleted antioxidants like GSH and SOD. Faforon administration effectively reversed these effects, reducing ALT to 6.69 ± 1.34 and restoring antioxidant enzyme activities. Furthermore, Faforon normalised WBC differential counts and significantly boosted platelet levels beyond control values. These protective effects align with the known bioactive properties of Faforon's constituents, such as *Sorghum bicolor* and *Theobroma cacao*, which exhibit potent antioxidant and haematopoietic activities. The Faforon herbal mixture possesses significant hepatoprotective and antioxidant properties, effectively counteracting cyanide-induced toxicity and oxidative damage while proactively enhancing the body's antioxidant defence system.

MTDDI-37

Purification and Characterisation of Urease from a Ureolytic Fungus from a Heavy Metal–Contaminated Battery Dumpsite

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This study was carried out to purify and characterise urease from a ureolytic fungal isolate for potential biotechnological applications. Crude urease was produced and purified using ammonium sulphate precipitation (80%), ion-exchange chromatography (DEAE-Sephacel), and gel filtration chromatography (Sephadex G-100). Enzyme purity was assessed using standard protein quantification methods. The biochemical characterisation included determination of effects of temperature, pH, metal ions, inhibitors, and substrate specificity, while kinetic parameters (Km and Vmax) were determined using Lineweaver–Burk analysis. Thermodynamic and thermal inactivation studies were conducted to evaluate enzyme stability. Results showed that urease exhibited optimal activity at 70°C temperature and pH 3.0, with significant sensitivity to extreme conditions. Metal ions and chemical inhibitors variably affected enzyme activity. Kinetic analysis revealed Km of 0.396 and Vmax of 0.203. The study concludes that the purified fungal urease is a moderately stable, inducible enzyme with potential application in biotechnological and environmental processes such as bioremediation and biomineralisation, particularly under controlled operational conditions.

MTDDI-38

Effects of Ascorbic Acid on Methotrexate-Induced Tissue Toxicity in Rats

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Methotrexate (MTX), a chemotherapeutic agent and its derived analogues used in the treatment of cancer, is known to accumulate significantly in tissues, causing various degrees of metabolic dysfunctions. This study investigated the effects of ascorbic acid (AA) on MTX-induced toxicity in male Wistar rats. Twenty-eight male Wistar rats, averagly weighing 150 g were randomly selected into four groups and treated as follows: A (dietary pellets and water only), B (MTX only, 2.5 mg/kg. body weight (kbw) at 7 days interval for 21 days, C (treated with AA, 100 mg/kbw/day and exposed to MTX, 2.5 mg/kbw for 21 days at 7 days interval) and D (AA only, 100 mg/kbw), all administered orally in 0.1 ml solution for 35 days. Biochemical indices were evaluated using standard methods. Results showed that treatment with MTX only (group B) caused significant ($p<.05$) decreases in red blood cell count, haemoglobin concentration, packed cell volume, plasma total protein and HDL-cholesterol, with increases in white blood cell count, lymphocyte count, platelet count, total triglyceride and cholesterol levels.It also elicits significant ($p<.05$) increases in the activities and levels of some liver and kidney indices respectively. In contrast, treatment with AA and MTX (group C) ameliorated metabolic alterations observed during MTX intoxication, as these indices were reversed with greater effects observed in group D. Results obtained are an indication of ameliorative, antioxidative and tissue protective effects of AA against haematological disorders, dyslipidaemia and tissue toxicity associated with MTX in cancer management or treatment.

MTDDI-39

Metabolite Profile, Antioxidant Activity and Ameliorative Efficacy of *Diospyros mespiliformis* on Carbon Tetrachloride (CCL4) Induced Oxidative-Stress in Albino Mice

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Liver diseases are deadly and requires continuous medication, conventional treatment is harmful and expensive, so there need for hepatoprotective remedy from plant sources. Bioactive phytochemicals were profiled and the efficacy of *Diospyros mespiliformis* (DM) stem-bark extracts was evaluated against carbon tetrachloride (CCL4) induced oxidative stress in mice. DM have been reported for various activities such as antioxidant, antiflammatory. Based on the previous reports it was anticipated DM will ameliorate CCL4 induced liver damage in murine model. Metabolite profile of the extract was obtained using LCMS/MS. Liver marker enzymes and oxidative stress biomarkers in serum and liver tissue were assessed. Liver tissues and homogenates were assessed for estimation of MDA, catalase, superoxide dismutase, and Glutathione S-Transferase activities, qRTPCR mRNA expression of hepatic tissue Glutathione S-Transferase was performed. Free radical scavenging activity of the extract were assessed using DPPH, FRAP and peroxide test. *In silico* molecular modelling was also conducted. The CCL4 induced liver damage through elevated marker enzymes and bilirubin, reduction in total protein and albumin as well as significant decrease in tissue catalase, GST and superoxide dismutase activities and also marked increase in serum MDA level. Glutathione-S transferase mRNA expression of hepatic tissue also supported the biochemical findings. Extract exhibited concentration dependent free radical scavenging activity. Molecular modelling data corroborates that some of the bioactive compounds may possess the potential to enhance the activities of the antioxidant enzymes. The DM stem-bark extract was beneficial in modulating the alterations induced in liver and serum variables of mice under the effect of CCl4.

MTDDI-40

Synergistic and Ameliorative Effects of *Bryophyllum pinnatum* and *Vernonia amygdalina* Ethanolic Extracts on L-NAME-Induced Renal Damage in Wistar rats

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Kidney damage remains a major global health challenge associated with oxidative stress, inflammation, and endothelial dysfunction, often linked to diabetes mellitus, hypertension, and other underlying conditions. This study evaluated the synergistic effects of *Bryophyllum pinnatum* and *Vernonia amygdalina* against LNAME-induced renal damage. Thirty-six male Wistar rats (120–150 g) were randomly assigned into six groups (n = 6): normal control, LNAME only (40 mg/kg), LNAME + captopril (100 mg/kg), LNAME only + BryP200 (200 mg/kg *B. pinnatum*), LNAME + VerA200 (200 mg/kg *V. amygdalina*), and LNAME+ (BryPVerA) 200. Kidney damage was induced for 28 days, while treatments were administered orally for 14 days. Blood pressure was measured on the final treatment day, and rats were sacrificed by cervical dislocation 24 hours after last administration. Serum and kidney homogenates were prepared for biochemical analyses, while renal histology was examined. LNAME administration significantly increased serum creatinine, urea, malondialdehyde (MDA), inducible nitric oxide synthase (iNOS), and lactate dehydrogenase (LDH), whereas superoxide dismutase (SOD) and catalase (CAT) activities decreased compared with the normal control ($p < 0.05$). These alterations reflected renal dysfunction, inflammation, and oxidative stress. Treatment with both extracts improved renal biomarkers, enhanced antioxidant activities, and reduced oxidative stress. Histological findings also showed preservation of renal architecture, particularly in the combined extract group. In conclusion, combined (BryPVerA) 200 treatment at a dose rate of 200 mg/kg demonstrated the strongest nephroprotective effect, suggesting synergistic interactions and potent antioxidant activity against LNAME-induced kidney damage.

MTDDI-41

Virgin Coconut Oil Mitigate Cyclosporine-Induced Hypertension via Modulation of ACE, Arginase, and Oxidative Stress Pathways in Rats

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The study assessed the effects of virgin coconut oil (VCO) on haemodynamic parameters, modulated enzymatic activities and oxidative stress biomarkers in cyclosporine induced hypertensive rats. The experimental rats were randomly distributed into various groups (n=5): control group; cyclosporine-induced hypertensive (CIH) rats as well as CIH rats- treated groups with captopril (10 mg/kg/day), CIH rats-administered with VCO (0.5 and 1 ml respectively). The experimental treatments lasted for 7 days with the measuring of haemodynamic parameters (systolic and diastolic blood pressure). Respectively, administration of captopril and VCO (0.5 and 1 ml/kg body weight) reduced hypertensive effects caused by cyclosporine. Our findings revealed that VCO caused significant ($P< 0.05$; $P< 0.01$; $P< 0.001$) reduction in systolic, diastolic blood pressure, activity of angiotensin converting enzyme (ACE), arginase, acetylcholinesterase (AChE), ectonucleoside triphosphate diphosphohydrolase (E-NTPDase) with corresponding increase in nitric oxide level in comparison with the untreated CIH rats. Likewise, treated CIH rats exhibited significantly ($P< 0.05$) higher antioxidant properties in comparison with untreated CIH rats. Our findings revealed that VCO exhibited blood pressure lowering effect with reductive effects on activities of key enzymes implicated in the onset of hypertension in CIH rats. These findings provided some possible insight into the mechanism of action through which VCO exhibits anti-hypertensive properties.

MTDDI-42

Clarias gariepinus Skin Protein Hydrolysates: Antioxidant Properties and Inhibition of Carbohydrate-hydrolysing Enzymes

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Clarias gariepinus (African catfish) is a commonly consumed fish species in many parts of Africa as a rich protein source. Despite its relative abundance, there is still limited information in the literature with respect to the health-promoting benefits of proteins derived from its skin, which is sometimes discarded as waste after processing such as fish smoking and drying. As a result, this study therefore evaluated the bioactivities of hydrolysates obtained from *Clarias gariepinus* (African catfish) skin protein, with respect to their antioxidant capacities, and their inhibitory effects on carbohydrate-hydrolysing enzymes. Proteins from *C. gariepinus* skin were isolated and hydrolysed enzymatically using chymotrypsin, trypsin and papain. The resulting hydrolysates were evaluated for their antioxidant effects in the presence of 1,1-diphenyl-2-picrylhydrazyl (DPPH) radicals, ferric ions and superoxide radicals. Their effects against α-amylase and α-glucosidase were also investigated, and the kinetics of inhibition of both enzymes were subsequently determined. The results revealed that papain hydrolysates demonstrated the highest DPPH scavenging activity (90.14±2.14%) whereas tryptic hydrolysates displayed better reducing power (93.16±1.16 mM Fe^{2+}) and superoxide quenching capacity (90.04±0.47%) than other digests. Papain digests exhibited the best enzyme inhibitory activities against both carbohydrases (80.76±3.11% α-amylase inhibition and 89.84±2.08% α-glucosidase inhibition). Kinetic studies using Hanes-Woolf plots revealed mixed mode of α-amylase inhibition for tryptic and chymotrypsin hydrolysates, whereaspapain hydrolysates displayed competitive inhibition and had the highest affinity for α-amylase (KI = 0.413 mg/mL). All hydrolysates demonstrated mixed mechanism of α-glucosidase inhibition and tryptic digests showed better affinity for α-glucosidase (KI = 0.082 mg/mL) than the other hydrolysates. It is concluded that proteins obtained from *C. gariepinus* skin encode biologically active peptide products which can be harnessed into nutraceuticals for diabetes mellitus therapy.

MTDDI-43

Structure of Glutarate Hydroxylase from *Escherichia coli* at 1.80 Å Obtained as a Contaminant During Routine use of *E. coli* as an Expression Host

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Glutarate hydroxylase (GlaH) from *Escherichia coli* is a stress-response protein involved in L-lysine degradation. The enzyme catalyses the hydroxylation of glutarate to L-2-hydroxyglutarate, a mid-step in the conversion of glutarate to succinate, which enters the TCA cycle for energy generation. This pathway serves as an alternative energy source for many microorganisms during carbon starvation. Thus, GlaH enhances microbial adaptation to carbon starvation and contributes to antimicrobial drug resistance (AMR). In this study, a crystallisation experiment aimed at solving mycothione reductase structure yielded crystals that were later identified as GlaH crystals. The X-ray diffraction data collected at the Diamond Light Source were processed with XDS to a resolution of 1.77 Å. The crystals belonged to space group I422 with unit cell parameters a = b = 121.13 Å, c = 135.51 Å. The crystal structure was solved by molecular replacement using PDB ID 1jr7 as the search model. The structure was refined to R-work and R-free of 0.20 and 0.23, respectively. The structure revealed GlaH in complex with a MES molecule bound at the active site, representing the highest resolution structure of this enzyme to date (PDB ID: 8CDF). The structure shows the characteristic double β-fold of non-heme Fe(II)-dependent oxygenases with Fe^{2+} coordinated by His160, His292, and Arg192. The positioning of the MES molecule across both the substrate and co-substrate binding sites provides insights into potential inhibitor development. The MES binding modes suggest new approaches for developing drugs that target bacterial stress response pathways to combat antimicrobial resistance.

MTDDI-44

Ameliorative Effects of *Alchornea cordifolia* on Testicular Lipid Dysregulation, Oxidative Stress and Reproductive Hormonal Alterations in High-Fat Diet-Induced Obese Male Wistar Rats

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This study evaluated the protective effects of *Alchornea cordifolia* extract on biochemical, oxidative stress and reproductive alterations in high-fat diet-induced obese male Wistar rats. Fifty-four male Wistar rats were randomly assigned into nine groups of six rats each, including normal control, high-fat diet control, orlistat-treated groups, *Alchornea cordifolia*-treated groups at 500 mg/kg and 1000 mg/kg, and high-fat diet-to-normal diet transition groups. Obesity induction markedly altered serum enzymatic and digestive biomarkers, testicular lipid profile, oxidative stress markers, reproductive hormones and organ weights. The HFD control group showed increased LDH, CK, lipase and amylase activities, alongside elevated testicular triglycerides, total cholesterol and phospholipids, indicating metabolic and testicular lipid disruption. HFD also increased MDA levels while reducing SOD activity, suggesting oxidative stress, and significantly decreased testosterone, LH and FSH levels compared with the normal control. Treatment with *Alchornea cordifolia*, particularly at 1000 mg/kg, improved these alterations by reducing LDH, lipase, amylase, triglycerides, total cholesterol, phospholipids and MDA levels, while enhancing antioxidant defence and restoring reproductive hormones. Testosterone increased from 2.62±0.44 ng/ml in the HFD control to 7.13±0.15 ng/ml in the *A. cordifolia* 1000 mg/kg + HFD group, while LH and FSH also improved substantially. The extract further reduced excessive adipose tissue accumulation and normalised testicular and epididymal weights relative to the HFD control. These findings suggest that *Alchornea cordifolia* possesses anti-hyperlipidaemic, antioxidant and reproductive-protective properties against high-fat diet-induced obesity and associated male reproductive dysfunction. The 1000 mg/kg dose produced the most pronounced protective effect.

MTDDI-45

Neuroprotective properties of *Laurus nobilis* Linn. (bay) leaf: *In vitro* and *in silico* assessment

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The prevalence of neurological disorders (such as Alzheimer's and Parkinson's disease) is high, especially in the elderly, and current therapies only provide temporary relief and elicit serious adverse effects. This study evaluated the neuroprotective effect of *Laurus nobilis* (bay) leaf using *in vitro* and *in silico* techniques. The inhibitory effect of the aqueous and ethanol extracts of bay leaf was tested against three enzymes implicated in neurological disorders viz; acetylcholinesterase (AChE), butyrylcholinesterase (BChE), and monoamine oxidase (MAO). This was followed by molecular docking to assess the interactions of the metabolites present in bay leaf on the selected enzymes. The ethanol extract of bay leaf displayed a better inhibitory effect on the activities of AChE (IC50: 44.05 µg/mL) and BChE (IC50: 79.71 µg/mL), while the aqueous extract inhibited monoamine oxidase in a stronger manner (IC50: 55.97 µg/mL). The IC50 values of the extracts are comparable to the standard drugs. Molecular docking revealed that resulting complexes from diazoprogesterone (-12.20 kcal/mol) and β-amyrone (-10.60 kCal/mol) had the lowest scores for AChE and BChE, while apigenin (-9.50 kcal/mol) and lupeol (-10.40 kcal/mol) displayed lowest scores for MAO and β-secretase, respectively. In conclusion, the aqueous and ethanol extracts of bay leaf displayed potent neuroprotective properties *in vitro* and its chemical constituents (especially diazoprogesterone, β-amyrone, apigenin, and lupeol) are potent inhibitors of neurological targets *in silico*. There is a need for further studies on the *in vivo* neuroprotective potentials of these compounds.

MTDDI-46

The Effects of Combined Vitamin C and Quercetin-Silver Nanoparticles on Dengue Viral Like Particle Stimulated Peripheral Blood Mononuclear Cells

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Due to the unregulated release of cytokines, dengue virus (DENV) infections continue to pose a serious threat to humans and frequently result in severe immunopathological reactions. Vitamin C, quercetin-silver nanoparticles (Q-AgNPs), and their combination were examined for their immunomodulatory effects on peripheral blood mononuclear cells (PBMCs) stimulated with dengue virus-like particles (DENV VLPs). After being isolated, the PBMCs were cultivated in RPMI-1640 media and stimulated with DENV VLPs. They were then treated with either vitamin C, Q-AgNPs, or combination of both. Proinflammatory (IL-15, IL-21 and IFN-γ) and anti-inflammatory (IL-10) cytokines, as well as inflammasome components (NLRP3), were measured for expression levels. The quercetin silver nanoparticles synthesised were heterogeneous as they had a Poly Dispersity Index (PDI) of 0.484 and the Surface Plasmon Resonance (SPR) was at 450nm after UV spectroscopy was carried out. IFN-γ expression was significantly downregulated at 12.5 µg/µL, with fold changes of 1.55 for Q-AgNPs, 2.0 for vitamin C, and 1.0 for the combination treatment (Q-AgNPs and Vitamin C) relative to the positive control which had a fold change of 4.85, with the combination showing the highest statistical significance. IL-10 expression was significantly upregulated at 100 µg/µL, with fold increases of 14.7, 10.5, and 12.0 respectively, compared with the positive control (5.72). NLRP3 expression was significantly reduced at 12.5 µg/µL, with fold changes of 4.8 (Q-AgNPs), 3.0 (vitamin C), and 0.5 (combination) relative to the positive control (8.0), indicating marked suppression of inflammasome activation, particularly with the combined treatment. These findings suggest that vitamin C and quercetin silver nanoparticles may modulate dengue-associated immunopathology and represent potential therapeutic or supplementary strategies for managing cytokine-mediated pathology in viral infections.

MTDDI-47

Assessment of Hepatic and Renal Effects of Co-Amoxiclav (Amoxicillin-Clavulanate) in Albino Rats

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Several antibiotics have been reported to cause toxic effects on different organs and tissues. Co-Amoxiclav (*Amoxicillin-Clavulanate*) is a widely used Beta-lactam antibiotic combination used in treating bacterial infections. The present study investigated possible hepatotoxicity and nephrotoxicity of Co-Amoxicillin in albino rats. The study was carried out using 20 adult male albino rats, randomly distributed into four groups of five rats each. Group A served as the control, while groups B, C, and D were given 8.9, 17.8, and 26.7 mg/kg body weight, respectively, of Co-Amoxiclav solution for 5 consecutive days. After the 5 days of drug administration, the serum activities of alanine aminotransferase (ALT) and aspartate aminotransferase (ALP), and serum concentrations of total bilirubin, albumin, creatinine, urea, uric acid, and bicarbonate were determined using standard biochemical methods. The results showed decreased physical activity, body weight, feeding, and water intake in the rat groups administered the drug compared with the control. The activities of ALT and AST and the concentrations of total bilirubin, creatinine, urea, uric acid, and bicarbonate recorded in the test groups were significantly ($P<0.05$) higher than those in the control. On the other hand, the albumin concentration was significantly ($P<0.05$) lower than in the control. The effect of the drug in the rats was found to be dose-dependent. The findings of this study showed that Co-Amoxiclav may be toxic to the liver and kidneys. Thus, cautious clinical use of the drug for treatment is necessary, especially in patients with pre-existing hepatic and renal disorders.

MTDDI-48

Combinatorial Protective Potentials of Chloroform Fraction of *Phyllanthus amarus* and *Piper guineense* on 1,2-Dimethylhydrazine Induced Colon Carcinoma in Wistar Rats

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This study investigates the combinatorial effects of Chloroform fraction of *Phyllanthus amarus* and *Piper guineense* leaves against 1,2-dimethylhydrazine (DMH) induced colon carcinoma in Wistar rats. A controlled experimental design was used, with 15 male Wistar rats divided into 3 groups, with the density of 5 mice/cage. Group A (Control), Group B (DMH+350mg/kg bwt of chloroform fraction of *P.amarus* + *P. guineense*) and Group C (DMH-Only). 25mg/kg bwt of DMH was administered orally three times a week for 12 weeks. The plants fraction was administered immediately after colon carcinoma induction for 21 days. Organ homogenate and serum were analysed for biochemical assays (Malondialdehyde, Catalase, Superoxide Dismutase, Electrolytes, Urea, and Creatinine, Alanine transferase, Alanine phosphatase, Aspartate transferase and TP53). The results demonstrated a partial to near complete restoration of antioxidant defences and enzyme activity, which was lost upon exposure to DMH and the concentration of TP53 was upregulated by the plants fraction. The findings from this study provide critical evidence of the therapeutic effects of these two plants against the toxicological effect of DMH in Wistar rat.

MTDDI-49

Qualitative Analysis, GC-MS Phytochemical Profiling and FTIR Analysis of Ethanol Leaf Extract of *Hyptis suaveolens*

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Hyptis suaveolens (L.) Poit. (Lamiaceae) is a perennial aromatic herb traditionally used across tropical regions for managing fever, gastrointestinal disorders, skin conditions, and respiratory infections. Despite extensive ethnomedicinal use, comprehensive phytochemical profiling of its ethanolic leaf extract remains inadequate. This study aimed to qualitatively profile phytochemical constituents using Gas Chromatography-Mass Spectrometry (GC-MS) and characterise functional groups using Fourier Transform Infrared (FTIR) spectroscopy. Fresh leaves collected from Veritas University, Abuja were authenticated, air-dried, powdered, and macerated in 90% ethanol for 72 hours. GC-MS analysis using the NIST spectral library identified thirty distinct compounds. 5,5-dimethylimidazolidin-2,4-dimine was the most abundant (20.35%), followed by 1-hexadecene (8.43%), 1-nonadecanol (6.68%), 1-octadecanol (6.51%), 5-chloro-2-furancarbaldehyde oxime (5.70%), 1-tetradecanol (5.55%), and (E)-4-methoxy-2,2-dimethyl-5-phenylhex-4-en-3-ol (5.06%). Other notable compounds included 1,8-cineole (3.21%), α-elemene (3.78%), and phytol acetate (1.23%). FTIR analysis confirmed functional groups including C≡H (3313.48 cm^{-1}, alkyne), N-H (3193.90 cm^{-1}, ammonium ion; 2364.57 cm^{-1}, aliphatic cyanide), C≡N (1668.31 cm^{-1}, open-chain imino), C-H bending (1454.23 cm^{-1}, methyl), O-H (1400.22 cm^{-1}, phenol/tertiary alcohol; 1334.65 cm^{-1}, primary/secondary alcohol), aromatic C-H (1195.78 cm^{-1}), and C-F (1114.78 cm^{-1}). The GC-MS and FTIR data demonstrated good correlation, validating the presence of terpenoids, fatty alcohols, phenolics, and nitrogen-containing metabolites. These findings support the traditional medicinal uses of *H. suaveolens* and its potential as a source of natural therapeutic agents, providing a robust phytochemical fingerprint for standardisation and pharmaceutical development.

MTDDI-50

Antivenom Potential of Bioactive Fraction from *Chrysophyllum albidum* Leaf Extract in *Bitis arietans* Envenomated Wistar Rats

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Snakebite envenomation is a significant public health issue in rural area where there are interactions with snake. This study evaluated antivenom effects of *Chrysophyllum albidum* leaf extract of active fraction against *Bitis arietans* venom in Wistar rats. Ethanol crude extract was separated via column chromatography using a gradient mobile phase, yielding 24 fractions. Following *in vitro* antioxidant and phytochemical analysis, F5B was selected for *in vivo* investigation. Twenty five Wistar rats were divided into five groups of five rats each. Envenomation was induced with 1.25 mL/kg body weights (bw) of *Bitis arietans* venom intraperitoneally (IP). Treatment groups 4 and 5 received varying doses (100 and 200 mg/kg bw) of fractions F5B, while control groups have three groups; group 1 was normal group, given feed and water only, group 2 was induced with 1.25 mL/kg bw *Bitis arietans* venom IP. Group 3 received standard anti-venom serum (SVA) after induction with 1.25 mL/kg body weights (bw) of *Bitis arietans* venom intraperitoneally (IP). Evaluations of biochemical markers (ALT, AST, and ALP) were also involved. There was an indication of venom toxicity significantly ($p < 0.05$) increased liver markers (ALT, AST, ALP) as reflected in group; 1 induced but not treated. Treatment with C. albidium fraction and standard anti-venom significantly reduced these parameters ($p < 0.05$) and restored indicators near normal levels. It is believed that the fractions attenuated the disruptive effects of venom in kidney and liver tissues, showing varied ameliorations in treated groups. These findings indicate that bioactive fraction of *Chrysophyllum albidum* leaf extract possesses significant antivenom activities against *Bitis arietans* envenomation. The results suggest the potential of these active compounds as therapeutic agents in mitigating venom induced oxidative stress and organ damage.

MTDDI-51

Parquetina nigrescens Ethanolic Leaf Extract vs. Hydroxyurea: Anti-Sickling Efficacy and Toxicity in Rats

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Sickle cell disease (SCD) remains a major public health challenge in sub-Saharan Africa, where access to hydroxyurea is limited by cost and toxicity. *Parquetina nigrescens*, a plant widely used in West African traditional medicine for blood disorders, was investigated as a potential natural alternative. The ethanolic leaf extract of *P. nigrescens* (PNE) was evaluated for anti-sickling activity and subacute toxicity in comparison with hydroxyurea. *In vitro*, PNE was tested for haemoglobin polymerisation inhibition and erythrocyte membrane stabilisation using sodium metabisulfite-induced sickling in rat blood. *In vivo*, male Wistar rats (n=5 per group) received oral PNE at 100 or 300 mg/kg or hydroxyurea (500 mg/kg) daily for 21 days. Parameters assessed included haematological indices, liver function biomarkers, oxidative stress markers (reduced glutathione, superoxide dismutase, catalase, and malondialdehyde), lipid profile, and C-reactive protein. For membrane stabilisation, PNE 100 µg/mL achieved the highest inhibition rate (2.59 ± 0.01%), significantly greater than PNE at 200 µg/mL (2.35 ± 0.01%) and hydroxyurea (0.27 ± 0.01%); and for membrane stabilisation, hydroxyurea produced the highest haemolysis (0.99 ± 0.00%), while PNE at 200 µg/mL and 400 µg/mL produced significantly lower haemolysis values (0.27 ± 0.00% and 0.30 ± 0.00%, respectively). PNE improved haematological parameters, offered better hepatoprotection, lipid normalisation, and reduction in oxidative stress. Hydroxyurea induced significant toxicity (leucopenia, elevated liver enzymes, dyslipidaemia, and increased malondialdehyde). These findings indicate that PNE possesses biphasic, dose-dependent antisickling and protective effects and appears safer than hydroxyurea, thereby supporting its traditional use and potential as an adjunct therapy for SCD management.

MTDDI-52

Antioxidant, Antidiabetic, and Cytoprotective Activities of Novel Chloro Curcumin Derivatives in C2C12 Myotubes

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Curcumin possesses broad antioxidant and antidiabetic properties but is limited by poor stability and bioavailability. To enhance its therapeutic efficacy, this study investigated three novel synthetic chloro-curcumin derivatives (compounds 1-3) developed through rational structural modification, including halogenation and heteroaromatic substitution, using differentiated C2C12 myotubes as the experimental model. Antioxidant capacity was evaluated by total phenolic and flavonoid contents, ferric reducing antioxidant power (FRAP), and Diphenyl-1-Picrylhydrazyl (DPPH) radical-scavenging assays, while antidiabetic potential was assessed through inhibition of α-amylase, α-glucosidase, and porcine pancreatic lipase. Cytotoxicity was determined using 3 (4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and crystal violet assays, and cytoprotective effects were examined under hyperglycaemic conditions (25 mM glucose, 48 h), alongside assessments of glucose utilisation and uptake. All derivatives demonstrated notable antioxidant activity, with methoxy-substituted compound 1 showing the strongest reducing power, dihydroxy-containing compound 2 exhibiting the highest phenolic content, and indole-based compound 3 displaying consistent radical-scavenging activity. The compounds showed mild α amylase and α-glucosidase inhibition and weak lipase inhibition. Cytotoxicity analysis indicated good tolerability for compounds 1 and 3, whereas compound 2 exhibited increased toxicity at higher concentrations. Hyperglycaemia significantly reduced myotube viability, which was markedly restored by all derivatives, particularly at low concentrations. Additionally, all compounds enhanced glucose utilisation and uptake in a concentration-dependent manner, with compound 3 producing the strongest metabolic response. These findings suggest that strategic halogenation and structural re-engineering of curcumin can generate derivatives with improved antioxidant, cytoprotective, and glucose-modulating properties, highlighting chloro-curcumin derivatives as promising candidates for managing oxidative stress-related metabolic disorders, especially type 2 diabetes mellitus.

MTDDI-53

Isolation, Purification, Partial Characterisation and Evaluation of the *in vitro* Antioxidant and Anti-inflammatory Potential of Fucoidan from *Sargassum fluitans* from Lagos Badagry coast

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Sargassum fluitans is a species of free-floating brown macroalgae (seaweed) found in the Atlantic Ocean and Caribbean Sea, often forming massive mats that wash onto beaches. Its presence hinders fishing activities by locals and recreational activities around the beaches. Sargassum contains steroids, polyphenols and polysaccharides like alginate and fucoidan amongst many others. Fucoidan is a negatively charged and sulphated polysaccharide with known pharmacological activity. Thus, this study was intended to isolate, partially characterise and evaluate the *in vitro* antioxidant and anti-inflammatory activities of purified fucoidan from *Sargassum fluitans* from Badagry coast. The seaweed was collected and fucoidan was isolated using acid-extraction method for optimal yield. Purification was done using ion exchange chromatography and partial characterisation was conducted with HPLC, FTIR and NMR. *In vitro* antioxidant (DPPH and H2O2 scavenging ability, reducing power, ferric reducing antioxidant power), and anti-inflammatory (NO, Protein inhibition and albumin denaturation assays) of the purified fucoidan were monitored and compared with standards (Ascorbic acid and Aspirin, respectively). The purified fucoidan had a higher fucose (67.96%) and sulfate (28.41%) content compared to the crude fucoidan. Compared to fucoidan from some tropical and subtropical species like *S. siliquosum*, and *S. hemiphyllum,* our isolate had higher sulfate but similar fucose contents. *In vitro* antioxidant and anti-inflammation activities of the purified fucoidan was significant higher ($p<0.05$) compared to the standard ascorbic acid and aspirin respectively. These findings suggest potential application of this readily available bioresource currently regarded as an environmental nuisance.

MTDDI-54

Effect of Bamboo (*B. vulgaris* L.) Leaves on Some Lipid Profiles and Insulin-Sensitive Genes in Stz- Induced Diabetic Rats

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Diabetes is a multifaceted energy metabolism disorder, conveniently defined by the degree of hyperglycaemia with a hallmark of tissue inflammation. *Bambusa vulgaris* (L.) has been traditionally used for the management of *Diabetes mellitus*, but scientific validation is needed on the mechanism involved. This study seeks to assess the effect of *B. vulgaris* (L.) leaves ethanolic extract on streptozotocin-induced diabetic rats' lipid profiles and insulin sensitive genes. HPLC analysis of *B. vulgaris* ethanolic extract (BVEE) was conducted to ascertain its phytochemicals. Rats were divided into **c**ontrol, diabetic control, metformin (100 mg/kg), and STZ-induced rats treated with *B. vulgaris* (100, 200, and 400 mg/kg) groups. Fasting blood glucose and body weight were monitored and treatment was done for twenty-one (21) days after which the animals were sacrificed. The pancreas was excised for molecular study using reverse transcriptase polymerase chain reaction. Administration of BVEE for 21 days reduced the blood glucose of diabetic rats significantly ($p<0.05$) when compared to the diabetic control. BVEE (100 mg/kg) reduces the total cholesterol, and elevates the HDL-lipoprotein. Lipid peroxidation level reduces when treated with varying doses of BVEE. BVEE up-regulates the expression of Glucagon-like peptide-1 (GLP-1), and insulin genes relative to diabetic control respectively. Conversely, it down-regulates lipase gene responsible for the utilisation of triglycerides as energy. The anti-diabetic potentials of *B. vulgaris* could be via its ability to up-regulate insulin sensitive genes, and down regulates lipase gene respectively.

MTDDI-55

Insilico Discovery of Small-Molecule Modulators of Differentially Expressed Genes Associated with Reduced Ataxin-2 Levels in an RTN4R Knockdown Model of Amyotrophic Lateral Sclerosis

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Abstract Amyotrophic lateral sclerosis (ALS) is currently an incurable neurodegenerative disease characterised by progressive degeneration of motor neurons, leading to muscle weakness, paralysis, and ultimately death. Ataxin-2 (ATXN2) has emerged as a key player in ALS pathogenesis, with elevated levels of ATXN2 linked to disease progression. The aim of this study was to identify small molecules capable of modulating the differential expressed genes (DEGs) associated with reduce level of ATXN2 in ALS. Computational methods used are differential expressed genes (DEG) analysis, ligand discovery from DEG, target prediction, gene network analysis, protein-protein interaction, pharmacokinetic prediction and molecular docking. The results showed several promising small molecules (Azaperone, Alprostadil, Medrysone, Pirinixic acid and BDBM241106) capable of modulating the DEGs associated with lower ATXN2 levels in ALS. Molecular docking with proteins linked to ATXN2 while molecular dynamics (MD) simulation and Molecular Mechanics with Generalised Born Surface Area (MMGBSA) of the complexes showed good binding affinity, stability and energy of interactions. These molecules exhibit favourable pharmacokinetic properties and demonstrate specificity towards target genes linked to ATXN2, making them attractive candidates for multidrug clinical investigation for ALS treatment

MTDDI-56

Anti-diabetic Properties of *Medicago sativa* (Alfalfa) Aqueous Leaf Extract on Alloxan-induced Diabetes in Albino rats

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The study investigated the anti-diabetic property of *Medicago sativa* (Alfalfa) aqueous leaf extract on alloxan-induced diabetes in Wistar Albino Rats. A total of 37 rats weighing 120-150g were used for the study. Twelve (12) rats were acclimatised for five days and used for acute toxicity study. Twenty five (25) rats were acclimatised for seven days and separated into five (5) groups of five (5) rats each; the normal control (NC) group, the diabetic control (DC) group, two (2) test groups and a standard group. All groups, except Normal control, were induced with diabetes intraperitoneally using 150mg/kgb.wt of alloxan monohydrate. The two test groups were respectively treated orally with 250mg/kg and 500mg/kg.bwt of aqueous leaf extract of *Medicago sativa* (Alfalfa) daily for 21 days. The standard group was treated with 7.14mg/kg.bwt of Glucophage (Metformin) daily for 21 days. Blood sugar levels, Aspartate Aminotransferase (ALT), Alanine Aminotransferase (AST), Alkaline Phosphatase, Urea, Creatinine, Total Billirubin and electrolytes (Potassium, Sodium, Chloride and Bicarbonate) were measured at the end of the experiment. The result revealed that the blood glucose levels of the treated rats were significantly ($P<0.05$) reduced by the extract, with 500mg/kg.bwt of the extract showing a higher efficacy than 250mg/kg and metformin. The result also revealed that the *Medicago sativa* leaf possesses organo-protective properties by normalising the level of the liver enzymes and the kidney biomarkers evaluated. Histological examination showed that the aqueous alfalfa extract caused reconstruction of damaged liver and kidneys. Therefore, all investigated signs of diabetes were improved by oral administration of aqueous leaf extract of *Medicago sativa*.

MTDDI-57

Bisphenol A as an Environmental Toxicological Risk Factor in *Diabetes mellitus* Prevalence: Mechanisms and Recommendations

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Diabetes mellitus (DM) is a major non-communicable metabolic disorder whose global prevalence continues to rise, posing a significant public health challenge. While established risk factors such as obesity, physical inactivity, and genetic predisposition contribute substantially to disease development, they do not fully account for the increasing burden of DM worldwide. Emerging evidence suggests that environmental toxicants, particularly endocrine-disrupting chemicals (EDCs) may contribute to the pathogenesis of metabolic disorders. The review examines Bisphenol A (BPA) as an emerging environmental toxicological risk factor in the increasing prevalence of DM, highlighting the underlying molecular and physiological mechanisms involved. A narrative review approach was adopted, and epidemiological, experimental, and mechanistic studies on the relationship between BPA exposure and DM were reviewed to evaluate its role in diabetes pathogenesis and potential mitigation strategies. Relevant literature published from 2016 to 2026 was systematically searched in PubMed, Web of Science, Google Scholar, and ScienceDirect. The review discussed evidence-based recommendations for reducing BPA exposure and the potential role of plant-derived bioactive compounds with antioxidant, anti-inflammatory, and antidiabetic properties in preventing or ameliorating BPA-induced DM. Findings from reviewed articles suggest that BPA exposure can alter glucose regulation through several mechanisms, including inducing insulin resistance, pancreatic β-cell dysfunction, oxidative stress, chronic inflammation, and endocrine signalling pathways alterations. The biological effects of BPA may contribute to the development, progression and prevalence of DM globally. Urgent public health interventions and targeted therapies are needed to reduce the contribution of environmental toxicants, such as BPA, to the global diabetes burden

MTDDI-58

Unveiling the Anti-Lung Adenocarcinoma Potential and Molecular Mechanism of Action of Compounds from *Chromolaena odorata* using Integrative Network Pharmacology and Molecular Docking

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Lung adenocarcinoma (LUAD) is the most prevalent histological subtype of lung cancer and remains a major cause of cancer-related mortality worldwide. Although *Chromolaena odorata* has been widely reported to possess anticancer potential, its activity against LUAD, the specific bioactive constituents involved, and their molecular mechanisms of action remain insufficiently explored. Phytochemical data mining revealed rhamnetin, laciniatin, tamarixetin, ombuin, dillenetin, and marionol as key bioactive compounds. *In silico* pharmacokinetic evaluation predicted favourable gastrointestinal absorption and acceptable drug-likeness profiles. Target prediction and disease-gene integration identified seven common targets, which were further analysed through protein–protein interaction network construction and hub gene analysis. Gene Ontology and KEGG pathway enrichment highlighted the involvement of inflammatory responses and arachidonic acid metabolism in LUAD pathogenesis, with ALOX5, PLA2G1B, and PLA2G2A emerging as core regulatory hub genes. Molecular docking analysis demonstrated strong binding affinities of rhamnetin, tamarixetin, dillenetin, and ombuin with the hub genes through hydrogen bonding, hydrophobic interactions, and π–π stacking. Collectively, these findings suggest that *C. odorata* harbours multi-target bioactive compounds capable of modulating inflammation-driven and lipid-mediated oncogenic pathways in LUAD, supporting its potential as a source of lead compounds for lung cancer therapy.

MTDDI-59

Computational Modelling and QSAR Analysis of CYP17A1 Inhibition by Bioactive Compounds from *Smilax anceps* in the Hypothalamic-Pituitary-Gonadal Axis

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The study specifically focused on bioactive compounds from HPLC analysis of *S. anceps*, comparing their binding energies and molecular interactions with standard drugs like abiraterone acetate and clomiphene citrate. Abiraterone acetate, a potent CYP17A1 inhibitor, is widely used to block androgen synthesis, thus limiting the progression of prostate cancer. While synthetic drugs like clomiphene citrate and abiraterone acetate have been effective in managing hormone imbalances, their side effects have driven the search for safer, plant-based alternatives like *Smilax anceps*. The study employed molecular computation techniques in the Maestro suite to assess molecular parameters, including molecular docking, MM-GBSA binding energy, and quantitative structure-activity relationship (QSAR) analysis. Several compounds from *S. anceps* were evaluated for their interactions with CYP17A1. The results showed that quercetin had a binding free energy of -47.46 kcal/mol, forming key hydrogen bonds with residues such as SER 42, ASP 298, and ARG 239. Rutin and ferulic acid displayed binding free energies of -40.55 kcal/mol and -39.46 kcal/mol, respectively. These energies were comparable to the standard drug abiraterone, which had a binding energy of -72.52 kcal/mol, indicating that *S. anceps* compounds have considerable binding affinities. QSAR results also showed the compounds possess favourable pIC50 values. In conclusion, the findings suggest that compounds from *S. anceps,* particularly quercetin, could serve as effective natural alternatives for modulating CYP17A1 enzyme activity involved in the biosynthesis of androgens and oestrogens**,** which are essential for reproductive function, and treating endocrine disorders as the case may be. Further experimental studies are currently ongoing to validate these computational predictions.

MTDDI-60

Data-Driven Identification of Anti-TNBC Compounds via Machine Learning and Explainable AI–Guided Validation

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Triple-negative breast cancer (TNBC) is an aggressive subtype characterised by the absence of oestrogen, progesterone, and HER2 receptors, limiting the effectiveness of targeted therapies and necessitating the discovery of novel therapeutic candidates. Despite advances in oncology, identifying new therapeutic scaffolds for TNBC remains a major challenge. In this study, we present a data-driven, machine learning–enabled virtual screening framework for identifying potential anti-TNBC compounds from large-scale natural product chemical space. Bioactivity data for TNBC-relevant cell lines were curated from the ChEMBL database and used to develop predictive models of compound potency. Molecular features were generated using Mordred descriptors and Morgan fingerprints to capture structural and physicochemical properties. Multiple machine learning algorithms, including Extra Trees, Random Forest, Gradient Boosting, and Light Gradient Boosting Machine, were trained and evaluated. The optimised models demonstrated strong predictive performance across cross-validation and independent test sets, indicating robustness and generalisability. To assess scalability, the validated models were applied to screen a large natural product library of 715,868 compounds. Top candidates were prioritised based on predicted bioactivity and drug-likeness criteria, while applicability domain analysis ensured the reliability of predictions. SHAP-based explainable artificial intelligence (XAI) was employed to identify key molecular features driving model predictions. Selected high-confidence compounds were further evaluated through ADMET analysis and molecular docking against key TNBC targets, including Epidermal Growth Factor Receptor (EGFR) and Poly(ADP-ribose) polymerase (PARP1/2), to elucidate binding interactions. This study presents a scalable, interpretable, and robust AI-driven pipeline for accelerating natural product–based drug discovery in TNBC.

MTDDI-61

Crude Extract of Saponin from *Telfairia occidentalis* Leaves Depletes Paroxetine-Induced Erectile Dysfunction by Reducing Expression of Phosphodiesterase 5 Gene, Enhancing Antioxidant and Anti-Inflammatory Cytokines

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Erectile dysfunction is a major blowback of the antidepressant medication such as paroxetine. *Telfairia occidentalis* (TO) is a medicinal plant with a wide range of biological activities which include antioxidant and antiulcer properties. Knowing this, the effect of TO leaves extract on paroxetine-induced sexual dysfunction in male Wistar rats was investigated. Forty- seven adult male wistar rats were divided into seven experimental groups:Normal control, PAR (20 mg/kg), PAR+sildenafil (5 mg/kg), TO 25 mg/kg, TO 50 mg/kg, TO 100 mg/kg and TO 200 mg/kg. The experiment lasted for 21 days, after which the rats were subjected to sexual behavioural test. Various biochemical and gene expression assays (phosphodiesterase-5, arginase, acetylcholinesterase, nitric oxide and MDA) were carried out on the penile tissue. Research has shown that paroxetine remarkably disrupt sexual activities in male rats and heightened phosphodiesterase-5, arginase and acetylcholinesterase activities with a concomitant decrease in nitric oxide level. Furthermore, paroxetine disrupted antioxidant status which is shown by increased MDA level as a result of reduced thiol level. Fortunately, treatment with crude saponin extract from TO leaves reversed the altered sexual behaviour in male rats and boosted antioxidant status. In addition, administration of crude saponin extract from *Telfairia occidentalis* leaves resulted in a significant attenuation of phosphodiesterase-5, arginase and acetylcholinesterase activities increased expression of NRF2 and IL-10 in paroxetine-induced rats. Hence, from these findings, crude saponin extract from *Telfairia occidentalis* leaves could be considered a promising natural therapy for erectile dysfunction.

MTDDI-62

Isolation and Molecular Characterisation of a Lipase/Esterase Producing *Pseudomonas aeruginosa*

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The increasing environmental pollution caused by organic wastes has necessitated the need for efficient microbial bioremediation strategies. Certain bacteria have attracted attention in the biodegradation of complex pollutants into environmentally friendly molecules. In this study, a potential waste-degrading *Pseudomonas aeruginosa* was isolated and characterised in an effort to reduce the rate of environmental pollution. Initially, bacteria-rich soil sample was collected from the animal house facility and was cultured using standard microbiological techniques. *Pseudomonas aeruginosa* was successfully isolated and subjected to both physiological and molecular characterisation. Positive isolation was confirmed through specific biochemical tests tailored for the identification of *P. aeruginosa* i.e. [citrate (+), Mobility (+), urease (-), indole (-), H2S (-), TSI (+), methyl-red (-), Voges Proskauer (-)]. Furthermore, molecular validation of the isolate was achieved through PCR amplification of 16S rRNA gene revealing a clear band of approximately 1,500 bp on an agarose gel after an electrophoresis, consistent with the expected band size for *P. aeruginosa*. More so, phylogenetic analysis of the sequence validated it to be a definitive strain of *P. aeruginosa*. Interestingly, the isolate displayed lipase/esterase activity via formation of visible precipitates on a tween 20/tween 80 supplemented agar plates suggesting it's bioremediation potential. Therefore, the findings of this study highlight the potential of this isolate as a promising candidate that can be exploited for biodegradation of environmental wastes.

MTDDI-63

Toward a Novel Therapeutics for Female Sexual Health: Experimental Validation and Optimisation of Kaempferol and DFT Characterisation of Its Derivatives

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Sexual dysfunction is a major problem in female reproductive health with a tremendous impact on women's quality of life which needs the development of safe and effective therapeutic interventions. The study aims to investigate the pharmacological activity of kaempferol in modulating reproductive hormones, and to evaluate its optimised derivatives through Density Functional Theory (DFT) calculations. Forty-five (45) female rats were used in experimental *in vivo* studies with kaempferol (20 mg/kg) administered as well as relevant receptor antagonists. Lead optimisation procedures was used to create derivatives, employing a consensus scoring for drug-likeness (ADMET) and docking score. Molecular electronic properties like HOMO-LUMO gaps, dipole moments and total SCF energies were calculated using DFT. *In vivo* experimental result indicated that kaempferol (20 mg/kg) significantly (p<0.05) elevated the progesterone, FSH, LH, oestrogen and nitric oxide synthase implantation sites (14.86) and the number of live foetuses (14.10) while decreasing resorption index to (5.11%), through ESR1 and CNR2 receptor. Derivatives UNK 900_615, UNK 900_674 and UNK 900_792 identified through lead optimisation exhibited enhanced drug-likeness properties that outperformed the parent compound. They have a consensus scoring (0.68, 0.65, and 0.64, respectively), HOMO-LUMO gaps of 4.020 eV, 4.171 eV, and 4.227 eV, respectively, human oral absorption rates greater than 73%, and better safety parameters for HERG inhibition, indicating high molecular stability. Thus, experimental induction of the hormone and computational lead optimisation supports kaempferol as a strong scaffold for high-affinity therapeutics, while the identified kaempferol derivatives exhibit better pharmacological and structural characteristics for improving female sexual health.

MTDDI-64

Protective Effects of *Justicia carnea* on TNBS-Induced ConjunctivalInflammation and 4-Hydroxynonenal Expression

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Conjunctival inflammation is strongly associated with oxidative stress and lipid peroxidation, which contribute to ocular tissue injury and dysfunction. This study investigated the protective effects of *Justicia carnea* on trinitrobenzene sulfonic acid (TNBS)-induced conjunctival inflammation, with particular emphasis on oxidative stress modulation and 4-hydroxynonenal (4-HNE) expression. Experimental animals were divided into seven groups including normal control, TNBS control, TNBS plus oral *J. carnea* extract (200 and 400 mg/kg), TNBS plus rectal gel extract (200 and 400 mg/kg), and a positive control group. Biochemical assays were performed in ocular tissue and ocular fluids, alongside histopathological and immunohistochemical evaluation of conjunctival tissue. TNBS administration induced marked oxidative imbalance, evidenced by elevated malondialdehyde (MDA), nitric oxide (NO), catalase (CAT), and superoxide dismutase (SOD) activities, with significant reductions in glutathione (GSH), glutathione peroxidase (GPx), and total antioxidant capacity (TAC). Treatment with *J. carnea* significantly restored antioxidant defences, reduced lipid peroxidation, and normalised oxidative stress markers compared with the TNBS group. Ocular fluid analysis showed that TNBS reduced aqueous humour glucose and protein levels, while extract treatment improved these parameters toward normal values. Histopathological examination revealed severe papillary changes, vascular congestion, and oedema, whereas *J. carnea*-treated groups showed minimal alterations with markedly lower histological scores. Immunohistochemical staining demonstrated strong 4-HNE expression in TNBS-injured tissue, which was substantially reduced in extract-treated groups, indicating suppression of lipid peroxidation. These findings suggest that *Justicia carnea* exerts significant anti-inflammatory and antioxidative effects and protects conjunctival tissue against chemical-induced injury, partly through inhibition of oxidative stress and 4-HNE-mediated lipid peroxidation.

MTDDI-65

Antioxidant and Haematoprotective Effects of *Catunaregam nilotica* Root-Bark in *Echis ocellatus* Snakebite Envenomation

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Snakebite from haemotoxic species such as *Echis ocellatus* causes oxidative stress, blood disorders, and organ damage, and remains a major health problem in sub-Saharan Africa. *Catunaregam nilotica* root-bark is traditionally used for snakebite treatment, but its protective mechanisms are poorly defined. Antioxidant activity was assessed *in vitro* using DPPH and FRAP assays. *In vivo*, *E. ocellatus*–envenomed rats were treated with *C. nilotica* fractions, antivenom (ASV), or their combinations. Oxidative stress markers, haematological indices, and liver and kidney function parameters were evaluated. The ethyl acetate fraction showed strong *in vitro* antioxidant activity comparable to vitamin C. Envenomation markedly increased lipid peroxidation and reduced endogenous antioxidant enzymes, with accompanying anaemia, thrombocytopenia, and organ dysfunction ($p < 0.05$). Treatment with the n-hexane fraction significantly reduced oxidative damage, restored antioxidant defences, improved haematological profiles, and normalised hepatic and renal biomarkers. Combined treatment with n-hexane fraction and ASV produced greater protection than either treatment alone, indicating synergistic effects. *Catunaregam nilotica* root-bark provides significant antioxidant and haematoprotective effects against *Echis ocellatus* envenomation and shows promise as an adjunct to conventional antivenom therapy.

MTDDI-66

Anti-Oxidant and Anti-Inflammatory Activity of Methanol Extract From *Tapinanthus bangwensis* in Animal Models

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Inflammation is the natural immune response of the body to injury, infection or irritants that is designed to protect tissues and initiate healing by releasing chemicals that increase blood flow and immune cell activity. *Tapinanthus bangwensis* is explored for preventive and management therapy of inflammation. Methanol extract of *T. bangwensis* was assessed for antioxidant activity using 2, 2-Diphenyl-1-Picrylhydrazyl (DPPH) and ferric reducing antioxidant power, while the anti-inflammation was carried out using albumin denaturation, membrane stabilisation, xanthine oxidase action and proteinase inhibitory activity. The anti-inflammatory activity was further examined in five groups of Swiss albino rats. The scavenging antioxidant activity of methanol extract of *T. bangwensis* was concentration dependent with 2,2-Diphenyl-1-Picrylhydrazyl (DPPH) having higher value of 55.15±0.1µg/ml at 100µg/ml. Membrane stabilisation was 82.17±0.23% at 100µg/ml. Anti-inflammatory activity showed a reduction in oedema paw volume at 1.83±0.07ml of 300mg/kg bodyweight after six hours. Haematological and biomarker enzymes of the liver were ameliorated when compared with the negative control group. The methanol extract of *T. bangwensis* therefore is loaded with anti-inflammatory activity with no adverse effect on biomarker enzymes.

MTDDI-67

In silico and *in vitro* Assessment of Neuroprotective-Related Activities of Solvent-Partitioned Fractions of *Verbena hastata* Whole Plant Ethanol Extract

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Neurodegenerative diseases involve oxidative stress, neuroinflammation, and cholinergic/dopaminergic dysfunction, necessitating multi-target therapeutic strategies. *Verbena hastata* (blue vervain) is traditionally used for neurological conditions but requires scientific validation.To evaluate antioxidant, anti-inflammatory, and neuroenzyme-inhibitory activities of solvent-partitioned fractions of *V. hastata* and predict the binding profiles and pharmacokinetics of its bioactive compounds. *V. hastata* ethanol extract was partitioned into n-hexane, ethyl acetate, n-butanol, and aqueous fractions. Antioxidant activity (DPPH, ABTS, NO•, FRAP), anti-inflammatory activity (protein denaturation, membrane stabilisation), and enzyme inhibition (AChE, tyrosinase) were determined. Bioactive compounds were identified via HPLC. Molecular docking (SP/XP) and ADMET profiling were performed using Glide and SwissADME/Protox-II. The ethyl acetate fraction showed a more potent activity with IC_{50} values: 60.69 (DPPH), 11.26 (ABTS), 50.11 (NO•), 102.41 (protein denaturation), 54.62 (membrane stabilisation), 152.19 (AChE), and 214.96 µg/ml (tyrosinase). HPLC identified hastatoside, verbascoside, luteolin, kaempferol, apigenin, and chlorogenic acid. Verbascoside (-13.317 kcal/mol) and luteolin (-12.036 kcal/mol) showed strong AChE binding; hastatoside (-7.020 kcal/mol) and chlorogenic acid (-7.229 kcal/mol) showed high tyrosinase affinity. ADMET profiling revealed luteolin and citral as promising leads, though some compounds showed predicted nephrotoxicity requiring further evaluation. *V. hastata* ethyl acetate fraction exhibits significant multi-target activity relevant to neurodegeneration. Luteolin and citral are identified as lead compounds for further *in vivo* and formulation studies.

MTDDI-68

Bioassay-Guided Isolation, Identification and Biochemical Characterisation of Oomycidal Compounds from Plant Extracts

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Brown rot, caused by *Phytophthora nicotianae* and *P. citrophthora*, is a major disease of citrus fruit, leading to significant economic losses globally. Conventional fungicides are commonly used to manage this disease, but concerns have been raised due to environmental persistence, human toxicity, and the emergence of resistant strains. This study evaluated the spore germination and mycelial growth inhibition of both *Phytophthora* species by extracts of 31 plant species *in vitro* and *in vivo*. DCM/MeOH extracts were tested against both pathogens using a microtiter plate assay and an amended media assay. All bioactive extracts were further fractionated into seven fractions using solid phase extraction (SPE), which were subsequently tested against both pathogens. Phytochemical profiling was determined by ultra-performance liquid chromatography quadrupole time-of-flight mass spectrometry (UPLC–QTOF-MS) analysis. Extracts of seven plants (*Artemisia afra*, *Dombeya rotundifolia*, *Eucomis regia*, *Olea europaea*, *Cannabis sativa*, *Peltophorum africanum* and *Mentha longifolia*) inhibited both *P. nicotianae* and *P. citrophthora* with an MIC < 1 mg/mL and MFC < 2.5 mg/mL as compared to azoxystrobin (6.0 mg/mL). In the lemon fruit *in vivo* assays, *A. afra* reduced brown rot severity by >50% compared to untreated controls, with superior performance to azoxystrobin, the standard fungicide. UPLC–QTOF-MS profiling of bio-active fractions identified scopoletin (*A. afra*), oleuropeinic acid (*O. europaea*), and bergenin (*P. africanum*) as putative contributors to the observed activity. These findings highlight *A. afra* as a promising natural product and suggest that other extracts warrant further evaluation for use as alternative oomycides in citrus post-harvest protection.

MTDDI-69

Molecular Characterisation of PFMDR-1, PCRT, PFDHFR, PFDHPS and K13 Propeller Gene Of *Plasmodium falciparum* Isolate from Gombe L.G.A. Gombe State, Nigeria

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Malaria is a serious deadly disease in Nigeria, for long prevention and treatment of the disease depend heavenly on different classes of synthetic drugs. However, *Plasmodium falciparum* has developed resistance to almost all the classes of synthetic antimalarial drug in use, including the most recently recommended drugs (Artemisinin based Combination Therapies). The aim of this research was to characterise genes of *P. falciparum* associated with drug resistance. Two hundred (200) study subjects were recruited for the research. Blood samples were collected using vein puncture technique and analysed using Giemsa stain, Rapid diagnostic Test and Polymerase Chain Reaction. DNA extraction kit was used to extract DNA from 167 samples. Nanodrop was used to determine the concentration and purity of the extracted DNA. Fifty seven (57) true-positive samples were used for molecular analysis. Nested PCR was used to amplify portion of the selected genes and the amplicons were sequenced. In *PFMDR-1* gene single point mutation was observed in four of the variant (N86Y, Y184F, N1042D and D1246Y) highest prevalence of 34(59.64%) was from N86Y variant. In *PFDHFR* point mutation was observed in four variant; A16V 05(8.7%), N51I (31.58%), C59R (5.26%) and I164L (21.05%). In *PFDHPS* a prevalence of 06(10.53%) was recorded from K540E variants. Two variants K76T and C72S from *PFCRT* gene had a prevalence of 46(80.70%) and 05(8.80%) respectively. K13 propeller gene recorded no point mutation in all selected position. Some basic bio-molecular makers of resistance were reported from Gombe L.G.A.

MTDDI-70

Molecular Identification of *Borreria verticillata* (Rubiaceae) Through DNA Barcoding Based on the Ribulose Bisphosphate Carboxylase Gene

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Molecular identification of plant using DNA barcoding based on chloroplast ribulose-1,5-bisphosphate carboxylase/oxygenase large subunit (*rbcL*) gene supports accurate authentication of plant. Fresh leaf of *B. verticillata* was subjected to genomic DNA extraction using silica-based protocol optimised for plants. The *rbcL* gene was amplified by (PCR) using universal primers, followed by agarose gel electrophoresis, purification, and Sanger sequencing. BLAST analysis against the NCBI GenBank database, nucleotide composition analysis, open reading frame (ORF) detection, codon usage evaluation, and phylogenetic reconstruction were performed using standard bioinformatics tools. PCR amplification produced a single, distinct band of approximately 559 bp, indicating specific amplification of the target region. Sequence analysis yielded a high-quality *rbcL* fragment of 559 bp, comprising adenine (157), thymine (165), cytosine (122), and guanine (114) nucleotides, with a GC content of 42.29%. BLAST analysis revealed high sequence similarity (⩾97%) with authenticated *Borreria verticillata* accessions and closely related Rubiaceae species, confirming the taxonomic identity of the sample. ORF analysis identified intact and biologically meaningful coding regions, consistent with a functional chloroplast gene. Codon usage analysis showed characteristic chloroplast, with frequent usage of codons such as TTT, TTC, and TAC. Phylogenetic reconstruction based on *rbcL* sequences clustered the study sample within a well-supported clade containing *Borreria* species and allied genera, including *Spermacoce*. In conclusion, DNA barcoding using the *rbcL* gene provides a reliable and reproducible approach for the molecular identification of plants. The generated sequence, deposited in GenBank, contributes to global barcode reference libraries and supports the authentication, conservation, and utilisation of medicinal plant.

MTDDI-71

Distribution of Nutritional Contents, Elemental Composition, Antioxidant Properties and Phytochemical Screening of Aqueous Extract of Parts of Cocoa (*Theobroma cacao*) Plant

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The Cocoa plant originated from the tropical rainforests of the Amazon basin in South America is rich in various bioactive compounds such as flavonoids, alkaloids, phenolic compounds, saponin, terpenoids, anthraquinone, tannins, and glycosides. This study evaluates the nutritional, antinutrients, minerals, phytochemicals and antioxidants composition of the various parts of cocoa plant (Leaf, stem, seed, pod and root) which contribute to their medicinal properties. The various parts of the plant of cocoa were collected from Ondo town, Ondo State, Nigeria. Proximate, antinutrient, vitamin C content and mineral composition were determined on the plant of *Theobrama cacao*. Qualitative and quantitative phytochemical contents as well as antioxidant potentials were evaluated on the aqueous plant extract of *Theobrama cacao* according to standard analytical procedure. The results for proximate composition showed high fat content for the seed, slightly high protein for the stem and high fibre for all the parts except the seed. The mineral contents and the antioxidant compounds are also high with relatively high radical scavenging abilities. The results also showed the presence of medicinal important phytochemicals. From the results of the analyses, it was evidenced that all the various parts of the cocoa contained bioactive compounds. These compounds present in the cocoa plant have exhibited medicinal benefits associated with improved cardiovascular health, antioxidant activity, neuroprotective ability as well as mood enhancement. This suggests its potential as an alternative or complementary treatment option for various health issues and it can be utilised for development of new drugs.

MTDDI-72

In vitro and *in vivo* Evaluation of *Bridelia ferruginea* Leaf Phytosome for Enhanced Gastric Ulcer Protection

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There is a need to encapsulate water-soluble herbal drugs for improved sustained release and efficacy. Gastric ulcer is a prevalent gastrointestinal disorder common among many Nigerians. Phytosome was formed using Maiti *et al.,* 2007, *in vitro* drug release was carried out by dialysis method, entrapment, ulcer induction and total acidity were done by methods of Urushidani *et al*., 1979 and Kulkani 1999. Other Biochemical assays were carried out by standard biochemical assay methods. The phytosome complexes were developed and characterised to improve solubility and bioavailability. Ethanol extract of *Bridelia ferruginea* leaves showed that phenol has the highest concentration of 1911.010 ± 2.308 mg/100g and lowest concentration of carbohydrates at 7.214 ± 0.005 mg/100g. *In vitro* drug release profiles of 1:1, 1:3 and 1:5 phytosome formulations are 32.93%, 10.73% and 7.0% respectively. The *in vivo* application of the formulated phytosomes indicated that 1:3 phytosome formulation has the highest ulcer protection property with ulcer index of 1.53 ± 1.04, total stomach acidity of 6.78 ± 2.71 mmol/L and percentage ulcer protection of 78.14%. Formulation of ethanol extract of *Bridelia ferruginea* leaves into Phytosome improved the physicochemical properties - absorption, solubility and controlled sustained release of *Bridelia ferruginea* extract which resulted in improved bioavailability and ulcer protective property of *Bridelia ferruginea* Phytosome in the *in vivo* study when compared to the ordinary crude extract. Phytosome formulations enhanced the therapeutic efficacy of *B. ferruginea* leaves.

MTDDI-73

Modulatory Effect of Ethyl Acetate Fraction of *Piptadeniastrum africanum* (HOOK.F.) in the Pore of Mitochondria

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Opening of the mitochondrial permeability transition pore (mPTP) is essential for regulating cellular survival and apoptosis, particularly under oxidative stress and calcium imbalance, leading to mitochondrial dysfunction and cell death. *Piptadeniastrum africanum* (PA), a medicinal plant used in traditional medicine, is rich in bioactive compounds such as flavonoids and phenolics. This study assessed the potency of ethyl acetate fraction of PA (EFPA) on mitochondrial pore opening and associated bioenergetics functions. Stem bark of PA was collected from a forest in Ibadan and authenticated at the University of Ibadan (UIH-22562). The plant material was air-dried, pulverised, and extracted with methanol to obtain the crude extract, which was subsequently fractionated into hexane, chloroform, ethyl acetate, and methanol fractions. Varying doses of EFPA were assessed for mitochondrial permeability transition (mPT) pore opening, ATPase activity (*In vivo*), and phytochemical composition using GC–MS analysis. This study utilised 20 mice grouped (n=5) treated with doses of the fraction (25, 50, and 100) mg/kg body weight (bw), respectively for 14 days. Data were analysed using descriptive statistics and ANOVA at a significance level of 0.05. The result revealed that there was a dose-dependent increase in pore induction by EFPA with 2.50, 4.90 and 6.90 folds at 25, 50 and 100mg/kgbw, respectively, alongside elevated ATPase activity (30%, 45%, 65%) in doses-dependent manner. GC–MS analysis confirmed the presence of tannins, saponins, and phenolic compounds. Conclusively, EFPA demonstrated significant pore induction by modulating mitochondrial membrane integrity, promoting mitochondrial destabilisation, warranting further investigation into its mechanistic pathways and toxicological implications.

MTDDI-74

Ganoderma lucidum Polysaccharide and *Pleurotus tuber-regium* Polysaccharide Extracts Ameliorate Lead-Induced Nephropathy and Haematological Derangement in Rats

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Lead toxicity is of public health concern due to its deleterious effects on various organs such as blood and kidneys. *Pleurotus tuber-regium* polysaccharide (PTP) and *Ganoderma lucidum* polysaccharide (GLP) were investigated for their activities on lead-induced haematological derangement and nephropathy in rats. Forty-eight (48) male Wistar rats were randomly divided to six groups (n =8). Whistar rats were orally treated with distilled water *(ad libtum*), lead acetate (Pb) (25mg/kg), lead acetate (25 mg/kg) plus PTP (100mg/kg), lead acetate (25mg/kg) plus GLP (100mg/kg), lead acetate (25mg/kg) plus Dimethyl succinic acid (50mg/kg), lead acetate (25mg/kg) plus Penicillamine. (30mg/kg) respectively for 28 days. Effects of polysaccharide extracts or the drugs on kidney function parameters and haematology of Pb treated rats were evaluated. Inflammatory markers, Oxidative stress, histopathologicals analysis and immunohistochemistry were determined. Results showed that PTP and GLP treatment ameliorated lead-induced haematological derangement by increasing the haemoglobin levels and packed cell volume and reduced lead-induced nephropathy. Expression of inflammatory enzymes in the kidneys was significantly ameliorated in PTP and GLP treated rats. Histology of the kidney of rats administered with Pb only, revealed degeneration of the glomeruli, whereas, extracts of PTP and GLPameliorated glomeruli degeneration. The study suggests that PTP and GLP could prevent lead-induced haematological derangement and nephropath by modulating antioxidant and inflammatory markers.

MTDDI-75

Antidiabetic Activities of the Leaf and Bark Methanolic Extract of *Jatropha curcas* on Alloxan Induced Diabetic Albino Rats

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Antidiabetic activity was measured using a glucometer to check blood glucose level before induction with alloxan, after induction with alloxan and after treatment with both plant extracts. The animals were divided into seven groups, two of which were used for toxicological studies, three were used as control (negative, positive and normal) while the remaining two were used for the test groups. The extracts were found to exhibit hypoglycaemic activity in the animals. The results of this study also revealed that the bark extract had more of the antidiabetic properties than the leaf extract as was observed in the change in blood glucose level of the animals in those groups. Histological studies were carried out on various organs of three of the groups among the seven groups (normal control group, group treated with leaf extract and group treated with the bark extract). It was observed that tissue necrosis was more prominent in the organs of the group treated with the leaf extract as compared to those treated with the bark extract when both were compared to the organs of the normal control group. The findings in this study provided the basis for further studies on the plant with the aim of finding out the mechanism of action of the folklore antidiabetic activity and the best extraction method of the toxic compounds without destroying other active components of the plant.

MTDDI-76

Interaction of Bioactive Phytochemicals from Selected Medicinal Plants with DNA and Glutathione: Implications for Antimicrobial Drug Discovery

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The escalating global burden of antibiotic-resistant pathogens has intensified the search for novel antimicrobial agents derived from natural sources. In this study, we investigated the antimicrobial activity using the agar well diffusion method against *Staphylococcus typhi* (gram-positive) and *Escherichia coli* (gram-negative) at concentrations of 5, 2.5, and 1.25 µg/mL of some selected plant extracts (*Diospyros mespiliformis* (leaf and stem bark), *Cassia nigricans*, *Khaya senegalensis*, *Ficus carica*, *Vernonia amygdalina*, and *Ficus sycomorus* stem bark). To elucidate the molecular mechanisms underlying these activities, we further examined the interaction of the bioactive phytochemicals present in these extracts with two critical intracellular targets; calf thymus DNA and glutathione (GSH) employing fluorescence spectroscopy, UV–Vis spectral analysis, and biochemical assays. Initial antimicrobial screening confirmed significant inhibitory activity across all extracts, with *K. senegalensis* and *F. carica* producing significant ($p < 0.05$) inhibition ranging from 30.94 ± 1.21 to 35.62 ± 0.28 mm against *S. typhi*, and *F. sycomorus* surpassing standard chloramphenicol (19.71 – 27.11 mm). Following the incubation of the plant extract with the measurement of GSH and GSSG (Glutathione disulfide), the result indicated that *K. senegalensis*, *F. carica*, *C. nigricans* and *V. amygdalina* oxidises GSH to GSSG at 69, 53, 40 and 62 % respectively. *D. mespiliformis* (leaf and stem bark) did not show any significance ($p > 0.05$) effect. Binding affinity studies revealed differential interactions of the plant-derived compounds with DNA, suggesting that groove binding or intercalation may contribute to their antimicrobial efficacy by disrupting microbial genomic integrity. These results position the investigated plants as promising leads in natural product-based antimicrobial drug discovery, warranting further phytochemical isolation, structure-activity relationship studies, and preclinical evaluation.

MTDDI-77

Heterocyclic and Organosulfuric Compounds Isolated From *Telfairia occidentalis* Stem As New Antimalarial Lead Compounds: Antiplasmodial Studies, GC-MS, and Pharmacological Profiling

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The proliferation of *Plasmodium falciparum* resistant strains has impeded the efficacy of many chemotherapies, necessitating the advent of new medications targeting malaria. This study profiled the antiplasmodial activities of *Telfairia occidentalis* stem, isolated its compounds, and *in silico* profiled them against target proteins implicated in malariogenesis. The plant's stem collection, extraction, antiplasmodial assay, GC-MS, and *in silico* studies were done using standard protocols. PKCSM and ADMET lab 2.0 tools were used in the prediction of pharmacokinetic properties, molecular docking done with AutoDock Vina while Biovia Discovery Studio enhanced the visualisation of interactions. Moreover, ethyl acetate fraction unravelled the best antiplasmodial therapeutic indices whereas GC-MS analysis revealed but not limited to these lead compounds, 2,3-Diphenylcyclopropyl)methyl phenyl sulfoxide (organosulfur) and 5-(1-phenyl-5-tetrazolyl)-1,3,4-Oxadiazol-2-amine (heterocycle). The heterocyclic compound could have mitigated the nucleic acid synthesis role of PfDHFR and mitochondrial function of cytochrome bc-1 whereas the organosulfuric compound inhibited PfDHFR and plasmepsins via pi-pi interactions and hydrogen bonds, thereby resulting in the inhibition of the resistant strains of the parasites. Further docking evaluation of the compounds against PfEMP-1. PfDHFR, cytochrome bc-1, and plasmepsin revealed favourable binding affinities and clues on possible disruption of the parasite's life cycle at various stages that led to their elimination. The confirmation of the results was evidenced through the prophylactic, suppressive, and curative antiplasmodial studies, MST of the mice, and *in silico* ADMET profiling of the compounds that bettered chloroquine. Hence, a novel option in antimalarial drug development against resistant strains of *P. falciparum*.

MTDDI-78

Role of Microbial Biotechnology and Genetic Engineering in Producing Bioactive Compounds

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Microbial biotechnology has been instrumental in producing natural bioactive products, including antibiotics, antivirals, and anticancer agents. With the rise of multidrug-resistant "superbugs," this review highlights the application of advanced genetic engineering techniques—such as CRISPR-Cas systems—to optimise microbial strains for enhanced production of these therapeutic enzymes and drugs. Furthermore, metabolic engineering of actinomycetes and other bacteria allows for the creation of "unnatural" natural products, providing a pipeline for novel drug discovery in modern medicine. Microbial biotechnology, the technological application of microorganisms, has been instrumental in producing significant natural bioactive products. These include antibiotics, antifungals, anticancer drugs, antiparasitics, antivirals, immunosuppressants, toxoid vaccines, and therapeutic enzymes. Certain microbial components have proven invaluable in the creation of genetic tools, such as CRISPR-Cas systems and thermostable DNA polymerase enzymes. These tools are essential for the development of genetic engineering strategies. Genetic engineering, as a discipline, plays a crucial role in the rational and precise advancement of microbial biotechnology. Consequently, these two conceptual themes—microbial biotechnology and genetic engineering—exhibit a positive interplay. This review presents major advancements in microbial biotechnology, with a particular emphasis on gene-based technologies within the medical field.

MTDDI-79

In vivo Antidiabetic Methanolic Extract's Potential of *Zizyphus spina-christi* (L.) Leaves in Alloxan-Induced Diabetic Rats: Phenolic Composition and Identification of Emodin

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Increasing burden of type 2 diabetes mellitus (T2DM) and the adverse effects and cost of conventional antidiabetic drugs underscore the need for efficacious plant-based alternatives. *Zizyphus spina-christi* (L.) Desf. is traditionally employed when managing diabetes mellitus, yet its bioactive constituents and *in vivo* efficacy remain insufficiently characterised. In this study, the phenolic profile and methanolic leaf extract's antidiabetic properties of *Z. spina-christi* were investigated using phytochemical and pharmacological approaches. The extract was prepared by cold maceration in 70 % methanol and subjected to qualitative and quantitative phytochemical analyses, while phenolic constituents were profiled by HPLC-DAD. Antidiabetic activity was evaluated in alloxan-induced diabetic Wistar rats over a 21-day treatment period. The extract exhibited a high total phenolic content and produced a significant reduction in fasting blood glucose levels, comparable to metformin, alongside improved body weight recovery in diabetic rats. Bioassay-guided fractionation of the ethyl acetate-soluble fraction yielded a major phenolic compound, structurally identified by ^{1}H and ^{13}C-NMR spectroscopy as 1,3,8-trihydroxy-6-methylanthracene-9,10-dione also known as emodin. The pronounced hypoglycaemic effect of *Z. spina-christi* is attributed to its phenolic-rich composition and the presence of bioactive anthraquinones. These findings provide scientific validation for its ethnomedicinal use and support its potential as a source of lead compounds for the development of antidiabetic medications.

MTDDI-80

Kinetic and Thermodynamic Properties of Rhodanese from the Liver and Small intestine of *Gallus domesticus* L

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Studies on enzyme's behaviour under varying temperature, thermal stability and reaction rates are of great importance for industrial biocatalysis. This study evaluated the kinetic and thermodynamic properties of rhodanese isolated from the liver and small intestine of *Gallus domesticus*. Purified rhodanese samples were incubated at different temperatures, and residual enzyme activity was measured over time to determine thermal inactivation kinetics and thermodynamic parameters. Results showed that rhodanese from both tissues exhibited considerable thermal stability, retaining approximately 90% and 80% of their activities at 60–80 °C after 30 min of incubation. The thermal inactivation rate constants (kd) at 80 °C were 20.40 and 19.50 min^{-1} for liver and small intestine rhodanese, respectively, while the corresponding half-life (t1/2) values were 34 and 36 min. At 40 °C, D-values of 288 and 292 min were obtained for liver and small intestine enzymes, respectively. A Q10 value of 1.00 was observed for both enzyme forms, indicating temperature as the principal factor influencing catalytic activity. The activation energies (Ea) were 24.63 and 25.01 kJ mol^{-1} for liver and small intestine rhodanese, respectively. Thermal denaturation energy (Ed) for liver rhodanese was 21.31 kJ mol^{-1}, while the enthalpy changes (ΔH‡) were 19.60 and 20.60 kJ mol^{-1}. The entropy changes (ΔS‡) were −225.15 and −202.09 J mol^{-1} K^{-1} for liver and small intestine rhodanese, respectively. These findings demonstrate the favourable kinetic and thermodynamic characteristics of rhodanese from both tissues, highlighting its potential applications in biotechnological applications.

MTDDI-81

Protective Effect of Ethanol Extract of *Chrysophyllum albidum* on Lead-induced Neurotoxicity in Male Wistar Rats

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Toxicity caused by heavy metals especially lead (Pb^{2+}) poses adverse effects on human health by interfering with normal cellular activities through oxidative stress. This study describes the ameliorative potential of *Chrysophyllum albidum* (CA) ethanol fruit extract on neurotoxicity caused by exposure to lead in male rats. Forty-two male rats were grouped randomly into six sets. Distilled water was administered to rats in Group 1 (control group). Groups 2 to 6 received 50 mg/kg lead acetate in drinking water daily for twenty-one days. In addition, groups 3 to 5 were administered orally with 100, 200 and 400 mg/kg bwt CA ethanol fruit extract orally while group 6 received 200 mg/kg bwt ascorbic acid once daily for twenty-one days. Thereafter, behavioural tests (Y-Maze test, forced swim test, open field test) were sacrificed under chloroform anaesthesia on day twenty-one after which biochemical tests were done. Brain superoxide-dismutase (SOD), catalase (CAT), glutathione (GSH), malondialdehyde (MDA) and acetylcholinesterase levels were assessed as well as histological alterations in the brain. Administration of CA fruit extract at 200 and 400 mg/kg bwt doses caused a significant increase in catalase ($p < 0.05$) and GSH level ($p < 0.05$). A significant decrease in immobility time ($p < 0.0001$) and increase in spontaneous alternation ($p < 0.0001$) was also observed. The findings suggest that CA ethanol fruit extract may offer a therapeutic avenue for mitigating lead-induced neurotoxicity due to its antioxidant and neuroprotective effect.

MTDDI-82

Effect of Ethyl Acetate Fraction of Methanol Crude Extract of *Datura stramonium* Leaves on Anticancer Immune Responses against Breast Cancer Cell-Line (MCF-7)

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The study was aimed at investigating antitumor immune responses against breast cancer cells. 300 g of pulverised leaves of the plant was macerated with 100 ml of methanol and fractionated with ethyl acetate by column chromatography. Human immune cells were extracted from about two pints (750 ml) of full blood and co-cultured with human breast cancer cell-line (MCF-7) in ratio 1: 20 in designate eight wells such that a pair of wells represented an experimental group which was observed after 24 hour and 48 hours as incubation periods. These are group 1 (normal), group 2 (treated with 2.5 µg/ml of fraction), group 3 (5.0 µg/ml) and group 4 (10.0 µg/ml). The levels of IL-2 IFN-γ, IgA, IgG, IgM and immune checkpoints (PD-1. PD-L1 and CTLA-4) were analysed in the supernatant of each group by ELIZA methods. The levels of cytokines and immunoglobulins increased while concentrations of immune checkpoints decreased significantly ($p < 0.05$) across the periods of incubation. The fraction could stimulate and potentiate the secretion of cytokines and immunoglobulins; and inhibit the immune checkpoints implying that it might possess immune anticancer activities which could be a potential source of immunotherapeutic agents. An animal model of this study is recommended to validate the observed outcomes in an ensemble of immune system.

MTDDI-84

Ameliorative Effects of *Bryophyllum pinnatum* on Liver of Rats Exposed to Microplastics

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Microplastics (MPs) are emerging environmental pollutants associated with oxidative stress, inflammation, cellular damage and organ toxicity especially in the liver. *Bryophyllum pinnatum* (miracle leaf) with secondary metabolites which includes alkaloids, phenols, flavonoids, tannins, bufadienolides and glycosides is recognised for its antioxidant, anti-inflammatory and immunomodulatory activities amongst others. This study provided insight into the toxicological effects of MPs on liver tissue of rats and the ameliorative impacts of *Bryophyllum pinnatum* to mitigate these effects. New polyethylene and polypropylene plastics was procured and mixed with standard rat feed at 5% concentration (50 g microplastics per 1 kg of feed). 30 adult male rats was purchased and acclimatised for 14 days before randomly divided into five groups of six rats each. Microplastics exposure lasted 28 days for 4 groups, followed by a 21 days of oral administration of the *Bryophyllum pinnatum* extract before been sacrificed for tissue collection for the determination of malondiadehyde (MDA) concentration,superoxide dismutase (SOD) activity as well as the liver injury biomarkers; glutathione peroxides (GPx), nuclear factor erythoid 2-related factor 2 (Nrf2), cytochrome P450 2E1 (CYP2E1) and alpha-foetoprotein (AFP)gene expression in the liver of the rats. The results shows the ameliorative impacts of *Bryophyllum pinnatum* across the tissues by significantly reducing the elevated MDA level, increasing the reduced SOD activity and modulating the expression of these genes to mitigate the effects of MPs in a dose dependent manner. Collectively, these findings highlight the therapeutic potential of *Bryophyllum pinnatum* in the liver tissue of rat exposed to MPs suggesting a potent antioxidants, lipid peroxidation reduction, cellular membrane promoting and free radical scavenging activities of this plant extract.

MTDDI-85

Luteolin, a Dietary Flavonoid, Ameliorates Biochemical and Histological Alterations in Testosterone Propionate-Induced Benign Prostatic Hyperplasia in Castrated Rats

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Benign Prostatic Hyperplasia (BPH) is a health condition common among elderly men. Different treatment options for BPH are associated with adverse side effects. Hence, phytotherapy is fast becoming one of the best management options. Luteolin (LN), a dietary flavonoid, has been shown to elicit antioxidative, anti-inflammatory and apoptotic effects in cancer cells. We assessed the chemopreventive activity of LN in rat model of BPH in this study. Daily injection of testosterone propionate (TP) (3 mg/kg, i.p) was administered to castrated rats assigned into group 2 to 5 for BPH induction while group 1 served as the castrated-control for 4 weeks. Furthermore, LN, Finasteride (FT) and LN+FT were administered to group 3, 4 and 5 respectively. Results showed that the prostate organo-somatic weight in BPH rats increased significantly by 2.8 folds relative to control. Additionally, prostatic myeloperoxidase and total nitric oxide were significantly increased in the BPH alone group by 659% and 583%, respectively relative to control. Furthermore, activities of enzymatic antioxidants: glutathione peroxidase, catalase and superoxide dismutase in prostate of BPH rats decreased by 63%, 53% and 54%, respectively. In addition, there were strong expressions of androgen Receptor (AR), Bcl-2 and COX-2, while mild expression of Bax and p53 were observed in prostate of BPH alone group. Interestingly, co-administration with LN ameliorated oxidative, inflammatory indices, and also promoted apoptosis in prostate of the BPH rats. Our results suggest that LN chemoprevents benign prostatic hyperplasia in castrated rats via mechanisms that involve antioxidation and anti-inflammation.

MTDDI-86

Acetylcholinesterase Inhibitory and Antioxidant Activities of Hydromethanolic Extracts of *Phyllanthus niruri* and *Euphorbia hirta* in Oxidatively Stressed Rat Brain

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Oxidative stress and cholinergic dysfunction are key factors implicated in neurodegenerative disorders such as Alzheimer's disease. This study investigated the antioxidant and acetylcholinesterase (AChE) inhibitory activities of hydromethanolic extracts of *Phyllanthus niruri* and *Euphorbia hirta* in oxidatively stressed rat brain. Forty-eight male albino rats were assigned into experimental groups and exposed to hydrogen peroxide (3ml/kg B.W weekly) to induced oxidative stress, followed by treatment with 200 mg/kg body weight plant extracts and tocopherol as a standard antioxidant. AChE activity and antioxidant parameters including superoxide dismutase, catalase, glutathione peroxidase, glutathione-S-transferase, and reduced glutathione were assessed using standard spectrophotometric methods. Results showed that treatment with both extracts significantly ($p < 0.05$) enhanced antioxidant enzyme activities and glutathione levels compared to the untreated oxidatively stressed group. Additionally, the extracts demonstrated inhibitory effects on AChE activity in the brain. These findings suggest that *Phyllanthus niruri* and *Euphorbia hirta* possess neuroprotective properties mediated through antioxidant and anticholinesterase mechanisms, highlighting their potential as sources of bioactive compounds for the management of neurodegenerative disorders. Further studies are required to isolate and characterise the active constituents responsible for these effects.

MTDDI-87

Hepatoprotective and Antioxidant Potentials of Crude *Leptadenia hastata* Methanol Extract against Carbon Tetrachloride Induced Liver Damage

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Leptadenia hastata, an edible medicinal plant widely used in tropical Africa, has been reported to possess diverse pharmacological properties. This study evaluated the hepatoprotective and antioxidant potential of its crude methanolic extract (70% methanol, 30% distilled water, v/v) against carbon tetrachloride (CCl_4)-induced hepatotoxicity in albino rats. Antioxidant activity was assessed using the DPPH radical scavenging assay, while phytochemical screening was performed using standard methods. Experimental animals were pretreated orally with the extract (100, 200, and 400 mg/kg body weight) for 10 days prior to CCl_4 administration (1.5 mg/kg). A normal control group received distilled water, while a positive control group was treated with silymarin (100 mg/kg). Hepatoprotective effects were evaluated using serum biochemical markers, including alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), total protein, and albumin. Antioxidant parameters assessed included superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH), and malondialdehyde (MDA), alongside histopathological examination of liver tissues. CCl_4 administration significantly ($p < 0.05$) elevated hepatic enzymes and MDA levels, while reducing antioxidant enzymes and serum proteins. Pretreatment with *L. hastata* extract produced a dose-dependent reduction in liver enzymes and MDA, and significantly restored antioxidant enzyme activities and protein levels toward normal values, comparable to silymarin. Histological findings supported these results, showing reduced hepatic damage. These findings suggest that *L. hastata* extract exhibits significant hepatoprotective effects, likely mediated through its antioxidant activity and modulation of oxidative stress.

MTDDI-88

Comparative Colloidal Stability of Mercaptoproionic Acid and Gum Arabic Capped CdTe Quantum Dots in Biologically Relevant Media

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Cadmium telluride (CdTe) quantum dots (QDs) have attracted considerable interest for biomedical imaging, biosensing, and therapeutic applications. This study evaluated the colloidal stability of mercaptopropionic acid-capped (QD-MPA) and gum Arabic-capped (QD-GA) CdTe quantum dots in biologically relevant media, including Dulbecco's Modified Eagle Medium (DMEM), RPMI-1640 medium, 10% foetal bovine serum (FBS), 0.5% bovine serum albumin (BSA), and phosphate-buffered saline (PBS). Stability was monitored using UV–Visible spectroscopy at 0, 1, 6, 12, 24, 48, and 360 h. QD-MPA and QD-GA nanoparticles remained largely stable for up to 48 h in most media, showing minimal spectral shifts. In contrast, prolonged incubation (360 h) resulted in spectral changes consistent with nanoparticle aggregation and increased particle size. Gum arabic-capped QDs demonstrated superior colloidal stability compared with MPAcapped QDs, particularly in serum-containing media. The findings indicate that polymeric gum arabic capping enhances steric stabilisation and may improve the suitability of CdTe quantum dots for biological and biomedical applications. These results provide useful information for the design of stable nanomaterials for *in vitro* and *in vivo* studies.

MTDDI-89

Unveiling the Antiviral Potential of Resveratrol and Quercetin against Dengue Virus Disease via Network Pharmacological Approach

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Dengue virus (DENV) continues to be a major global health concern with limited antiviral options. This study investigated the therapeutic mechanism of resveratrol and quercetin against DENV disease using network pharmacology and molecular docking approaches. Potential targets of Resveratrol and quercetin were obtained from the Swiss Target Prediction database. DENV-related targets were sourced from GeneCards databases, GEO databases, and Comparative Toxicogenomics Database (CTD), and the therapeutic targets were identified by intersecting the compound-target and the disease-target data. Bioinformatics analyses, including Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology enrichment studies, were performed on these targets. Overlapping genes were analysed by constructing protein–protein interaction (PPI) networks using STRING and Cytoscape. A total of 118 common targets was confirmed between the compound and DENV. Notably, TNF, IL6, AKT1, STAT3, and IL1B were identified as hub genes. The shared targets of the compounds and DENV mainly involved the Toll-like receptor signalling pathway, HIF-1 signalling pathway, Th17 cell differentiation, and TNF signalling pathway. Molecular docking validated the most promising compound-target interactions. Resveratrol and quercetin show promise in treating DENV-related diseases by modulating key pathways associated with immune, inflammatory, and metabolic responses. These findings support their potential use as therapeutic candidates for the management of DENV diseases.

MTDDI-90

Synergistic Effects of *Ficus capreifolia* and *Mangifera indica* in Alloxan-Induced Diabetic Wistar Rats

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The study evaluated the synergistic effects of *Ficus capreifolia* and *Mangifera indica* in alloxan-induced diabetic rats. Leaves of *Ficus capreifolia* and *Mangifera indica* were collected from Bodo and Aluu communities. Diabetes mellitus was induced by a single intraperitoneal injection of freshly prepared alloxan (150mg/kg body weight) except the control. Diabetes was confirmed after 48 hours in all the rats with fasting blood glucose levels above 250mg/dl. The experimental animals were grouped into 7 of 10 rats each. Group 2 consisted of diabetic control rats that received no treatment. Group 3, 4, 5, 6 and 7 rats were diabetic rats but treated with Co-mepiryl(SD), FC500, FC200 (*Ficus capreifolia* at 500,200 mg/kg), Mg500 (*Mangifera indica* at 500mg/kg) and CB (combination of both extracts). Blood and pancreas were collected after 14 and 28 days of treatment for biochemical assay. The dose dependent treatment significantly lowered ($p \leqslant 0.05$) fasting glucose level, lipid profile (except for High density lipoprotein which was significantly increased, ($p \leq 0.05$)), hepatic, oxidative stress and atherogenic indices when compared with the control. This study showed that *the*extracts showed antidiabetic potentials by reduction in elevated glucose level, amelioration of dyslipidaemia, reduction in oxidative biomarkers, hepato-renal, cardio-protective potentials and regeneration of islet of Langerhans. These support the use of the extracts in the management of diabetes mellitus.

MTDDI-91

Isolation and Characterisation of Natural Compounds from *Irvingia gabonensis* Stem Bark as Potential Inhibitors of Pancreatic Lipase

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The inhibition of pancreatic lipase is very crucial in the management of diabetes, obesity and other metabolic disorders. This study investigated the natural inhibitors of pancreatic lipase from *Irvingia gabonensis* stem bark using *in vitro* and molecular docking approach. The ethanol extract of *I. gabonensis* was first subjected to *in vitro* anti-pancreatic lipase activity. Followed by identification and characterisation of its compounds using high performance liquid chromatography (HPLC) and liquid chromatography mass spectrometry (LCMS), subsequently the molecular docking of the compounds with pancreatic lipase using the Maestro molecular interface of Schrödinger suites. The ethanol extract demonstrated a high inhibitory activity against pancreatic lipase with IC50 of 32.85µg/ml. Compounds including ellagic acid, gallic acid, rhamnetin, kaempferol, quercetin, and cinnamic acid were identified and characterised from the plant. The binding affinity for pancreatic lipase showed gallic acid (-5.114 kcal/mol), quercetin (-5.685 kcal/mol), and ellagic acid (-4.069 kcal/mol). In addition, compounds including methyl gallate (C8H8O5, m/z: 183.03), gallic acid (C7H6O5, m/z: 169.01), methyl methylene ellagic acid (C16H10O8, m/z: 329.03), ellagic acid trimethyl ether (C17H12O8, m/z: 345.06), tetramethyl ellagic acid (C18H14O8, m/z: 359.08) demonstrated drug-like and pharmacokinetic properties against pancreatic lipase which are required for an ideal drug in the inhibition of pancreatic lipase. The results also showed all the isolated compounds had promising inhibitory action (pIC50) compared to the reference drug, orlistat (6.607) against pancreatic lipase. This study concludes that compounds from *Irvingia gabonensis* stem bark have great potential as pancreatic lipase inhibitor and could be explored further for molecular simulation.

MTDDI-92

Integrated *in vitro* and *in silico* Evaluation of Anti-Inflammatory Bioactive Compounds from Hydromethanolic Extract of *Thaumatococcus daniellii* Leaves

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Inflammation is a complex biological response implicated in the progression of numerous chronic diseases, necessitating the search for safer and more effective therapeutic agents from natural sources. This study combined *in vitro* and *in silico* approaches to evaluate the anti-inflammatory potential of bioactive compounds from the hydromethanolic extract of *Thaumatococcus daniellii* leaves (HETDL). Leaves were collected, authenticated, air-dried, and extracted using 80% methanol. Phytochemical profiling via gas chromatography (GC-FID and GC-MS) identified over 30 bioactive compounds, including flavonoids and phenolics such as quercetin, luteolin, catechin, resveratrol, kaempferol, isorhamnetin, and vanillic acid. *In vitro* anti-inflammatory activity was assessed through lipoxygenase inhibition and human red blood cell membrane stabilisation assays. The extract demonstrated significant ($p<0.05$) dose-dependent inhibition of lipoxygenase activity and protection against heat-induced haemolysis, although slightly lower than aspirin. For *in silico* analysis, selected compounds were subjected to ADMET screening, revealing favourable pharmacokinetic properties with minimal Lipinski's rule violations and high gastrointestinal absorption. Molecular docking against key inflammatory targets, Cyclooxygenase-2 (COX-2) and Topoisomerase-II (TOPO-II), showed strong binding affinities. Notably, vanillic acid (−9.1 kcal/mol) exhibited comparable affinity to ibuprofen, while isorhamnetin (−8.9 kcal/mol) and resveratrol (−7.8 kcal/mol) outperformed aspirin (−6.8 kcal/mol) against COX-2. Similar trends were observed for TOPO-II interactions. The combined findings suggest that *Thaumatococcus daniellii* leaves are rich in bioactive compounds with significant anti-inflammatory potential, mediated through multiple biochemical pathways. Vanillic acid and isorhamnetin emerged as promising lead candidates. Further *in vitro, in vivo*, and mechanistic studies are required to validate these findings and support drug development efforts.

MTDDI-93

Computational Evaluation of Bioactives from Miracle Leaf (*Bryophyllum pinnatum*) As Potential Inhibitors of Key Enzymes Linked To Type-2 Diabetes

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Bryophyllum pinnatum commonly known as Miracle Leaf, is traditionally used for its antidiabetic, antioxidant, membrane-stabilising, and anti-hypertensive properties. However, the mechanisms underlying these effects remain underexplored. Bioactive compounds were screened using GC-MS analysis, identifying seven flavonoids and ten phenolic compounds. Molecular docking studies evaluated the inhibitory actions against α-amylase, α-glucosidase, DPP-4, and SGLT2, using Maestro Schrödinger, Biovia Discovery Studio, and PyMol.Molecular docking revealed strong inhibitory actions, with binding energies for α-amylase and α-glucosidase ranging from -6.86 to -10.474 kcal/mol and -4.217 to -2.687 kcal/mol, respectively, and for DPP-4 and SGLT2 from -8.723 to -2.522 kcal/mol and -9.346 to -5.088 kcal/mol, respectively. The findings suggest that the phenolics and flavonoids from *Bryophyllum pinnatum* possess significant inhibitory actions against key enzymes related to diabetes management, these bioactives confers robust antioxidant properties. These results highlight the therapeutic potential of *Bryophyllum pinnatum* for managing diabetes, warranting further experimental validation and development into effective therapeutic agents.

MTDDI-94

Protective Effect of *Gladiolus psittacinus* Extract on Cholinergic Enzymes, Oxidative Stress and Antioxidant Status in Brain of Streptozotocin-induced Diabetic Rats

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This study is aimed to assess protective effect of *Gladiolus psittacinus* aqueous (AGP) extract on cholinergic enzymes, oxidative stress and antioxidant status in brain of streptozotocin-induced diabetic rats using *in vitro*, *in vivo* and *in silico* studies. Phytochemical profiling and *in vitro* antioxidant and antidiabetic potentials of AGP were determined. *Diabetes mellitus* (DM) was induced by a single (i.p.) injection of 50 mg/kg streptozotocin and diabetic rats were treated orally once per day for 14 days. Body weight and fasting blood glucose concentration (FBGC) were monitored. Also, effects of treatment on brain's markers of oxidative stress, antioxidant enzymes and histopathology were assessed in diabetic rats. Compounds in AGP were docked against alpha-glucosidase and alpha-amylase. The results revealed that AGP possessed phytochemicals, antioxidant and potential to inhibit α-amylase and α-glucosidase enzymes (*In vitro*). Oral administration of AGP was able to reverse increased blood glucose concentration and reduction in body weight of diabetic rats. The aberrant cholinergic enzymes and hyperglycaemia-mediated oxidative damage in brain of diabetic were modulated by treatment with AGP. Also, histopathology slides showed an improvement in the structural architecture of brain of treated diabetic rats. Molecular docking analysis revealed bioactive compounds like rutin, hesperidin and oleracein A from *Gladiolus psittacinus* which binds alpha glucosidase and alpha amylase to elicit antidiabetic effects. This study has justified the use of *Gladiolus psittacinus* corm for treatment of DM in folk medicine and its associated complications.

MTDDI-95

Protective Effects of *Annona muricata* (soursop) Fruit against Carbon Tetrachloride-Induced Liver Damage in Rats

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Liver injury caused by toxic chemicals remains a significant health challenge worldwide, largely due to oxidative stress and inflammation. This study investigated the potential protective effects of *Annona muricata* (soursop) fruit extract against carbon tetrachloride (CCl_4)-induced liver damage in rats. Chronic hepatotoxicity was induced by administering CCl_4 intraperitoneally (0.5 µL/g body weight) twice weekly for six weeks. Twenty-five rats were randomly assigned to a normal control group, a CCl_4-only group, and treatment groups receiving CCl_4 along with soursop extract at 200 mg/kg and 400 mg/kg body weight for eight weeks. Exposure to CCl_4 alone resulted in significant liver injury, evidenced by elevated serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels, increased malondialdehyde (MDA) concentration, and reduced antioxidant enzyme activities, including catalase, superoxide dismutase, and reduced glutathione. In addition, interleukin-6 (IL-6) levels were markedly elevated, indicating an inflammatory response. However, treatment with soursop extract significantly reduced ALT, AST, MDA, and IL-6 levels while restoring antioxidant defences. Histological examination further confirmed that *Annona muricata* (soursop) preserved liver structure and minimised inflammatory cell infiltration. These findings suggest that *Annona muricata* fruit extract exerts notable hepatoprotective effects against CCl_4-induced liver injury, likely through its antioxidant and anti-inflammatory properties. The study supports the potential use of *Annona muricata* (soursop) soursop as a natural therapeutic agent for managing toxin-induced liver damage.

MTDDI-96

DNA Extraction from Selected Plant and Animal Tissues Using Phenol-Chloroform Method

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This study evaluated the efficiency of the phenol–chloroform method for extracting genomic DNA from a wide range of biological samples, including animal tissues (blood, spleen, liver, kidney, hair, lung, tongue, heart, skin, tail tip), plant leaves (mango, *Moringa*, sandpaper, catalpa, butterfly plant), cereal grains (rice, maize, millet, wheat, sorghum), and commonly cultivated fruits in Nigeria (apple, pineapple, banana, orange, watermelon). Samples were homogenised, lysed, and subjected to phenol–chloroform purification followed by ethanol precipitation. DNA yield, purity, and integrity were assessed using spectrophotometry (A260/A280 and A260/A230 ratios) and agarose gel electrophoresis. Results showed that DNA yield and quality varied with tissue type and biochemical composition: blood, spleen, liver, kidney, and millet consistently provided higher DNA concentrations, while tissues such as hair, tongue, tail tip, and maize exhibited lower yields. Plant leaves and fruits displayed variable purity due to secondary metabolites, polysaccharides, and phenolic compounds, although high–molecular-weight DNA suitable for downstream applications was obtained from all samples. Agarose gel electrophoresis confirmed the integrity of the extracted DNA, with more distinct bands in tissues with higher purity. Overall, the phenol–chloroform method proved to be a reliable, cost-effective, and versatile technique for isolating genomic DNA across diverse animal and plant tissues, though tissue-specific challenges highlight the need for protocol optimisation and additional purification steps to ensure consistently high-quality DNA for molecular biology applications such as PCR, sequencing, and genetic analyses.

MTDDI-97

Kolaviron Enhances the Renoprotective Effects of Metformin in Diabetic Rats

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Diabetes mellitus is a long-term metabolic disease marked by sustained hyperglycaemia and associated metabolic derangements. Kolaviron (KV), a bioactive fraction isolated from Garcinia kola, contains garcinia biflavonoid 1 (GB1), garcinia biflavonoid 2 (GB2), and kolaflavanone. This study evaluated the renoprotective and possible synergistic effects of KV combined with metformin (MET) in streptozotocin-induced diabetic rats. Kolaviron was extracted from *Garcinia kola* seeds and initially characterised *in vitro* through total phenolic and flavonoid content determination, DPPH radical scavenging, ferric reducing antioxidant power (FRAP), and lipid peroxidation inhibition assays. Diabetes was induced by intraperitoneal administration of streptozotocin (45 mg/kg). Thirty-five male rats were allocated into five groups (n = 7): normal control, diabetic control, MET (100 mg/kg), KV (100 mg/kg), and KV(100 mg/kg) plus MET(100 mg/kg). Treatments were administered for 28 days. Fasting blood glucose (FBG), body weight, renal biomarkers (urea, creatinine, uric acid, total protein), antioxidant indices (SOD, CAT, GSH), malondialdehyde (MDA), and renal histopathology were assessed. Kolaviron exhibited marked antioxidant capacity *in vitro*. Combined therapy significantly decreased FBG and improved body weight relative to monotherapies. The co-treatment group showed reduced serum urea, creatinine, uric acid, and MDA levels, alongside elevated total protein and antioxidant enzyme activities. Histological examination revealed notable restoration of renal tissue architecture. Kolaviron potentiated the renoprotective and antioxidant effects of metformin, suggesting a synergistic therapeutic strategy for attenuating diabetic nephropathy.

MTDDI-98

GC-MS Analysis and Molecular Docking studies of Bioactive Compounds from ethanolic extracts of *Alchornea laxiflora* against Staphylococcus aureus proteins

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Staphylococcus aureus is a gram-positive bacterium that frequently colonises the human nasal passages and skin. Often a harmless commensal but under certain conditions, can become an opportunistic pathogen responsible for a range of ailments from minor skin infections to more severe disorders such as pneumonia, septicaemia, etc. The rise in antibiotic resistance, particularly in *Staphylococcus aureus*, poses a significant health challenge with severe implications. *Alchornea laxiflora* is a medicinal plant traditionally employed in the management of infectious diseases, yet its molecular mechanisms of action remain underexplored. Phytochemical constituents identified from the GC-MS analysis of ethanolic leaf extract of this plant were subjected to molecular docking against two *Staphylococcus aureus* targets: DNA gyrase (3U2D) and *Staphylococcus aureus* sortase A (1T2P). Docking simulations revealed strong binding affinities of several compounds, notably 7H-benzo[c]carbazole (−9.0 kcal/mol) and Caranine-7-one, 15,16-didehydro-1-oxo- (−8.7 kcal/mol), which outperformed the standard antibiotic Vibramycin (−8.0 kcal/mol) against DNA gyrase. Conversely, weaker interactions were observed against *Staphylococcus aureus* sortase A, indicating that the antibacterial potential of these compounds may primarily derive from DNA gyrase inhibition. Absorbsion, Distribution, Metabolism, Excretion and Toxicity (ADMET) predictions demonstrated high gastrointestinal absorption and blood–brain barrier permeability across most compounds, alongside substantial cytochrome P450 inhibitory tendencies and short elimination half-lives (<3 h). However, elevated carcinogenicity scores raise safety concerns requiring further experimental validation. Collectively, these findings suggest that *A. laxiflora* phytochemicals represent promising lead compounds for antibacterial drug discovery targeting DNA gyrase in *S. aureus*, however, optimisation is necessary to improve metabolic safety and reduction of potential toxicity.

MTDDI-99

Protective role of *Ocimum basilicum* and *Ocimum gratissimum* against Oxidative Stress in Alloxan-induced Diabetes in Wistar Albino Rats

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Oxidative stress is globally known as one of the causes of diabetic mellitus and its debilitating effects and complications. This study revealed the antioxidant potential of ethanolic leaf extracts from *Ocimum basilicum and Ocimum gratissimum* using alloxan-induced diabetic Wistar albino rats. The phytochemical profiling revealed the presence of bioactive compounds like anthraquinones, phenolic, flavonoid, tannin, saponin, and reducing sugars. Comparatively, there was a variation among the two plants screened for the phytochemistry. Furthermore, the anti-nutrient composition also elucidates that oxalate, phytate and cyanide levels were relatively low. The findings from the *in vitro* antioxidant tests revealed notable free radical scavenging activity. As expected, the reference standards quercetin showed significantly higher ($p < 0.05$) radical scavenging activity than *Ocimum basilicum and Ocimum gratissimum* extracts. Between the two, however, the *Ocimum gratissimum* extract consistently outperformed the *Ocimum basilicum* extract. Also, the *in vivo* study was conducted with forty male Wistar albino rats divided into seven groups: a normal control, an alloxan induced diabetic group and four co-treatment groups receiving the extracts and standard drug treated group alone. Administration of alloxan was significantly ($p < 0.05$) decrease in antioxidant enzymes such as SOD, Catalase and GSH. Nevertheless, co-treatment with *Ocimum basilicum and Ocimum gratissimum* extracts revealed an increase in the endogenous antioxidant enzyme levels and decrease oxidative level. Conclusively, the study adjudges that *Ocimum basilicum and Ocimum gratissimum* extracts possess antioxidant potential for the management of diabetes mellitus caused by oxidative stress.

MTDDI-100

Drug Repurposing Potential of synthesised Dinitrophenyl Hydrazone Ligand and Ni(II)/V(II) Complexes: An integrated Computational Studies

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The urgency for effective SARS-CoV-2 therapeutics has revived the interest in metal-based drug re-purposing, particularly Schiff base-derived hydrazones with established bio-activity. This study employs an integrated computational approach to evaluate a dinitrophenyl hydarzone ligand (DHZ) and its Ni(II) and V(II) complexes against SARS-CoV-2 main protease (Mpro), RNA dependent RNA polymerase (RdRp), and spike RDB-ACE2 interface. Molecular docking (autodock Vina) was coupled with ADMET prediction, Lipinski's compliance and bioavailability radar profiling using SwissADME and pkCSM. Density Functional Theory (DFT) calculations at the B3LYP/6-31G(d,p)//LANL2DZ level assessed HOMO-LUMO gaps and reactivity parameters. Metal complexation enhanced binding affinity, pharmacokinetics indices, and electronic reactivity, with the V(II) complex showing the strongest predicted inhibition. The findings indicate that transition metal-hydrazone frameworks are promising candidates for antiviral drug re-purposing and merit experimental validation.

MTDDI-101

Comparative Analysis of Antioxidant and Antimicrobial Potentials of Different Extracts of *Turraea vogelii* Leaves

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Turraea vogelii Hook.f. is a plant valued for its medicinal properties. The aim of this study is to investigate the comparative analysis of antioxidant and antimicrobial potentials of different extracts of *Turrea vogelii* leaves. The fresh leaves of the plant were harvested, air-dried, ground, and extracted with three solvents based on polarity (Dichloromethane (DCM), Ethyl Acetate, and n-hexane) via a maceration procedure. The antioxidant and antibacterial potential of these compounds was tested to assess their efficacy. Fourier Transform Infrared Spectroscopy (FTIR) and Gas Chromatography Mass Spectrometry (GC-MS) were used to analyse the functional groups and organic compounds present in the drug materials, respectively. Antioxidant screening identified flavonoids (24.63 ± 0.47, 19.96 ± 0.17, 21.04 ± 0.04), phenols (20.18 ± 0.4, 17.61 ± 0.11, 8.65 ± 0.15) in 100µg/mL of the DCM, ethyl acetate, and n-hexane crude extracts, respectively. The antibacterial evaluation showed that the DCM extract demonstrated potent activity, with minimum inhibitory concentration (MIC) values as low as 3.125 µg/mL and minimum bactericidal concentration (MBC) values ranging from 6.25 µg/mL to 50 µg/mL against pathogens such as *Escherichia coli* ATCC 35218, *Staphylococcus aureus* ATCC 2921, Escherichia coli ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Klebsiella pneumoniae* ATCC 700303, and *Salmonella typhi* ATCC14028. FTIR analysis identified several functional groups in the extract, including hydroxyls, alkanes, amides, ethers, and amines, indicative of diverse bioactive compounds, and GC-MS identified key compounds like squalene and Hexanoic acid. The results highlight the potential of plant leaves to possess notable antioxidants and antibacterial properties, supporting their traditional use in folk medicine and paving the way for the development of novel antibacterial agents.

MTDDI-102

Effect of Aqueous Extract of *Solanum indicum* Fruits on Aluminium Chloride-induced Neurotoxicity in *Drosophila melanogaster*

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Aluminium is an environmental and industrial neurotoxicant known to induce neurotoxicity, oxidative damage and inflammation in tissues. *Solanum indicum* contains polyphenols with antioxidant and anti-inflammatory properties. In this study, the effect of aqueous extract of S*olanum indicum* fruits (AESIf) on aluminium chloride-induced neurotoxicity in *Drosophila melanogaster* was investigated. A 12-day survival analysis was carried out to determine the treatment safe dose of AESIf. Subsequently, flies were exposed to AlCl3 (1 mg/g diet) and/or AESIf (0.2, 0.4, 0.8 mg/g diet) for 7 days. Flies were thereafter homogenised, and parameters such as climbing ability, acetylcholinesterase (AChE), nitric oxide, total thiol, reduced glutathione (GSH), glutathione-s-transferase (GST), and glucose assays were carried out. Results indicated that AlCl3 significantly ($p < 0.05$) increased AChE activity, and nitric oxide and glucose levels, with a significant ($p < 0.05$) reduction in reduced GSH and total thiol level, as well as GST activity and climbing abilities. However, AESIf significantly restored the abnormal changes in these parameters caused by AlCl3. In this study, AESIf at doses up to 0.8 mg/g diet was shown to improve neurological toxicity occasioned by AlCl3 in *Drosophila melanogaster*. These ameliorative potential of AESIf could be linked to the presence of secondary metabolites present in the *Solanum indicum*. In conclusion, *Solanum indicum* fruits can therefore be suggested a possible protective agent against AlCl3-induced neurotoxicity.

MTDDI-104

Antitrypanosomal and Molecular Docking of *Naja nigricollis* Venom on Infected Mice

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African trypanosomiasis, known as sleeping sickness in humans and nagana in animals, remains a major public health problem and a significant cause of economic loss in Africa. This study evaluated the *in vitro* and *in vivo* antitrypanosomal efficacy of *Naja nigricollis* (cobra) venom against *Trypanosoma brucei brucei*. Acute toxicity testing was performed to determine the median lethal dose (LD_{50}) of the venom. *In vitro* antitrypanosomal activity was assessed at concentrations of 100, 50, 25, 12.5, and 6.25 µg/mL over a 2-hour incubation period. For the *in vivo* study, thirty mice were randomly assigned into six groups (n = 5). Groups I–V were infected intraperitoneally with 10^6 *T. brucei brucei* cells/mL. Following establishment of infection, Groups I–III were treated with cobra venom at doses of 0.3, 0.15, and 0.075 mg/kg body weight, respectively. Group IV received diminazene aceturate, Group V normal saline, while Group VI served as the uninfected control. The venom was characterise using HPLC after which the compounds obtained was subjected to molecular docking. The LD_{50} of the venom was 0.643 mg/kg bodyweight. In *in vitro*, complete parasite immobilisation occurred within 30 minutes at all tested concentrations, with the 100 µg/mL showing the fastest effect. *In vivo*, venom treatment produced dose-dependent antitrypanosomal activity, with the 0.3 mg/kg dose showing significantly higher efficacy than the positive control ($P < 0.05$). Venom treatment reversed infection-induced hepatomegaly without significant changes in other organ weights. HPLC analysis identified six bioactive peptides, and molecular docking showed strong binding of cystatin to trypanothione reductase and pteridine reductase 1 which resulted to the death of the parasites in the infected and venom treated animals

These findings suggest that *N. nigricollis* venom contained a promising source of novel antitrypanosomal compounds.

MTDDI-105

Phytochemical Profiling, Antioxidant Activity, Cytotoxicity and EGFR-Targeted Molecular Docking Analysis of *Lannea egregia* Shoot Extract: Insights into Its Anticancer Potential

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The search for new cancer chemotherapies from natural sources has increased due to the limitations of conventional chemotherapy. *Lannea egregia*, being a medicinal plant widely used in folk medicine, has shown promise in treating various diseases, including cancer. Methodology: This study explored the therapeutic potential of the ethanol extract of *L. egregia* shoots (EELES) through phytochemical study, antioxidant, cytotoxicity evaluation and computational molecular docking were conducted. Six major bioactive compounds, including maleic acid (70.45 ppm), caffeine (30.70 ppm), saponins (5.59 ppm), quercetin (2.20 ppm), glutathione (1.07 ppm) and naringenin (0.41 ppm) were identified. The antioxidant activity of the extract (58.06 ± 0.03 µg/mL) was comparable to that of ascorbic acid (69.03 ± 0.03 µg/mL). There was a significant cytotoxic activity at 30.08 ± 0.53 µg/mL. Molecular docking against epidermal growth factor receptor (EGFR) kinase (PDB ID: 1M17) showed that quercetin exhibited the highest binding affinity (-9.969 kcal/mol), surpassing both the native ligand (-9.510 kcal/mol and gefitinib (-8.487 kcal/mol). Moreover, the MMGBSA binding free energy calculations showed that quercetin has a superior stability (ΔG = -39.50 kcal/mol) compared to gefitinib (ΔG = -27.38 kcal/mol). Similarly, drug-likeness analysis revealed that most of these compounds, including quercetin, naringenin and coumaric acid, satisfied Lipinski's Rule of Five, indicating favourable oral bioavailability. These findings suggest that *L. egregia* shoots contain bioactive compounds with significant antioxidant, cytotoxic and EGFR-inhibitory properties, warranting further investigation for the development of novel anticancer therapeutics, particularly for EGFR-driven malignancies such as colorectal cancer.

MTDDI-106

Assessment of Phytochemical and *in silico* Molecular Docking of *Masularia acuminata* for Dental Biofilm Inhibition

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Dental caries is a prevalent oral infection worldwide, caused by bacterial adherence to the tooth surface and the formation of biofilms. Prevention of adherence on tooth enamel is crucial in halting orodental progression. The objective was to investigate the anti-biofilm potential of *Masularia acuminata* stem extract. Methanolic stem extract was prepared by maceration.GCMS was adopted in revealing the compounds present in the plant. Molecular docking simulation was used to reveal the affinity of the plant compounds to the active site of chain B of glycosyltransferase-I, in addition to the use of the Protein Data Bank (PDB) and AutodockVina. Protein preparation and visualisation were carried out using BIOVIA Discovery Studio. The pharmacokinetics, pharmacological, and biological activities of the plant compounds were carried out using PubChem, Swiss ADME, and PASS servers. GC-MS revealed forty non-fragmental compounds. Molecular docking reveals the affinities of the compound, while the different pharmacological potentials of the lead compounds (L1-L5) are demonstrated through SwissADME. Methanolic stem extract of M. acuminata has pharmacological potential against βglucosyltransferase-I and may be considered an alternative means for controlling oral pathogens by blocking the activities of glucosyltransferase and further preventing bacteria from adhering to tooth enamel.

MTDDI-107

Effects of *Brassica oleracea* (Cabbage) In Gastric Ulcer -Induced Gut-Brain Axis Dysregulation in Wistar Rat

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Increasing evidence highlights the role of bidirectional gut–brain axis, whereby ulcer-induced inflammation and oxidative imbalance disrupt neuroendocrine signalling and neurotransmitter homeostasis, contributing to stress-related biochemical and neurological alterations. Cabbage contains several bioactive phytochemicals with established anti-ulcer properties. This study investigated the protective effects of cabbage powder (CP) and cabbage ethanol extract (CEE) on gastric ulcer–induced dysregulation of gut–brain axis in Wistar rats. Seventy male Wistar rats (150–250 g) were randomly assigned to six groups and pretreated for seven days before ethanol challenge: normal control, rabeprazole-treated, CP (500 mg/kg), CEE (250 mg/kg), ulcer-untreated negative control, and CP (500 mg/kg) without ulcer induction. Catalase (CAT), superoxide dismutase (SOD), and glutathione (GSH), as well as malondialdehyde (MDA), were evaluated. Inflammatory mediators nuclear factor kappa B (NF-κB) and cyclooxygenase-2 (COX-2), neurotransmitters serotonin (5-HT) and gamma-aminobutyric acid (GABA), and neuroendocrine hormones corticosterone and ghrelin were also assessed. Treatment with CP and CEE significantly reduced ulcer index and improved percentage inhibition compared with the untreated ulcer group. Ethanol-induced severe gastric lesions were markedly attenuated by both treatments. CP and CEE restored CAT, SOD, and GSH activities and reduced MDA levels, while significantly suppressing NF-κB and COX-2 expression ($p < 0.05$). Alterations in GABA and 5-HT were improved, and dysregulated corticosterone and ghrelin levels were normalised in treated groups. These findings demonstrated that cabbage preparations attenuate ethanol-induced gastric ulceration and restore gut–brain axis homeostasis through antioxidant, anti-inflammatory, and neuroendocrine mechanisms, supporting cabbage as a promising complementary dietary therapy for gastric ulcer management.

MTDDI-108

Effects of *Bryophyllum pinnatum* Aqueous Leaf Extract on Renal Insulin Signalling, Mitochondrial Biogenesis, and Metabolic Regulatory Genes in Streptozotocin-Induced Diabetic Rats

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Dysregulation of key biomarkers involved in insulin signalling and mitochondrial biogenesis contributes to impaired glucose homeostasis and progression of diabetes mellitus. The molecular effects of *Bryophyllum pinnatum* on insulin signalling and mitochondrial regulatory pathways are underexplored, though it has been utilised traditionally to manage diabetes. This study evaluated the effects of the aqueous leaf extract of *Bryophyllum pinnatum* on renal insulin signalling, mitochondrial biogenesis, and metabolic regulatory genes in streptozotocin-induced diabetic rats. Thirty-six Wistar rats(male) were grouped into six experimental groups, including control, diabetic control (induced with 55 mg/kg of streptozotocin), diabetic rats (100 mg/kg metformin, and diabetic rats treated with varying concentrations (50, 100 and 200 mg/kg) of *Bryophyllum pinnatum* leaf extract. The rats were subjected to blood glucose tests at intervals, during the twenty-one days of treatment, after which the rats were sacrificed. The expression of insulin receptor, phosphatase and tensin homolog, Peroxisome Proliferator-activated Receptor-γ Coactivator-1 alpha, oestrogen-related Receptor, and Takeda G protein-coupled receptor 5 was determined using reverse-transcriptase polymerase-chain reaction. Results revealed that streptozotocin had a significant effect on the insulin-signalling, mitochondrial-biogenesis and metabolic regulatory genes. However, treatment with the leaf extract reversed the effect of streptozotocin on blood glucose levels. Also, compared to the diabetic control group treatment with this leaf extract resulted in reversals in the expression of insulin-signalling, mitochondrial-biogenesis and metabolic-regulatory genes. The study suggests that the leaf could be considered a potential therapeutic candidate in the management of diabetes.

MTDDI-109

Subacute Oral Administration of a Benzene-Eluted Fraction of Chloroform Extract of *Carica papaya* Seeds Alters Sperm Parameters and Acrosomal Enzyme Activity in Adult Male Rats

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The antifertility effects of *Carica papaya* seeds in male rats have predominantly been associated with post-testicular mechanisms, with limited evaluation of acrosomal function and androgen-linked indices. Subacute oral administration of a benzene-eluted fraction derived from the chloroform extract of *Carica papaya* seeds was evaluated for its effects on sperm quality, acrosomal enzyme activity, and selected reproductive biochemical indices in adult male Wistar rats. Seventy-two rats (190–210 g) were randomised into three groups: control (vehicle), 100 mg/kg, and 200 mg/kg. Treatment was administered orally for 21 consecutive days, followed by a 21-day withdrawal period, with assessments conducted at 7-day intervals up to Day 42. Treatment produced significant ($p < 0.05$), dose- and time-dependent reductions in all measured parameters. Sperm quality was markedly reduced, with sperm count, motility, viability, and morphology decreasing by approximately 35%, 27%, 16%, and 16%, respectively, at the highest dose by Day 21. Acrosomal enzyme activities were also significantly reduced, with acrosin and hyaluronidase declining by up to 39% and 40%, respectively. Similarly, serum testosterone, acid phosphatase, and seminal sialic acid levels showed significant dose-dependent decreases, with maximal reductions of approximately 48%, 37%, and 36%, respectively. During the post-treatment phase (Days 28-42), all parameters showed progressive recovery toward control values; however, the high-dose group remained significantly lower than the control at Day 42. These findings indicate that the benzene-eluted fraction of *Carica papaya* seed chloroform extract induces reversible, dose-dependent impairment of male reproductive function, mediated through disruption of sperm quality, acrosomal enzyme activity, and androgen-dependent biochemical indices.

MTDDI-110

In silico Evaluation of Matrix Gene RT-PCR Primer and Probe Binding Site Stability in Influenza A (H5N1): Implications for Diagnostic Assay Performance

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Real-time RT-PCR assays targeting the influenza A matrix (M) gene are widely used in clinical laboratories for routine detection of H5N1 infections. Viral genetic drift may compromise primer and probe binding efficiency, potentially affecting assay sensitivity. Continuous evaluation of binding site stability is therefore essential for diagnostic reliability. Forty-nine full-length matrix gene sequences of influenza A (H5N1) collected between 1996–2025 and included isolates from: Homo sapiens, Avian species, other mammalian hosts. Only sequences covering nucleotide positions 79–175 were included. Gene sequences were retrieved from the NCBI GenBank database. Multiple sequence alignment was performed using (MUSCLE in MEGA software). Primer and probe binding regions corresponding to coordinates 79–97 (forward primer), 120–138 (probe), and 154–175 (reverse primer) were evaluated for nucleotide mismatches. Frequencies of substitutions were calculated and stratified by host and temporal distribution. All sequences fully covered the evaluated binding regions. The majority of isolates demonstrated complete conservation within primer and probe sites. Observed substitutions were infrequent and primarily single nucleotide mismatches. No extensive multi-site disruptions were identified within any binding region. Substitution patterns showed temporal clustering but did not suggest widespread destabilisation of assay target regions. The results indicate that the evaluated matrix gene RT-qPCR assay demonstrates substantial tolerance to isolated nucleotide substitutions, with most circulating strains remaining within predicted tolerance limits. Observed limited mismatches are unlikely to significantly compromise diagnostic assay performance. Continued molecular surveillance of primer and probe binding sites is recommended to maintain analytical sensitivity in clinical laboratories.

MTDDI-111

Synthesis of Aflatoxin B_1 Derivatives for Immunoassay Development

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Aflatoxin contamination in foods and their products has been a growing global concern in recent years. This study was done to synthesise AFB_1 derivatives towards immunoassay development. AFB_1 derivative was synthesised using oximation of AFB_1, and activation of this oxime was done via a short cross-linker (succinic anhydride) to introduce a reactive carboxyl group for subsequent immunogen preparation. The Thin-layer chromatography (TLC) analysis on the resulting product confirmed the successful conversion of AFB_1 to AFB_1-oxime, with the AFB_1 (standard) exhibiting higher mobility in the selected solvent systems with strong fluorescence under UV (365) nm. Succeeding oximation, a distinct change in chromatographic mobility was observed, indicating the formation of a modified AFB_1 derivative (AFB_1-oxime). Further conversion of AFB_1-oxime with succinic anhydride led to the production of AFB_1-oxime-succinate. TLC analysis confirmed a marked reduction in mobility, with the product of AFB_1-oxime-succinate remaining close to the baseline. This behavioural change, observed by increased polarity, results from the introduction of a carboxyl functional group into the AFB_1-oxime. In conclusion, AFB_1 derivatives were successfully synthesised through oximation and succinic anhydride activation, generating a reactive intermediate suitable for subsequent immunoassay development.

MTDDI-112

Targeting the MDM2/p53 Axis: Diosmin as a Potential Antitumor Agent

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Osteosarcoma is a highly aggressive malignancy with limited therapeutic advancements, often characterised by overexpression of murine double minute 2 (MDM2) and functional suppression of p53. Diosmin, a citrus-derived flavonoid, exhibits broad pharmacological properties, yet its molecular role in MDM2-p53 regulation remains unexplored. This study investigates the anti-cancer potential of diosmin in osteosarcoma via modulation of the MDM2-p53 signalling axis. Human SJSA-1 osteosarcoma cells were treated with diosmin and assessed for viability, apoptosis (Annexin V/Propidium iodide (PI)), and cell cycle dynamics via flow cytometry. Western blot analysis was used to evaluate the expression of MDM2, p53, and caspase-3. Mechanistic validation employed ZVAD (a caspase inhibitor), MG132 (a proteasome inhibitor), and MDM2 siRNA. MDM2 ubiquitination was examined *in vitro*. Molecular docking and 100 ns molecular dynamics simulations assessed diosmin-MDM2 interactions. Diosmin induced dose-dependent cytotoxicity (IC_{50} = 27.91 µM), G2-M arrest, and apoptosis. It suppressed MDM2, stabilised p53, and activated caspase-3, effects reversed by ZVAD and potentiated by MG132. MDM2 knockdown mimicked diosmin's effect and co-treatment showed no additive effect, indicating a shared pathway. Diosmin enhanced MDM2 ubiquitination, and showed favourable MDM2 binding affinity (−8.6 kcal/mol) and complex stability. Diosmin effectively disrupts the MDM2-p53 axis, inducing apoptotic cell death and tumour suppression in osteosarcoma. These findings highlight diosmin as a promising natural candidate for MDM2-targeted cancer therapy.

MTDDI-113

An Integrated Computational-Experimental Discovery and Biophysical Validation of Inhibitors Targeting Multidrug-Resistant ESKAPE Pathogens and Neglected Tropical Disease Organisms

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The systematic integration and use of empirical and computational studies in the discovery and validation of inhibitors targeting multidrug-resistant target enzymes implicated in diseases caused by ESKAPE and neglected tropical disease (NTD) pathogens is critical. This is because the approach has proven effective in this kind of study by providing complementary insights that significantly enhance understanding of how potential drug candidates interact with specific protein targets within the pathogen. While empirical methods (such as biophysical and biochemical characterisations) provide detailed insights into the binding affinities, kinetics, and structural conformations of protein-ligand complexes, they also enable empirical determination and confirmation of the binding site and interaction strength of these complexes. Additionally, these help identify key amino acids involved in the interaction, validating the design of ligands with improved binding efficiency and specificity. On the other hand, computational studies employed in these studies using advanced algorithms and simulations, help predict and analyse protein-ligand interactions at the molecular level. Techniques such as molecular docking, molecular dynamics simulations, and molecular mechanics/generalised born solvent area (MM/GBSA) calculations provide valuable insights into the dynamic behaviour and energetics of these interactions. Similarly, high-throughput virtual screening enables rapid screening of large compound libraries for potent inhibitors, thereby predicting binding modes and affinities before empirical testing. This combinatorial approach has undoubtedly proven valuable in accelerating drug discovery by focusing experimental efforts on the most promising candidates. In conclusion, the inhibitors identified in this study warrant further investigation to advance their usefulness in the drug discovery pipeline.

MTDDI-114

Computational Repurposing of Selected FDA-Approved Sigma-1 Receptor Agonists for Neuroprotection via Endoplasmic Reticulum-Mitochondria Associated Membrane (ER-MAM) Calcium Regulation: A Molecular Docking Study

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The 2021 published Global Burden of Diseases (GBD) analysis revealed significant health crises with neurological disorders now affecting 43·1% of the global population. The continuously increasing cost of novel therapeutics pose significant economic barriers to patient access, necessitating economically viable drug repurposing strategies. Neurodegeneration is characterised by calcium excitotoxicity and mitochondria-associated apoptosis driven by dysregulated Endoplasmic Reticulum-Mitochondria Associated Membrane **(**ER-MAM) calcium signalling. Sigma-1 Receptor (SIGMAR1), an ER-MAM chaperone regulating inositol 1,4,5-trisphosphate receptor (IP3R)-mediated calcium flux, represents a highly neuroprotective target. This study computationally screened FDA-approved SIGMAR1 agonists to identify the best repurposing candidates. From 8,440 SIGMAR1-binding compounds in ChEMBL (CHEMBL287), filtering by agonist mechanism, FDA Phase 4 approval, and molecular properties yielded five candidates: raloxifene, donepezil, dextromethorphan, fluvoxamine, and pentazocine (reference). The selected candidates were evaluated using AutoDock Vina, followed by PLIP analysis and ADMET assessment via SwissADME and ADMETlab 3.0. Raloxifene exhibited highest binding affinity (−10.630 kcal/mol), donepezil (−10.500 kcal/mol), dextromethorphan (−10.100 kcal/mol), pentazocine (−8.823 kcal/mol), and fluvoxamine (−7.291 kcal/mol). Despite superior thermodynamic affinity, raloxifene showed critical ADMET liabilities, restricted BBB penetration and hERG cardiotoxicity risk precluding its immediate clinical use. Conversely, donepezil demonstrated favourable ADMET compliance and stable electrostatic anchoring within SIGMAR1 binding pocket, suggesting translational potential as a repurposing candidate. This study identifies donepezil as the superior repurposing candidate for SIGMAR1-mediated neuroprotection, owing to its established clinical safety, availability, and favourable pharmacokinetics profile. Future experimental validation will incorporate *in vitro* binding assays and *in vivo* efficacy studies in AD models to confirm donepezil's neuroprotective potential via ER-MAM calcium regulation.

MTDDI-115

Biochemical Effects of Curcumin on N-nitrosodiethylamine-Induced Toxicity in Harwich Strain *Drosophila melanogaster*

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N-nitrosodiethylamine (NDEA) induces oxidative and cellular damage primarily through the generation of free radicals. Curcumin is a natural compound with well-established antioxidant properties. This study aimed to evaluate the biochemical protective effects of curcumin against NDEA-induced toxicity in Harwich strain *Drosophila melanogaster*. Flies were divided into five groups (n = 50 per group) and administered the following diets: Group 1 – distilled water (control), Group 2 – DMSO (3 µL/g diet), Group 3 – curcumin (0.5 mg/g diet), Group 4 – NDEA (0.01 mg/g diet), and Group 5 – NDEA (0.01 mg/g) plus curcumin (0.5 mg/g). After six days of exposure, physical activity, biochemical markers, and gene expression levels were assessed. NDEA treatment resulted in a significant decrease ($p < 0.05$) in negative geotaxis response, lifespan, antioxidant enzyme activity, and SOD-1 gene expression. Conversely, there was a significant increase in lipid peroxidation, cholesterol, and triglyceride levels. These alterations were significantly ameliorated ($p < 0.05$) in the group co-treated with curcumin. These findings demonstrate that curcumin possesses antioxidant, anti-hyperlipidaemic, and antigenotoxic properties in *Drosophila melanogaster* exposed to NDEA.

MTDDI-116

Protective Role of *andrographis paniculata* Aqueous Extract against Lipid Peroxidation and Altered HDL/LDL Levels in Type 2 Diabetic Albino Rats

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Diabetes mellitus is a global metabolic disorder characterised by chronic hyperglycaemia, often accompanied by dyslipidaemia that increases the risk of cardiovascular complications. This study investigated the effect of *andrographis paniculata* aqueous leaf extract on serum high-density lipoprotein cholesterol (HDL-C), lipid peroxidation and low-density lipoprotein cholesterol (LDL-C) levels in streptozotocin-induced Type 2 diabetic albino rats. Toxicological assessment revealed no acute toxicity even at 5000 mg/kg, suggesting safety at therapeutic doses. Forty eight male Wistar rats were grouped into diabetic control, normal control, metformin-treated, and extract-treated subgroups at varying doses. Toxicological assessment revealed no acute toxicity even at 5000 mg/kg, suggesting safety at therapeutic doses. Type 2 diabetes was induced by priming the albino rats with fructose diet for seven days (10% w/v) followed by standard dose STZ (60 mg/kg) injection and Rats with blood glucose level of greater than 200 mg/dl was considered diabetic. Administration of the extract for 28 days resulted in significant improvements in fasting blood glucose levels, alongside dose-dependent modulation of lipid profiles, marked by increased HDL-C, reduced LDL-C and reduced lipid peroxidation compared to diabetic controls. Histological analysis of liver organs demonstrated reduced degeneration and inflammatory infiltration in extract-treated groups. These findings suggest that *A. paniculata* aqueous extract exhibits antidiabetic and hypolipidaemic properties, potentially offering a safe, accessible, and alternative therapy in the management of Type 2 diabetes and associated dyslipidaemia. Further studies, including extraction of bioactive compounds, clinical trials, are recommended to validate its safety and efficacy in humans.

MTDDI-117

Zanthoxylum zanthoxyloides Enhances Sexual Behaviour and Hormonal Profile in Rats: Integrating *in vivo* Pharmacology with *in silico* Identification of Dual PDE5 and NOS Inhibitors

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Male sexual dysfunction affects a significant global population, yet effective treatments remain limited. *Zanthoxylum zanthoxyloides* is renowned in ancient literature for aphrodisiac properties but lacks contemporary validation. This study investigated the aphrodisiac potential of *Zanthoxylum zanthoxyloides* aqueous stem extract in male rats, integrating *in vivo* behavioural and hormonal analyses with *in silico* molecular docking. Forty male Wistar rats were divided into five groups (n=8). Control received distilled water; positive control received sildenafil (5 mg/kg); test groups received extract at 100, 200, and 400 mg/kg orally for seven days. Sexual behaviour parameters were assessed on days 5–7. Serum testosterone, FSH, and LH were measured. Molecular docking evaluated binding affinities of rutin, gallic acid, and quercetin toward nitric oxide synthase (NOS) and phosphodiesterase-5 (PDE5), with drug-likeness assessed using Lipinski's rule. Extract-treated rats exhibited significantly improved precopulatory behaviours, increased mount, intromission, and ejaculation frequencies, and reduced mount and intromission latencies compared to controls ($p < 0.05$). Serum testosterone, FSH, and LH were significantly elevated, particularly at 400 mg/kg, suggesting enhanced hypothalamic-pituitary-gonadal axis activity. Molecular docking revealed strong binding affinities of rutin, gallic acid, and quercetin for NOS and PDE5. Gallic acid (-6.467 kcal/mol) and quercetin (-6.221 kcal/mol) showed highest NOS interactions and complied with Lipinski's rule, indicating favourable drug-likeness. This study provides the first integrated evidence supporting *Z. zanthoxyloides* aphrodisiac properties. Enhanced sexual behaviour and hormone profiles, coupled with phytochemical interactions with NOS and PDE5, establish a mechanistic basis for its traditional use and highlight its therapeutic potential for male sexual dysfunction.

MTDDI-119

Curative Antimalarial Effects of Sub-Fractions of *Spilanthes filicaulis* Ethyl-Acetate Extract on *Plasmodium berghei* Infected Mice

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Malaria is a vector borne disease caused by *Plasmodium* species, with *Plasmodium falciparum* being the most virulent and deadly form. Sub-Saharan African countries bear the major brunt of malaria, with children under five years and pregnant women being most vulnerable. Emergence of drug-resistant *Plasmodium* spp. necessitates novel antimalarial; ethnopharmacological approaches leveraging traditional medicine are crucial. This study assessed the antimalarial efficacy of Sub-Fractions (SFA, SFB, & SFC) of *Spilanthes filicaulis* ethyl-acetate extract on *Plasmodium berghei* infected mice. A total of sixty-six intraperitoneally inoculated mice with chloroquine-sensitive *Plasmodium berghei* (NK65) weighing between 17-23g were divided into five groups (n=6). Group 1 (untreated), II (10mg/kg chloroquine), III-V (250, 500, and 750 mg/kg respectively) administered each of SFA, SFB, & SFC. The curative antimalarial activities were evaluated using Rane's test and parameters from body weight (BW), packed cell volume (PCV), rectal temperature (RT), survival time (ST), and level of parasitaemia were assessed. The sub-fractions exhibited significant highest dose-dependent curative activities in the order SFC > SFB > SFA with parasitaemia chemosuppression of 64.48%, 51.89% and 49.79 % respectively. There was significant ($p < 0.05$) chemosuppression and improved ST at all treated doses relative to the untreated. Also, quality BW, RT, and PCV reduction was observed in SFC compared to the fairly reduction in activities in SFA. However, the chloroquine treated proffers the best activities. Findings revealed that SFC has good significant curative antimalarial potential relative to SFA & SFB with moderate antimalarial activity. Thus, making SFC a strong candidate for further exploration.

MTDDI-120

Nephroprotective and Electrolyte-Modulating Effects of *Persea americana* Seed Extract in Streptozotocin-Induced Diabetic Wistar Rats

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Diabetes mellitus is a metabolic disorder recognised by obstinate hyperglycaemia and is often related with difficulties such as electrolyte imbalance and renal dysfunction, simulated by elevated serum creatinine and urea levels. This study investigated the effect of aqueous seed extract of *Persea americana* (avocado) on electrolyte balance and renal function in streptozotocin-induced diabetic Wistar rats. Thirty male Wistar rats were arbitrarily assigned into six groups of five rats each: normal control, diabetic untreated control, diabetic rats treated with metformin, and diabetic rats treated with aqueous *Persea americana* seed extract at doses of 100, 200, and 400 mg/kg body weight for 28 days. Diabetes was induced by a single intraperitoneal injection of streptozotocin (65 mg/kg). At the end of the treatment period, serum electrolytes (sodium, potassium, chloride, bicarbonate, and calcium), creatinine, and urea levels were determined using standard biochemical methods. Diabetic untreated rats showed significant disturbances in electrolyte levels and a significant increase ($p < 0.05$) in serum creatinine and urea compared with the normal control, indicating renal impairment. Treatment with *Persea americana* aqueous seed extract produced dose-dependent improvements in electrolyte balance and significantly reduced serum creatinine and urea levels. The highest dose (400 mg/kg) showed the most pronounced effect, with values approaching those of the normal and metformin-treated groups. These findings suggest that *Persea americana* aqueous seed extract may help restore electrolyte balance and exert nephroprotective effects in diabetic conditions, possibly due to its bioactive compounds with antioxidant properties. This supports the ethnomedicinal use of *Persea americana* seed in the management of diabetes and its associated renal complications.

MTDDI-121

Molecular Docking Analysis of Rutin's 5-α Reductase Inhibitory Potential from *Syzygium aromaticum* Bud Extracts in BPH Management

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A common age-related condition called benign prostatic hyperplasia (BPH) is caused by the buildup of dihydrotestosterone (DHT) through the action of the enzyme 5-α reductase. Even if there are synthetic inhibitors, finding natural substitutes with fewer adverse effects is still a top clinical priority. In order to treat BPH, this work examined the inhibitory ability of rutin, a main phytochemical found in *Syzygium aromaticum* (clove) flower buds, against 5-α reductase using molecular docking and *in vivo* models. Ethyl acetate and ethanol components were separated from clove bud ethanol extracts. Among the several phenols and flavonoids, rutin was found to be the most bioactive molecule by HPLC. Using *in silico* docking (Auto Dock), the binding affinities of rutin and finasteride, a common drug, against 5-α reductase (PDB ID: 3G1R) were investigated. According to molecular docking, rutin forms stable contacts inside the active region of the enzyme and has a strong binding affinity (−9.2 kcal/mol) that is almost equal to finasteride's (−9.8 kcal/mol). Prostate weight, PSA, DHT, and testosterone levels were all successfully returned to normal by *S. aromaticum* extracts, according to *in vivo* data. Additionally, the treatment decreased lipid peroxidation (MDA), improved antioxidant defences (SOD, CAT, and GSH), and restored the structural integrity of the prostate and epididymis. According to these results, rutin from *S. aromaticum* functions as a strong natural 5-α reductase inhibitor, offering a scientific foundation for the creation of safer phytotherapies based on cloves to treat BPH.

MTDDI-122

Comparative Evaluation of DNA-Repair Potentials of *Zingiber officinale* and Glycine Max Extracts on Lead-Induced DNA Damage in Wistar Rats

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A number of evidence indicate that DNA damage can lead to the development of cancer. Cancer is a major deadly disease. Although survival rates from administration of available therapies are improving, several undesirable side effects are observed. This study evaluated the DNA-repair potentials of *Zingiber officinale* and *Glycine max* on lead-induced DNA damage in male Wistar rats. Sixty Wistar rats were grouped into ten (n=6). Group 1, the control; groups 2-7, orally administered daily with lead (dissolved in distilled water at 50mg/ml concentration) for 14 days at a dose of 10mg/kg. At day 15 to 28, *Glycine max* and *Zingiber officinale* were orally administered at varying doses (200 mg/kg and 400 mg/kg). Genomic DNA was extracted and purified from serum of the rats. Groups 8-10 were administered with plant extracts. Three sets of blood were collected from the rats at 14 days interval; before and after lead treatment, and after treating with plant extracts. UV-absorption spectrum and PCR analysis reveal DNA damage status and DNA repair potentials of extracts. Cluster analysis of optical density (OD) and PCR were carried out. Genomic diversity and similarity resulting from lead treatment were investigated using Random Amplified Polymorphic DNA (RAPD) primers. Results revealed occurrence of DNA damage and repair potentials of 400mg/kg and 200mg/kg for *Glycine max* and *Zingiber officinale* respectively, at 60% coefficient of diversity. Cluster analysis revealed similarities and variation between control, lead-treated and plant extract-treated genomic DNA. This study suggests that *Zingiber officinale* and *Glycine Max* Extracts possess DNA repair potential.

MTDDI-123

Blood Pressure-Lowering Effects of *Theobroma cacao* Pod Husk Ethyl Acetate Fraction: An Integrated Experimental and Computational Study

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The high incidence and mortality of hypertension-related diseases are a great threat to public health. However, the hunt for safer and more effective substitutes has been motivated by the inability of synthetic medications to return blood pressure to an acceptable range. This study investigated the antihypertensive effects of ethylacetate fraction of *Theobroma cacao* pod husk (EAF-TCPH) in L-nitro-arginine-methyl-ester (L-NAME)-induced hypertensive male rats. The EAF-TCPH fraction was obtained by partitioning *Theobroma cacao* pod husk (TCPH) methanol extract. An oral dose of 40 mg/kg body weight (bw) L-NAME was used to induce hypertension, and tail plethysmography was used to measure blood pressure. There were six groups of Wistar rats. For six weeks, group 1 was given 1.0 ml of paraffin oil, while groups 2–6 were given 1.0 ml of paraffin oil, 12.5, 25, and 50 mg/kg bw of EAF-TCPH, and 25 mg of captopril, respectively. High-performance liquid chromatography was used to identify the compounds in EAF-TCPH, and they were docked against the angiotensin converting enzyme (ACE). In the group treated with 25 mg/kg bw EAF-TCPH, the hypertensive rats' elevated blood pressure of 180.17 (systolic) and 125.79 (diastolic) mmHg was reduced to 125.33 and 88.00 mmHg, respectively. Cianidanol, theaflavin, procyanidin, epicatechin, and epigallocatechin were the major compounds present in EAF-TCPH. With binding energies of −10.8 and −5.8 kcal/mol, respectively, theaflavin binds to ACE more effectively than the conventional medication captopril. This study suggests that EAF-TCPH's bioactive components, which likely interacted favourably with ACE, may have exhibited antihypertensive effects in L-NAME-induced hypertensive rats.

MTDDI-124

Integrated *in vivo* and *in silico* Assessment of the Nephroprotective Efficacy of *Bryophyllum pinnatum* in Ethylene Glycol–Induced Renal Injury in Male Wistar Rats

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Bryophyllum pinnatum has been shown to have powerful antimicrobial, antioxidant, nephroprotective, anti-stress, anti-inflammatory, anti-diabetic as well as a wide range of other uses. This present study analyses the *in silico* and *in vivo* nephroprotective effect of *Bryophyllum pinnatum* of leaf extracts (BPLE). Pulverised *Bryophyllum pinnatum* of leaf were extracted using ethanol. The *in silico* was carried out by docking Heme Oxygenase-1, with PDB ID: 9FW4 against the phytochemicals of BPLE. Thirty (30) male Wistar rats were divided into 6: Group 1(control) received distilled water, group 2 was administered Ethylene glycol only, group 3 and 4 were administered 200 mg/kg body weight of BPLE and silymarin respectively; group 5 and group 6 were administered Ethylene glycol and treated with 200 mg/kg body weight BPLE and Silymarin. The rats were sacrificed on the 15^{th} day after treatment, blood were collected, and the kidney were excised for further biochemical analysis. The molecular docking score of N, N'-Bis[2-benzothiazolyl] terephthalamide from BPLE was -7.6 kcal/mol while silymarin had the docking score of -8.0 kcal/mol. Significant $p<0.05$ increase was observed in blood urea nitrogen (BUN), creatinine and malondialdehyde (MDA) in group 2 as compared with the control group. Also, the histopathology result shows vascular congestion with oedema group 2. In conclusion BPLE has good prospects of being a nephroprotective drug candidate.

MTDDI-125

Pharmacological Evaluation of the Antidiabetic and Anti-inflammatory Properties of *Bambusa vulgaris* (L.) Leaves in Experimental Wistar Rats

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Although *Bambusa vulgaris* (L.) has been used traditionally to treat diabetes mellitus (a metabolic disorder ailment), little is known about the underlying process. This investigation uses molecular methods and partly computational approaches to evaluate the *in vitro* and *in vivo* anti-diabetic and anti-inflammatory potentials of *B. vulgaris* leaves in streptozotocin (STZ)-induced diabetic rats. The rats' groups were control, diabetic control, metformin (100 mg/kg), and STZ-induced rats treated with *B. vulgaris* (100, 200, and 400 mg/kg). Treatment lasted for 21 days, and the Fasting blood (FBG) was recorded at intervals. Blood and Pancreatic tissue was removed for biochemical and molecular analysis utilising RT-PCR. R. *B. vulgaris* ethanolic extract (BVEE) exhibited good DPPH and ferric-reducing ability and significantly ($p< 0.05$) reduced glucose (FBG) after 21 days. BVEE reduces the activities of serum ALT, AST and ALP relative to diabetic control. BVEE also upregulated the expressions of the TGR5, GLP-1, and Nrf-2 genes while repressing TNF-α and DPP-IV genes compared to the untreated groups. Phyto-extract from *B. vulgaris* up-regulated insulin-sensitive and antioxidant genes but downregulated pro-inflammatory genes. *B. vulgaris* phytocompounds could be a potential drug that modifies the GLP-1/TGR-5 signalling pathway to control blood sugar levels. Keywords: *Bambusa vulgaris*, inflammation, oxidative stress, antioxidant, gene expression.

MTDDI-126

Prospects of Antibody-Drug Conjugates in Cancer Treatment

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Chemotherapy is one of the major therapeutic options for cancer treatment and is often associated with low therapeutic window due to its poor specificity towards tumour cells/tissues. Antibody-drug conjugate (ADC) technology provides a potentially new therapeutic solution for cancer treatment. The antibody-drug conjugate (ADC), a humanised/human monoclonal antibody conjugated with highly cytotoxic small molecules (payloads) through chemical linkers, is a novel therapeutic format and has great potential to make a paradigm shift in cancer chemotherapy. This new antibody-based molecular platform enables selective delivery of a potent cytotoxic payload to target cancer cells, resulting in improved efficacy, reduced systemic toxicity, preferable pharmacokinetics (PK)/pharmacodynamics (PD) and bio-distribution compared to traditional chemotherapy, this is as a result of the specificity of monoclonal antibodies (mAbs) to deliver potent cytotoxic drugs selectively to antigen-expressing tumour cells. Boosted by the successes of FDA-approved Adcetris and Kadcyla, this drug class has been rapidly growing along with about 60 ADCs currently in clinical trials. In this study, we briefly reviewed molecular aspects of each component (the antibody, payload, and linker) of ADCs and then discussed traditional and new technologies of the conjugation and linker chemistries for successful construction of clinically effective ADCs. Current efforts in the conjugation and linker chemistries will provide greater insights into molecular design and strategies for clinically effective ADCs from medicinal chemistry and pharmacology standpoints. The development of site-specific conjugation methodologies for constructing homogeneous ADCs is an especially promising path to improving ADC design, which will open the way for novel cancer therapeutics.

MTDDI-127

Biochemical Characterisation of Alpha-amylase Produced by *Trichoderma harzianum* Species isolated from the Bark of a Decaying Plant

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Alpha-amylase is an important industrial enzyme widely utilised in food processing, pharmaceutical, textile, paper, and biofuel industries because of its ability to hydrolyse starch into simpler sugars. This study investigated the production and biochemical properties of alpha-amylase from *Trichoderma harzianum* isolated from decaying plant bark. The fungal isolate was obtained using standard microbiological methods and screened for alpha-amylase activity on starch agar medium. Enzyme production was carried out through submerged fermentation, after which the crude enzyme extract was recovered and characterised. The effects of pH, temperature, incubation time, substrate concentration, and selected metal ions on enzyme activity were evaluated to determine the catalytic properties and stability of the enzyme. The alpha-amylase obtained *T. harzianum* exhibited maximum activity at pH 6.0 and 50 °C, and also retained considerable activity over a broad range of environmental conditions. The influence of metal ions varied with concentration; enzyme activity was enhanced in the presence of 5 mM KCl, whereas 0.5 mM EDTA significantly inhibited activity, suggesting a possible requirement for metal ions in catalytic function. Kinetic analysis revealed a km value of 0.44 mM and a Vmax of 23.64 µg/ml/min, indicating a strong affinity for the substrate and high catalytic efficiency. This study showed that *T. harzianum* is a promising source of alpha-amylase with desirable biochemical characteristics and its possible potential for industrial applications.

MTDDI-128

Biomarker-Driven Biosensors for Early Cancer Diagnosis: Current Approaches and Future Perspectives

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Cancer continues to be a leading cause of global mortality, with approximately 20 million new cases diagnosed in 2022 alone, of which approximately 1.1 million occurred in Africa, underscoring the urgent need for early detection to improve patient survival outcomes. Conventional diagnostic modalities such as imaging, biopsies, and laboratory tests, while valuable, exhibit limitations including high costs, invasive procedures, side effects, and inadequate sensitivity for detecting cancer at its earliest stages. Consequently, there is a growing demand for diagnostic approaches that are rapid, sensitive, specific, and minimally invasive. Recently, biomarker-driven biosensors have emerged as promising tools for early cancer detection by employing specific bio-recognition elements to selectively detect cancer-associated biomarkers such as proteins, nucleic acids, circulating tumour cells, microRNAs, and volatile organic compounds. These biosensors translate molecular interactions into quantitative signals, enabling highly sensitive and rapid detection of cancer-related molecular changes. This review provides a comprehensive overview of recent advances in biosensor technologies for early cancer diagnosis, with a focus on electrochemical, optical, nanomaterial-based, polymer-based, and field effect transistor biosensors. It highlights innovations in biosensor design, biomarker discovery, signal amplification, and integration with microfluidics and artificial intelligence to enhance diagnostic accuracy and facilitate real-time, point-of-care monitoring. The review also discusses the critical challenges faced in achieving high specificity, clinical validation, and large-scale implementation of these bio-sensing platforms. Finally, it explores future directions emphasising the convergence of nanotechnology, microfluidics, and machine learning to develop next-generation, non-invasive diagnostic systems that could revolutionise cancer detection and personalised treatment management.

MTDDI-129

Murine Norovirus-3 Infection Promotes Atherosclerosis Progression by Boosting the Expression of Pro-inflammatory Markers in Macrophage Derived Foam Cells

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Atherosclerosis, a leading cause of cardiovascular disease, is driven by chronic inflammation and lipid accumulation. Viral infections might exacerbate this condition by influencing immune cell responses. MNV-3 which infects macrophage, provides a model to explore viral contributions to atherosclerosis. This study examines how MNV-3 influences atherosclerosis progression in foam cells. RAW 264.7 cells were treated with oxLDL to induce foam cell formation and subsequently infected with MNV-3 passage 4 (1.2 x 10^6 TCID50/ml) at a multiplicity of infection of 0.5. The presence of infection was confirmed by PCR and TCID50 assays. Cholesterol levels and foam cell formation were assessed using Oil Red O staining and total cholesterol esterification (TCE) assay. Flow cytometry and qRT-PCR were used to analyse CD36, CD88, and CD11b expression at protein and mRNA levels. The secretion of IL-β, TNF-α, TGF-β, and IL-6 were quantified using ELISA. MNV-3 titer in foam cells increased at 24 h post-incubation.MNV-3 significantly increased TCE, CD36, CD88, and CD11b expression, as well as the secretion of TNF-α, IL-6, and IL-1β, while reducing TGF-β secretion in foam cells. The mixed treatment of MNV-3 and oxLDL does not significantly alter CD36, CD88, CD11b expression or proinflammatory cytokine production. This study demonstrates that MNV-3 accelerate atherosclerosis in hyperlipidaemia conditions by elevating TCE levels, surface protein expression, and pro-inflammatory cytokines while suppressing anti-inflammatory cytokine secretion in foam cells. This study suggest that viral infection accelerates atherosclerosis in individuals with preexisting hyperlipidaemia by increasing the foam cell formation markers.

MTDDI-132

Expression of Caspase 8, BAX and C-reactive proteins in Triple Negative Breast cancer (TNBC): A Cross-sectional study with Computational Analysis of Shared Molecular Networks with Cervical cancer

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Triple negative breast cancer is prevalent in third world countries like Nigeria and recent studies show its association with the cervical cancer. A dysregulated caspase 8 and BAX expression can impart on the severity of the disease. The aim of this study was to determine the subtype distribution of breast cancer in South-eastern Nigeria with respect to caspase 8, BAX and C-reactive protein and determine shared molecular networks between TNBC and cervical cancer. Fifty breast cancer women and forty age matched apparently healthy women were recruited for this study. Breast cancer women were recruited from the University of Nigeria Teaching Hospital (UNTH). Informed consent form and questionnaire were distributed to the subjects and blood samples collected were subjected to ELISA for caspase 8, BAX and C-reactive protein determination. Association between cervical cancer TNBC was determined using computational biology tools. The sociodemographic data showed association ($p<0.05$) between child bearing and incidence of breast cancer and TNBC was the most frequently diagnosed subtype in South-eastern Nigeria. There were significant ($p<0.05$) subtype specific variation in caspase 8, BAX and C-reactive proteins among the subtypes and severity. Using computational biology tools, we identified five proteins (CDK1, BIRC5, AURKB and CCNB1 and TOP2A) that are modulated in both pathologies. Caspase 8, BAX and C-reactive protein modulation in TNBC predicts its clinical picture as the subtype with worst prognosis and suggests their prognostic value. CDK1, BIRC5, AURKB and CCNB1 and TOP2A can be potential targets in drug development and hence a basis for further experimental research.

MTDDI-133

Ameliorative Effects of Polyherbal Extracts of *Mangifera indica*, *Persea americana* and *Psidium guajava* of on the Hepato-Renal Toxicity and Oxidative Stress of Doxorubicin-Induced Models

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Doxorubicin–induced toxicity serves as a well-established model for evaluating potential protective interventions. This study evaluated the protective effects of di- and tri-combined plant extracts of *Mangifera indica, Persea americana and Psidium guajava* against Doxorubicin-induced hepato-renal toxicity and oxidative damage of the liver and kidney in wistar rats. 30 rats were randomly distributed into groups of six (five rats each). Group I (control group administered distilled water). Group II (Drug control) received Doxorubicin intraperitoneally (12mg/kg). Group III and IV were treated with 200 and 400 mg/kg of the di-extract (*Mangifera indica and Psidium guajava*) (for 28 days) prior to doxorubicin administration on day 26, 27 and day 28. This process was repeated for group V and VI with the tri-combined leave extract (*Mangifera indica, Persea americana and Psidium guajava*) treatments. Biochemical parameters were determine using standard methods. Doxorubicin administration significantly reduced total protein (Group V: 0.58+0.027mg/Dl and Group VI: 0.6005+0.030mg/dL) and albumin (Group V: 0.470+0.008mg/dL and Group VI: 0.486+0.006mg/dL) compared to drug control group, While elevating total bilirubin, alanine aminotransferase (ALT), urea, and creatinine levels compared to control ($p < 0.05$), indicating hepatic and renal impairment. Oxidative stress was evident by marked depletion of reduced glutathione (GSH) and superoxide dismutase (SOD) in liver, kidney, heart, and spleen tissues. Treatment with the combined extracts (400mg/kg) significantly reversed these alterations with the higher dose of the tri-combined extracts demonstrating superior protective effect compared to the di-herbal. These findings demonstrate that combined plant extracts confer dose-dependent significant hepato-renal protection against Doxorubicin–induced toxicity.

MTDDI-135

GCMS Profiling and *in silico* Antimalarial Studies of the Methanol Stem Bark Extract of *Gnetum buchholzianum* Plant

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Malaria remains a major global health challenge, exacerbated by increasing resistance of *Plasmodium parasite to* conventional therapies. This study investigated the phytochemical composition and antimalarial potential of *Gnetum buchholzianum* stem bark using Gas Chromatography–Mass Spectrometry (GC-MS) profiling and *in silico* molecular docking. The stem bark was extracted with methanol, yielding 7.77% crude extract. GC-MS analysis identified fifteen bioactive compounds, with benzene, 1,3-dimethyl (40.86%), 2,3-heptadien-5-yne, 2,4-dimethyl (13.33%), and cyclohexane derivatives (9.56%) as the major constituents. Pharmacokinetic evaluation revealed high gastrointestinal absorption, no Lipinski's rule violations, and favourable bioavailability scores (0.55), suggesting good drug-like properties. *In silico* molecular docking against *Plasmodium* target enzymes, including dihydropteroate synthase (DHPS), demonstrated significant binding affinities. Compound 6993182 exhibited the strongest interaction (−6.4 kcal/mol), comparable to sulphadoxine (−6.3 kcal/mol), a standard antimalarial reference. Additionally, benzenesulfonamide and 4-piperidinecarboxylic acid showed blood–brain barrier permeability, broadening their therapeutic potential. Molecular dynamics simulations confirmed the stability of protein–ligand complexes under physiological conditions, reinforcing their binding reliability. The findings indicate that *G. bucholzianum* stem bark harbors promising antimalarial agents with favourable pharmacokinetic and pharmacodynamic profiles.

MTDDI-136

Combined Zinc and Vitamin C Supplementation Restores Hippocampal Function Through Modulation of Oxidative Stress, AMPK Signalling, and IGF-1 Expression in Monosodium Glutamate-Exposed Rats

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Monosodium glutamate (MSG)-induced neurotoxicity has been implicated in oxidative stress, neuronal degeneration, and cognitive dysfunction. Zinc and vitamin C are potent antioxidants with established neuroprotective properties, the effects of combined Zinc and Vitamin C (CoZnVitC) on hippocampal dysfunction from MSG exposure remain under-reported. This study unmasked the protective effects of combined zinc and vitamin C supplementation against MSG-induced hippocampal dysfunction. Thirty-five Adult Wistar rats were grouped into five (n=7): control group, MSG exposed group, MSG group treated with zinc, MSG group treated with vitamin C and MSG group treated with CoZnVitC. Spatial working memory was assessed using the Y-maze test. Hippocampal oxidative stress status was evaluated by measuring reduced glutathione (GSH) and malondialdehyde (MDA) levels. Hippocampal AMP-activated protein kinase (AMPK) and insulin-like growth factor-1 (IGF-1) concentrations were determined using standard immunofluorescence techniques. Histopathological examination of hippocampal tissues was by H and E to check neuronal integrity. Data were analysed using one-way analysis of variance followed by appropriate post hoc testing, with statistical significance set at $p < 0.05$. MSG exposure impaired spatial working memory, these behavioural deficits were accompanied by increased lipid peroxidation, depletion of endogenous antioxidant defences, suppression of AMPK and IGF-1 signalling, and marked histopathological alterations within the hippocampus. CoZnVitC significantly improved cognitive performance, restored antioxidant balance, enhanced hippocampal AMPK and IGF-1 concentrations and preserved hippocampal cytoarchitecture. These findings suggest that combined antioxidant therapy may represent a promising strategy for protection against hippocampal injury and cognitive impairment associated with excitotoxicity in MSG exposure.

MTDDI-137

Combined Zinc and Vitamin C Supplementation Attenuates Oxidative Stress and Inflammatory Responses in High Fat Diet-Induced Obesity through Modulation of Nrf2 Signalling

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Obesity has been linked to oxidative stress and Meta-inflammation. High Fat Diet (HFD) contribute significantly to metabolic dysfunction especially meta-inflammation and obesity-associated neurological complications. Zinc and vitamin C possess potent antioxidant and anti-inflammatory properties; however, their synergistic biochemical effects in obesity remain understudied. This study explored the effects of combined zinc and vitamin C supplementation on oxidative stress, inflammatory biomarkers, and nuclear erythroid factor-2 (Nrf2) signalling in HFD-induced obese Wistar rats. Forty-nine adult male Wistar rats were allocated into seven groups (n=7). Serum and brain MDA, GSH, TNF-α, IL-6 and Nrf2 were determined using standard biochemical assays. Data were analysed using one-way ANOVA ($p<0.05$). The Result show increased Lipid peroxidation and inflammatory cytokines as well as suppressed antioxidant defence and Nrf2 activity in HFD-induced obese Wistar rats. Combined zinc and vitamin C significantly reduced MDA, TNF-α and IL-6 and restores antioxidant defence by increasing GSH and Nrf2 activity. These findings showed that combined antioxidant therapy may prevent obesity-associated oxidative tissue injury.

MTDDI-138

Molecular Docking Analysis of *Vernonia amygdalina* Phytocompounds as Oestrogen Receptor Inhibitors for the Treatment of Endometriosis

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Endometriosis is a chronic, oestrogen-dependent inflammatory disorder characterised by the presence of endometrial-like tissue outside the uterus, resulting in chronic pelvic pain, infertility, and reduced quality of life. The oestrogen receptor is a key molecular target in the pathogenesis of the disease, making it attractive for therapeutic intervention Endometriosis influence 70% of women and the pathophysiology is poorly known. This study therefore investigated the bioactive compounds of *Vernonia amygdalina* (bitter leaf) and evaluated their potential as oestrogen receptor inhibitors for the management of endometriosis. *Vernonia amygdalina* leaves were harvested, washed, air-dried, pulverised, and subjected to gas chromatography-mass spectrometry (GC-MS) analysis to identify phytochemical constituents. The canonical SMILES of the identified compounds were used for target protein prediction, while molecular docking was performed to evaluate their binding affinity against the oestrogen receptor. The GC-MS analysis identified 17 phytoconstituents, including Benzeneacetaldehyde, Caryophyllene oxide, n-Hexadecanoic acid, Oleic acid, Phthalic acid, Tetradecanoic acid, and Phenol, 3,5-bis(1,1-dimethylethyl)-. Target prediction suggested interactions with oestrogen receptor alpha (ESR1), peroxisome proliferator-activated receptor gamma (PPARɣ), and transcription factors including TP63, YY1, KLF4, and E2F6. Molecular docking identified six lead compounds with favourable binding affinities ranging from −7.974 to −5.490 kcal/mol, with Phenol, 3,5-bis(1,1-dimethylethyl)-, Caryophyllene oxide, Oleic acid, Phthalic acid, Hexadecanoic acid methyl ester, and Benzaldehyde exhibiting the strongest interactions with the oestrogen receptor. These findings indicate that *Vernonia amygdalina* contains promising phytochemicals with potential oestrogen receptor inhibitory activity, supporting their further investigation as lead compounds for the development of novel therapeutic agents against endometriosis.

MTDDI-139

Computational and Experimental Evaluation of Lumefantrine, Doxycycline, and Pyrimethamine as Potential Larvicidal and Adulticidal Agents against *Anopheles gambiae*

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Malaria remains a major public health challenge, particularly in sub-Saharan Africa, where widespread insecticide resistance in *Anopheles gambiae* threatens the effectiveness of current vector control strategies. Drug repurposing provides a cost-effective approach for identifying alternative mosquitocidal agents with established safety profiles. This study investigated the larvicidal and adulticidal potential of lumefantrine, doxycycline, and pyrimethamine against pyrethroid-resistant *A. gambiae* using integrated computational and experimental approaches. Molecular docking was performed with AutoDock Vina in the PyRx platform to evaluate interactions between the selected drugs and the mutated voltage-gated sodium channel (VGSC; PDB ID: 6LQA), a major target associated with pyrethroid resistance. Field-collected *A. gambiae* larvae were reared according to World Health Organization (WHO) guidelines, and susceptibility tests confirmed pyrethroid resistance in the mosquito populations. Standard WHO larvicidal and adulticidal bioassays were conducted at concentrations ranging from 0 to 10 mg/mL, and median lethal concentrations (LC_{50}) were determined. Docking analysis showed favourable binding of all three compounds to the mutated VGSC, with doxycycline exhibiting the strongest binding affinity (−8.2 kcal/mol), followed by lumefantrine (−6.8 kcal/mol) and pyrimethamine (−6.2 kcal/mol). However, pyrimethamine demonstrated the greatest biological efficacy, producing 95% larval and adult mortality at 10 mg/mL, with LC_{50} values of 4.00 mg/mL and 3.91 mg/mL, respectively. Doxycycline showed moderate activity, while lumefantrine was the least effective. These findings highlight the potential of repurposed drugs, particularly pyrimethamine, as promising complementary agents for malaria vector control and the management of insecticide resistance.

MTDDI-140

Computational Analysis of *Garcinia kola* Phytochemicals Targeting the RNA-Dependent RNA Polymerase in Lassa Virus: MMGBSA, ADME/Tox, and Molecular Dynamics Simulation Studies

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Lassa fever is a severe viral haemorrhagic fever caused by the single-stranded RNA Lassa virus. It is a significant health threat with a rising mortality rate of 5,000–18,000 per year in 100,000- 3 million cases annually, particularly in West Africa. *Garcinia kola* is a traditional plant used to treat fever and viral infections, but information on its mechanisms of action is limited. This study investigates the antiviral activity of *G. kola* phytocompounds against the Lassa virus RNA-Dependent RNA Polymerase (RDRP) using a computational approach. Molecular docking against RDRP (PDB ID: 5J1N), binding free energy, and ADMET profile were calculated using Schrödinger v2023-1. MD simulations of the top-docked complexes were carried out in Desmond for 100 nanoseconds. The RMSD, RMSF, rGyr, MolSA, SASA, PSA, and IntraHB of the ligands were monitored throughout the 100 ns simulation. The molecular docking (kcal/mol) and binding free energies (kcal/mol) of the hit compounds apigenin-4,7-methyl ether (-8.395; -15.98) and Sakuranin (-8.212; -14.87) are greater than those of ribavirin (-7.471; -4.13), a common antiviral drug. The amino acids LEU 43, PHE 104, and CYS 103 play critical role in stabilising these compounds in the active site of the RDRP. ADMET analysis revealed favourable oral absorption and Lipinski compliance. The MD simulations suggest that Apigenin-4,7-methyl ether and Sakuranin *G. kola* are good inhibitors of RDRP, as they bind tightly to the protein throughout the simulation. The study suggests the potential of apigenin-4,7-methyl ether and Sakuranin from *G. Kola* as novel drug for the management of Lassa fever.

MTDDI-141

MicroRNA-Mediated Epigenetic Inheritance in Alzheimer's disease: Mechanisms, Evidences, and Therapeutic Implications

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Alzheimer's disease (AD) is a leading global public health challenge characterised by a complex, multifactorial pathogenesis and a lack of curative treatments. This narrative review synthesises current literature to examine the roles of microRNAs (miRNAs) as central post-transcriptional modulators in AD networks and their participation in epigenetic regulatory mechanisms. By comprehensively evaluating recent experimental animal models, clinical data, and epidemiological studies, we mapped the biological functions of central nervous system's miRNAs and their dysregulation across key AD pathways—including amyloid-β metabolism, tau hyperphosphorylation, neuroinflammation, and mitochondrial dysfunction. The synthesis reveals compelling evidence that environmental stressors, lifestyle choices, and prenatal exposures induce heritable alterations in miRNA expression, establishing a critical link between epigenetic inheritance and neurodegenerative susceptibility. Furthermore, we analyse how life-course determinants like air pollution, pesticide exposure, and sleep disturbances drive AD pathology through these epigenetic lenses, alongside assessing the diagnostic and therapeutic potential of circulating miRNAs, mimics, and antagomiRs. Conclusively, miRNAs act as pivotal bridges integrating genetic susceptibility, life-course environmental factors, and epigenetic mechanisms in AD. They offer immense promise as minimally invasive biomarkers and targeted therapeutic interventions, though addressing current mechanistic knowledge gaps remains vital for successful translational clinical applications.

MTDDI-142

Molecular Detection and Phylogenetic Analysis of *Microsporidia MB* in *Anopheles gambiae* s.l. from Kaduna State, Nigeria

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This study investigated the prevalence and phylogenetic relationship of Microsporidia MB in *Anopheles gambiae* s.l. populations from Zaria, Chikun, and Kachia Local Government Areas of Kaduna State, Nigeria. A total of 3,514 mosquitoes were screened, of which 550 were identified as *Anopheles gambiae* s.l., giving an overall prevalence of 15.65%. Molecular detection targeting the 18S rRNA gene confirmed the presence of Microsporidia MB with an overall prevalence of 6.18%. Zaria recorded the highest prevalence (7.8%), followed by Chikun and Kachia. PCR amplification produced distinct bands of approximately 500 bp, confirming successful detection of the symbiont. Phylogenetic analysis using MEGA 12 revealed that the Nigerian isolates clustered closely together with strong bootstrap support, indicating high genetic similarity and a conserved lineage circulating within mosquito populations across the study areas. The isolates were genetically distinct from other microsporidian taxa, including *Nosema ceranae* and *Encephalitozoon intestinalis*. The natural occurrence of Microsporidia MB in *Anopheles gambiae* populations suggests its possible role as a biological control agent capable of reducing malaria parasite transmission. These findings provide important baseline molecular and ecological data that may support future symbiont-based malaria vector control strategies in Nigeria and sub-Saharan Africa.

MTDDI-143

Comparative *in vitro* Antioxidant Profiling of Melatonin and *in silico* Targeting of the Keap1 Kelch Domain

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Melatonin is a multifunctional indoleamine widely recognised for its cytoprotective potential, operating through both direct antioxidant activity and modulation of cellular defence pathways. In this investigation, its chemical reactivity was benchmarked against specialised reference antioxidants, while computational docking was employed to explore its molecular interactions with the Kelch domain of Keap1—the principal negative regulator of the Nrf2 pathway. Together, these approaches provided a comprehensive understanding of melatonin's defence mechanisms against oxidative stress. The cell-free antioxidant capacity of melatonin was quantitatively assessed across four spectrophotometric assays, using Ascorbic Acid, Trolox, and BHT as reference benchmarks. Melatonin demonstrated clear, concentration-dependent activity in all assays. Radical scavenging yielded IC50 values of 1.662 mg/mL for DPPH, 1.373 mg/mL for ABTS, and 1.277 mg/mL for hydroxyl radicals, requiring higher concentrations than the hyper-pure standards—Ascorbic Acid (IC50=0.0315 mg/mL), Trolox (IC50=0.012 mg/mL), and BHT (IC50=0.0258 mg/mL). Nonetheless, melatonin exhibited a steady and robust multi-radical neutralising capacity. Its reducing efficiency, measured via the FRAP assay, was quantified at 32.0918 mg Ascorbic Acid Equivalents per gram (mg AAE/g). For the *in silico* phase, docking simulations were executed using PyRx (AutoDock Vina), followed by interaction analysis in BIOVIA Discovery Studio. Computational analysis revealed a strong binding affinity of −7.1 kcal/mol for melatonin within the Keap1 active pocket, forming stabilising hydrogen bonds and hydrophobic interactions. This binding energy surpassed that of the standard pathway activator Oltipraz, which yielded −6.6 kcal/mol. These findings confirm that melatonin operates through a multi-pathway defence network involving direct electron transfer, radical neutralisation, and pathway modulation. Its superior computational binding profile to Keap1 highlights a distinct molecular mechanism for disrupting the Keap1-Nrf2 interaction, thereby enhancing endogenous cellular defences. Collectively, this underscores melatonin's therapeutic value in mitigating oxidative pathologies.

TRACK 7 · EIBSD

Environmental and Industrial Biochemistry for Sustainable Development

98 abstracts · EIBSD-01 to EIBSD-110

EIBSD-01

Development of Recombinant Bi-functional Chimeric Enzyme from *Bacillus subtilis* CFB-09 for Enhancing Lignocellulose Biomass Deconstruction

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The increasing demand for sustainable, efficient, and cost effective techniques for the conversion of biomass to valuable products such as biofuel has led to the urgent search for powerful biocatalysts. *Bacillus subtilis* CFB-09, a lignocellulolytic bacterium was identified in our previous study. Cellulase and laccase genes from *B. subtilis* CFB-09 were cloned and expressed in *Escherichia coli* DH5α. Both genes were fused using HiFi DNA assembly technique to develop a bi-functional chimeric enzyme. The cellulase-laccase chimera was evaluated using Nano-Structure Initiator Mass Spectrometry (NIMS) to analyse its cleavage efficiency on NIMs-tagged lignocellulose dimers. Results from the cloning and expression studies revealed that *B. subtilis* CFB-09 laccase and cellulase genes have sizes of 834 bp and 1500 bp, respectively. Both genes were successfully propagated in *E. coli* DH5α cells using p-QE30 as the recombinant vector. Colonies on plate were subjected to polymerase chain reaction (PCR), and agarose gel electrophoresis was done to determine positive clones which revealed band sizes of 834 bp and 1500 bp, respectively. The fused recombinant laccase and cellulase genes had a band size of 2.3 kDa on agarose gel and expressed chimeric enzyme had a molecular weight of 82 kDa on SDS gel. The bi-functional chimeric enzyme successfully cleaved the NIMs-tagged cellobiose and β-β (resinol) substrates to products, with the highest conversion rate of 60% and 90%, respectively, at 60℃ showing its functionality and thermo-tolerance potentials. Findings demonstrate the potentials of the developed chimeric enzymes as a useful tool in biomass deconstruction for enhanced production of biofuel.

EIBSD-02

Role of Biochemists in Tackling Challenges Bedeviling the Nigerian Food System

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Food systems refers to the entire activities you carry out on food, getting it from the farm to your plate. The Nigerian food system is bedeviled with a lot of threats that makes the targeted attainment of Nigeria as a food secured nation a mirage. The challenges range from high food spoilage, widespread malnutrition/hidden hunger, and poor food quality/safety among others. This paper adopts a narrative review approach, drawing on existing literature and practical applications of biochemistry in agriculture, food science, nutrition and environmental management. It exposes how biochemists can help tackle these urgent problems with the view to enhancing smooth running and effective food system in the country. Biochemists as scientists that study life forms at molecular level find themselves in a more challenging position to apply their knowledge in order to help solve these problems. Issues like post- harvest loss minimisation by developing bio-preservatives/spoilage enzyme inhibitors, eradication of malnutrition and hidden hunger by fortifying everyday Nigerian staple foods with the required micro-nutrient, agricultural biotechnology by genetically engineering pest-resistant and drought resistant varieties of food crops. Food safety and quality control by developing more efficient food toxin detection and removal systems, new methods of enhancing fertiliser and soil health efficiency are among the transformations that biochemists can key also into, in helping to solve Nigerian food system concerns. Harnessing the expertise of biochemists in developing innovative solutions across the food value chain is crucial to strengthening Nigeria’s food system and advancing national food security.

EIBSD-03

Catalytic Impact of Polyphenol Oxidase and Its Amelioration in African Cherry (*Chrysophyllum albidum*) Fruit Pulp

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Postharvest enzymatic browning remains a major challenge in the preservation and processing of tropical fruits, leading to quality deterioration, nutrient loss, and reduced market value. This problem is primarily associated with the activity of polyphenol oxidase (PPO), a copper-containing enzyme that catalyses the oxidation of phenolic compounds to quinones, resulting in enzymatic browning. This study focused on the evaluation of catalytic impact of PPO and its amelioration in African cherry *(Chrysophyllum albidum*) fruit pulp. PPO was extracted by homogenisation and centrifugation, yielding a crude enzyme extract with an activity of 826.70 U/mL and protein concentration of 298.71 mg/mL. After 70% ammonium sulfate precipitation and dialysis, activity increased to 1889.14 U/mL with reduced protein concentration (153.75mg/mL) resulting in a 1.84-fold purification and 34% recovery. The enzyme showed optimum activity at pH 6.0 and 40 °C, and remained stable within pH 5.0–7.0. Metal ion assays revealed that K^+, Mg^{2+}, Na^+, and Fe^{2+} enhanced PPO activity at 5–10 mM, while Ba^{2+} and Na^+ at 20 mM caused inhibitory effect. Inhibitor assays showed strong suppression of PPO by SDS, EDTA, and ascorbic acid at 20 mM concentration. Kinetic studies indicated substrate specificity of (Vmax=3333.33U/mg; Km=16.33mg/ml) and (Vmax=1666.67U/mg; Km=28.57mg/ml) for Catechol and Guaiacol respectively, with catechol as preferred substrate due to higher affinity. This study confirms a pronounced activity of PPO in *C. albidum* pulp, with defined biochemical features and potential applications in food processing, postharvest management, and bioremediation.

EIBSD-04

Optimisation and Temperature-Dependent Artificial Chaperone-Assisted Refolding of Guanidine Hydrochloride-Induced Unfolded β-Amylase Using Different Detergent Systems

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Protein unfolding and aggregation remain major limitations in enzyme production and industrial biocatalysis. Artificial chaperone-assisted refolding has emerged as an effective strategy for protein recovery. However, limited information is available on the comparative effectiveness of different detergent systems and the influence of temperature on the recovery of guanidine hydrochloride (GuHCl)-denatured β-amylase. This study investigated the optimisation and temperature-dependent refolding of β-amylase using selected cationic, nonionic, and zwitterionic detergents in combination with α-cyclodextrin (α-CD). Native β-amylase (5 µM) was denatured with 4 M GuHCl for 2 h at 25°C before refolding was initiated through detergent-assisted complex formation followed by detergent removal using α-CD. The effects of CTAB, DTAB, Tween 20, Tween 80, Triton X-100, and CHAPS, together with varying α-CD concentrations (25–100 mM) and refolding temperatures (4, 15, 25, 30, and 37°C), were systematically evaluated. Refolding efficiency was assessed by β-amylase activity recovery, percentage aggregation, intrinsic fluorescence spectroscopy, ANS fluorescence, and light scattering analyses. Comparative evaluation demonstrated significant differences among the detergent systems, with cationic detergents producing superior refolding yields and lower aggregation than nonionic and zwitterionic detergents under optimised conditions. Maximum enzyme recovery, about (94 %) was obtained at 25°C using an optimised artificial chaperone system consisting of CTAB and α-CD, with substantial reduction in surface hydrophobicity. These findings provide valuable insights into detergent-dependent refolding mechanisms and establish optimised artificial chaperone conditions for efficient recovery of GuHCl-denatured β-amylase, with potential applications in enzyme biotechnology and industrial bioprocessing.

EIBSD-06

Hypoglycaemic and Organ-Protective Effects of Methanol Extract of *Bombax costatum* Stem Bark in Alloxan-Induced Diabetic Rats

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The rising burden of diabetes mellitus, particularly in low-resource settings, underscores the urgent need for affordable and effective therapeutic alternatives. Despite widespread ethnomedicinal use of *Bombax costatum* in West Africa, its antidiabetic efficacy and systemic effects remain insufficiently validated. Stem bark was shade-dried, pulverised, and cold-macerated in methanol for 72 hours, then concentrated via rotary evaporation to yield the crude extract (MEBCS), which was subjected to phytochemical screening. Diabetes was induced in male Wistar rats via intraperitoneal alloxan monohydrate (150 mg/kg), confirmed by fasting blood glucose ⩾200 mg/dL at 72 hours. Animals (n = 4/group) received normal control, diabetic control, Metformin, or MEBCS orally once daily; serum glucose, liver enzymes, renal markers, lipid profile, and haematological indices were assessed. Phytochemical analysis revealed the presence of flavonoids, alkaloids, saponins, tannins, phenols, terpenoids, glycosides, and steroids. MEBCS produced a significant reduction in fasting blood glucose from 17.81 ± 0.20 to 4.34 ± 0.06 mmol/L ($p \leqslant 0.05$), demonstrating antihyperglycaemic activity comparable to Metformin. Alanine aminotransferase fell from 167.32 ± 1.45 to 62.25 ± 0.51 U/L and aspartate aminotransferase from 311.20 ± 3.87 to 180.67 ± 3.46 U/L, indicating hepatoprotection, while significant declines in urea and creatinine suggested nephroprotection. Total cholesterol and LDL were also reduced, supporting metabolic benefits, although triglycerides and uric acid rose and warrant further investigation. These findings provide experimental validation for the ethnomedicinal use of *Bombax costatum* as a multi-target therapeutic candidate in diabetes management; further studies should elucidate its mechanisms of action and safety profile.

EIBSD-07

Anti-Cancer Potential of *Zingiber officinale* Rhizomes in a DMBA-Induced Testicular Cancer Model in Male Wistar Rats

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Testicular cancer remains a significant oncological concern, particularly in young and middle-aged men. Despite advances in conventional treatments like surgery and chemotherapy, side effects and recurrence risks necessitate alternative strategies. *Zingiber officinale* (ginger), known for its antioxidant and anti-inflammatory properties, has been explored as a natural therapeutic agent. This study aimed to evaluate the *in vitro* and *in vivo* anti-cancer, antioxidant and anti-inflammatory properties of ethanolic and aqueous extracts of *Zingiber officinale* rhizomes in a DMBA-induced testicular cancer model in male Wistar rats. Testicular cancer was induced using 7,12-dimethylbenz[a]anthracene (DMBA). Thirty-five rats were grouped into seven and treated with graded doses (100–400 mg/kg) of *Z. officinale* extracts and standard drug, flutamide were orally administered. *In vitro* antioxidant activities were assessed via DPPH, FRAP, TAC, and hydroxyl radical scavenging assay, while *in vivo* evaluations; such as tumour marker assays (LDH, AFP), anti-inflammatory markers (COX-2, IL-1β, IL-10), oxidative stress enzymes (SOD, CAT, GPx), haematological parameters, biochemical indices, and histopathological studies were assessed and recorded. The ethanolic extract of *Z. officinale* exhibited superior antioxidant potential, with dose-dependent tumour suppression observed. Biomarker analysis showed significant reductions in LDH and AFP levels. Histopathological examination revealed notable restoration of testicular architecture in treated groups. Additionally, the extract improved antioxidant enzyme levels and reduced inflammatory cytokines compared to the untreated testicular cancer group. *Zingiber officinale* demonstrates significant chemopreventive and therapeutic potential against testicular cancer through its antioxidant and anti-inflammatory mechanisms. These findings support its development as a complementary therapy in testicular cancer management, pending further clinical validation.

EIBSD-08

Effects of Chitosan Silver Nanoparticles on Biochemical Parameters and Tissue Integrity in African Catfish (*Clarias gariepinus*)

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This study evaluated the biochemical, haematological, and histopathological effects of chitosan silver nanoparticles (Ch-AgNPs) synthesised from fish scale-derived chitosan on African catfish (*Clarias gariepinus*). Sixty fish were exposed to 1–5% Ch-AgNPs for 96 h alongside a control. Liver enzymes decreased with concentration: ALT (50.23–20.66 U/L vs 51.51 control), AST (151.52–87.61 U/L vs 195.49), and ALP (55.52–25.76 U/L vs 58.64), indicating no hepatocellular damage. Total protein (8.70–18.68 g/dL vs 18.40) and albumin (4.77–7.68 g/dL vs 3.89) remained stable. Renal markers showed elevated urea (140.67–88.70 mg/dL vs 145.77) with stable creatinine (0.64–1.33 vs 0.95), suggesting mild stress without impairment. Haematological indices revealed reduced WBC (6.83–4.17 $\times 10^3$/µL vs 8.89) and increased lymphocytes (59.22–71.49% vs 36.42), while RBC (5.60–6.49 $\times 10^6$/µL vs 4.86) and HGB (11.26–14.82 g/dL vs 11.46) remained within normal ranges. Histopathology showed mild–moderate lesions, including gill necrosis, hepatic cellular changes, and intestinal villi atrophy. Overall, Ch-AgNPs induced sublethal, dose-dependent physiological responses without severe toxicity, indicating relative biocompatibility and environmental safety.

EIBSD-09

Effects of Hydrothermal Pretreatment on Morpho-Chemical Properties and Biosaccharification of *Cordia millenii* and *Funtumia elastica* Sawdust by *Alcaligenes* sp. CFF-02

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Sawdust, a lignocellulosic waste (LCW) generated during wood processing, is composed of biopolymers that can be used for sustainable production of chemicals and bioenergy. However, the structural toughness of LCW ascribed to its tightly bonded constituent biopolymers limits enzyme accessibility during conversion. Hence, the need for an effective pretreatment method. In this study, the effects of hydrothermal pretreatment on morpho-chemical properties and biosaccharification of *Cordia millenii* and *Funtumia elastica* sawdust by *Alcaligenes* sp. CFF-02 was investigated. Hydrothermal pretreatment of sawdust was done by incubating a mixture of sawdust and distilled water (at 1:15) at 121°C for 60 minutes. Untreated and pretreated sawdust were analysed using Scanning Electron Microscopy-Energy Dispersive Spectroscopy (SEM-EDS) to determine their morpho-chemical properties. Saccharification of sawdust was carried out through submerged fermentation by cultivating *Alcaligenes* sp. CFF-02 in a sawdust-based medium for 12 days at 30°C and 180 rpm. Cellulase and xylanase activity and reducing sugar concentration were determined at 48 h intervals during saccharification of sawdust using dinitrosalicylic acid (DNS) method. SEM-EDS analysis revealed that hydrothermal pretreatment significantly disrupted the surface morphology of sawdust, increased the concentration of carbon and decreased the concentration of oxygen in the biomass. Moreover, the yield of reducing sugar from pretreated *Cordia millenii* and *Funtumia elastica* sawdust increased by 27.23% and 48.34% at 96 and 192 h, respectively. This study demonstrates that hydrothermal pretreatment effectively improved enzymatic hydrolysis of sawdust, highlighting its suitability for integration with biochemical processing of sawdust in biorefineries for enhanced manufacture of valuable bioproducts.

EIBSD-10

Assessment of Heavy Metal Concentrations in Soil and Staple Food Crops near Two Lead Mining Sites in Ebonyi State, Nigeria

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Heavy metal contamination of agricultural soils and food crops remains a critical environmental and public health concern, particularly in regions affected by mining activities. In Ebonyi State, Nigeria, ongoing lead mining operations have raised concerns about the possible transfer of heavy metals into commonly consumed crops and the associated health risks to local populations. This study evaluated the levels of selected heavy metals (Cu, Cd, Zn, Ni, As, and Pb) in soils and staple food crops cultivated in the vicinity of the Enyigba and Ameka mining sites, with reference to established safety standards. Soil and crop samples, including cassava, potatoes, yams, fluted pumpkin leaves, and bitter leaves, were collected from farmlands near Enyigba and Ameka lead mining sites in August 2025 following established sampling procedures. Samples were processed, acid-digested, and analysed using Atomic Absorption Spectroscopy (AAS) to determine the concentrations of Cu, Cd, Zn, Ni, As, and Pb. The data were compared with the international safety thresholds established by WHO and FAO. The result revealed that heavy metal concentrations in both soil and crop samples remained within internationally accepted safety thresholds, although some variations were observed between the two study areas. These findings indicate that, at the time of sampling, the levels of investigated metals did not exceed recommended limits for agricultural and food safety. Despite these reassuring results, the potential for long-term accumulation underscores the importance of sustained environmental monitoring to safeguard soil quality and food safety in the regions.

EIBSD-12

Screening, Purification and Characterisation of Microbial-Urease Isolated from Dumpsite and Grey-Water Affected Soil

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Urease is an enzyme that hydrolyses urea into ammonia and carbon dioxide. Microbial urease can be applied in biotechnology, agriculture, medicine, construction, and geotechnical engineering. This study aims to screen, purify and characterise urease producing microorganisms from dumpsite and grey-water affected soil. The soil samples were collected from greywater-affected soil and a dumpsite and were screened primarily on Christensen medium. Secondary screening was carried out via submerged fermentation. The urease where purified using Ammonium sulphate precipitation, Dialysis, and Sephadex G-200 filtration. The enzyme activity was assessed under varying pH and temperatures. Fifteen microbial strains were isolated and their enzymes index were checked out of which four microbes showing promising urease activity were selected for further analysis.*A. fumigatus* was the highest (126 ± 0.02 U/mL), followed by *Proteus mirabilis* (55.84 ± 0.01 U/mL), *A. flavus* (49.80 ± 0.16 U/mL), and *A. niger* (45.92 ± 0.02 U/mL). *A. fumigatus, Proteus mirabilis, and A. niger* showed Vmax and Km values of 714.39 U/mL and 574.07 mM respectively, while *A. flavus* showed Vmax of 7.44 U/mL/min and Km of 88.58 mM. The urease from *A. fumigatus* was further purified, achieving a specific activity of 181.9 U/mg, yield of 28.79 mg/mL, and purification fold of 3.54. Optimal pH of the urease was 7.0 and optimal temperature was 30°C. This microbial urease could be suitable for various biotechnological applications.

EIBSD-13

Water Quality Assessment of Obe River in Edo State, Nigeria

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River water serves as an important source of water to several communities in Edo State, Nigeria. This study was conducted to assess the water quality of Obe River, which is well-used for domestic purposes by inhabitants of surrounding communities. Water samples were collected from three stations in the river and assessed for physicochemical and bacteriological parameters using standard analytical protocols. The results showed that the pH, electrical conductivity, total dissolved solids, salinity, total hardness, calcium and magnesium hardness, sodium, calcium, magnesium, nitrate, carbonate, and bicarbonate were within the limits recommended by the World Health Organization (WHO). Although the temperature and sulphate content of the river was lower than the range recommended by WHO, these low values do not pose any significant threat to the health of consumers. The heavy metal and bacteriological profile of the river water were above the limits recommended by WHO. The water quality index (WQI) ranged from 660.50 - 679.24. This indicates that the water is contaminated by human activities and is unsafe for drinking purpose and domestic use. It is highly recommended that before consuming the water from this river, the water be subjected to filtration and disinfection via chlorination.

EIBSD-14

Optimisation of Itaconic Acid (IA) Production Using Organic Acid Producing Fungi Isolated from Soil

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This research work was aimed to isolate *Aspergillus terreus* producing itaconic acid from soil and optimise the maximum yield conditions. *Aspergillus terreus* was isolated, screened and identified morphologically and molecularly and for itaconic acid production. The itaconic acid produced was confirmed by bromocresol purple and measured by UV spectrophotometer in which the optical density was taken at 385nm. Itaconic acid was optimised initially by one factor at a time (OFAT) and then response surface methodology (RSM) using Central Composite Design (CCD). Incubation time, substrate concentration, pH and temperature were optimised and obtained the maximum yield of 22.601mg/ml itaconic acid at incubation time of 96hrs, substrate concentration 10% of molasses, pH of 4.0 and temperature of 34.5^{o}C with a significant quadratic model of P- value less than 0.05. The response surface plots (3D and contour) presented that the interactions between the parameters were significant to itaconic acid production. Based on this research *Aspergillus terreus* has a good potential influence for microbial production of itaconic acid using molasses as substrate.

EIBSD-15

Production and Characterisation of Glucose Oxidase from *Aspergillus niger* Using Irish Potato Peel as Carbon Source

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Glucose oxidase is an important enzyme because of its wide range of applications in food and beverage industries, healthcare and biotechnology. As the demand for glucose oxidase is on the increase, there is a need for finding sustainable and cost efficient methods for large scale production. This study therefore seeks to produce glucose oxidase from a low cost carbon source; Irish potato peel. Fresh Irish potato peels were washed, dried, ground into fine powder and used as the primary carbon source in a basal fermentation medium. The medium was inoculated with a standardised spore suspension of *A. niger* and incubated under controlled conditions with continuous shaking to ensure proper aeration. Samples were withdrawn at 24 hour intervals, centrifuged to obtain the crude enzyme and assayed for glucose oxidase activity using the o-dianisidine peroxidase method while protein concentration was determined by the lowry method. Enzyme activity and protein concentration increased progressively peaking on Day 5. Optimal catalytic activity was observed at 8% glucose, pH 6 and 30^0C. Kinetic analysis revealed a Km of 0.25 mM and a Vmax of 1.60 µmol/min. The data obtained is in conformity with that of glucose oxidase produced from other carbon sources. The findings demonstrate that irish potato peels can serve as sustainable, cost effective substrates for glucose oxidase production and it is recommended that production be scaled up in bioreactors, followed by further enzyme purification and characterisation.

EIBSD-16

Biosorption of Lead from Aqueous Solution by *Ziziphus mauritiana* seed shells

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Lead contamination remains a major environmental and public health concern, particularly in regions affected by industrialisation and mining. This study evaluates *Ziziphus mauritiana* seed shells, an agricultural residue, as a biosorbent for Pb(II) removal from aqueous solutions. Batch experiments were conducted to assess the effects of concentration, dosage, agitation, pH, temperature, and contact time. Adsorption behaviour was analysed using Langmuir and the Freundlich isotherms, with kinetics and thermodynamics providing further insights. FTIR analysis identified functional groups involved in Pb(II) binding. Maximum biosorption was achieved at a biosorbent dose of 4g/200 mL (2%), an initial metal ion concentration of 10 mg/L, a contact time of 60 min, a temperature of 70 °C, a pH of 7, and an agitation speed of 300 rpm. The Freundlich model had a better fit, with an R^2 of 0.952, compared to the Langmuir model, which had an R^2 of 0.721. The kinetic studies indicated that the biosorption process followed the pseudo-second-order model, as evidenced by the R^2 value of 0.997. The thermodynamic parameters calculated indicated an endothermic, spontaneous, and feasible biosorption process. FT-IR analysis of the biosorbent revealed O-H, C-O, C=O, C=N, and NO2 as the functional groups involved in the biosorption. Results show *Ziziphus mauritiana* seed shells have strong adsorption capacity, with adsorption efficiency influenced by solution chemistry and operating conditions. *Ziziphus mauritiana* seed shells can therefore be used as effective, low-cost, and environmentally friendly biosorbents for the removal of Pb(II) from aqueous solution.

EIBSD-17

Chemodynamics Of Hexavalent Chromium Bioremediation Using Cyanin

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Cyanin (Cyanidin-3,5-O-diglucoside), a naturally occurring flavonoid, was explored for its bioremediation potential of hexavalent chromium, Cr(VI), via reduction to trivalent chromium [Cr(III)]. The effect of process parameters viz: initial cyanin concentration, initial Cr(VI) concentration, pH, contact time and temperature were determined. The kinetics and thermodynamics of the reduction process were also established. A 100% maximum reduction was observed within 5min at pH 2 and a temperature of 40°C. Cr(VI) reduction efficiencies decreased with increase in pH from 2 to 9, and increased with increase in temperature from 20 to 90°C. The reaction followed the pseudo-second order rate kinetics and was feasible, spontaneous and exothermic. This study shows the potency of cyanin as a good reducing agent for the effective reduction of Cr(VI) to Cr(III) even at higher pH, lower temperature and shorter time.

EIBSD-18

Comparative Toxicological Assessment of Formulated Feeds from Various Post Packaged Beans

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The application of biodegradable film for beans packaging prevent insect infestation which can reduce its market value leading to economic loss. This study evaluated the toxicity of bean seeds packaged with zinc oxide nano-composite film (ZCF), polyethene, ZnO-NP (ZNP)-sprinkled, neem-sprinkled and starch films. Feeds were formulated with the packaged bean seeds and proximate analysis was done. Twenty-four rats were randomly distributed into six groups and fed the test feeds for 28 days. Biochemical and haematological parameters were determined, histopathology of the liver, kidney and intestine was also carried out. The carbohydrate, ash, fat and fibre content of the feeds compared favourably to the control. The protein content of the ZCF-packaged beans feed and moisture content of the polyethene-packaged beans feed were significantly ($p<0.05$) higher compared to the control. There was a significant ($p<0.05$) increase in the body weight of rats fed polyethene and ZCF-packaged beans feed compared to the other groups. ALT, AST, ALP activities, creatinine level and lipid profile indices of rats fed the test feeds were significantly lower whereas TP, ALB and globin levels were significantly ($p<0.05$) higher compared to the control group. The urea level of rats fed the ZNP-sprinkled and starch film-packaged beans feed were significantly higher ($p<0.05$) than in other groups. No lesion was found in the sections of the liver, kidney and intestine of the test feed groups except for the ZNP-sprinkled and polyethene-packaged beans fed groups. Therefore, this study suggests that zinc oxide nano-composite film are safe for beans packaging.

EIBSD-19

Isolation and Characterisation of Dehalogenase-Producing Bacteria From Agricultural Contaminated Soil

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Halogenated organic compounds are among the largest group of environmental pollutants which are persistent in nature. The use of microorganisms to remediates these compounds through natural or evolved dehalogenases merits urgent consideration. This research was aimed at isolating and characterising dehalogenase-producing bacteria with the potential to degrade trichloroacetic Acid (TCA). The bacterial was isolated using mineral salt media (MSM). Morphological, Biochemical and molecular identification was performed using standard procedures. Chloride ion detection assay was performed according to the standard procedure. The effect of temperature, pH, substrate concentration, inoculum size, and incubation time on the dehalogenation function of the bacteria was performed. The isolate was identified morphologically, biochemically and molecularly as *Lysinibacillus sphaericus* strain. The sequence of the isolate was deposited at the National Centre for Biotechnology information (NCBI) and was assigned as BUK_BTE_UNA with NCBI accession number OR344904. The degradation was optimal at a substrate concentration of 20 mMTCA, temperature of 30ºC, pH of 7.5, inoculum size of 0.4 mL, at 96 h of incubation with an optimum chloride ion released of 0.77 mM. The degradation efficiency of this bacterium to TCA after 96 h of incubation was found to be 12.80%. The dehalogenase-producing isolate could be a suitable strain in bioremediation of the halogenated organic compounds.

EIBSD-20

Identification and Characterisation of Citric Acid-Producing Fungi from Soil and Melon *(Cucumeropsis mannii)* Rind Samples Collected from Melon Farm in Lafia, Nasarawa State, Nigeria

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The essential and important organic acid used industrially worldwide for microbial fermentation, especially filamentous fungi, is citric acid. In this investigation, soil and melon rind (*Cucumeropsis mannii*) samples from melon farms in Lafia, Nasarawa State, Nigeria were obtained. These were used to isolate, screen, identify, and characterise citric acid-producing fungi. Standard microbiological culture protocols were used for serial dilution followed by plating on Potato Dextrose Agar (PDA). The samples were also cultivated on Czapek-Dox Agar (CZA) enriched with bromocresol green to specifically achieve acidogenic strain isolates. This specialised medium allows for the identification of potent isolates with observable translucent halo zones around the colonies. Green colonies were the most common of the 212 fungi colonies that were obtained. Morphological and microscopic characterisation revealed the presence of several fungi genera, including *Aspergillus niger, Aspergillus flavus, Aspergillus tamarii, Penicillium spp., Fusarium spp.,* and *Rhizopus stolonifer*. Out of the characterised and identified fungus, *Aspergillus niger* showed highest potential for citric acid production. The results highlighted the possibility to use melon rind as an inexpensive substrate for industrial fermentation operations and revealed the abundance of native fungi in soil and agricultural leftovers capable of generating citric acid. This research shows how local microbial sources can be effectively used in industries and biotechnological projects.

EIBSD-21

Comparative Phytochemical Profiling and Chemical Characterisation of Bioactive Constituent of *Citrus limon* Epicarp Oil and Mesocarp Powder

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Underutilised *Citrus limon* waste contains bioactive components with promising health and industrial applications. This study comparatively evaluated the physicochemical, proximate, qualitative and quantitative phytochemical, and mineral constituents of *Citrus limon* waste fractions, epicarp and mesocarp. Both plant parts were processed separately using standard *in vitro* methods. All analyses were conducted in triplicate and results expressed as mean ± standard deviation, with statistical significance set at $p < 0.05$. Based on the comparatively higher lipid content and rich phytochemical profile, the epicarp was selected for ethanolic oil extraction using the Soxhlet method. The results revealed distinct compositional differences where the epicarp had higher crude fat, ash content and significantly greater concentrations of secondary metabolites like alkaloids, flavonoids, and terpenoids. In contrast, the mesocarp showed higher crude fibre, carbohydrates, moisture content and elevated concentrations of macro minerals including calcium, magnesium and potassium. The oil yield was 12.98% with an acidic pH (3.5), specific gravity (1.36) and density (1.108 g/mL). Physicochemical indices including acid, saponification, iodine, ester, peroxide values and free fatty acid content indicated the presence of predominantly stable, moderately unsaturated lipids. Further characterisation using Fourier Transform Infrared Spectroscopy (FTIR) and Gas Chromatography-Mass Spectrometry (GC-MS) confirmed the presence of monoterpenes, carbonyl-rich compounds, and other volatile bioactive compounds like β-pinene, and citral. These findings show that both components are biochemically-rich constituents, with the epicarp as a richer source of lipid-soluble bioactive supporting its potential in nutraceuticals, antimicrobials, and industrial applications and reinforcing the importance of citrus waste valorisation.

EIBSD-22

Effects of Spent Engine Oil on the Physicochemical Properties of Soil and Heavy Metal Accumulation in Maize (*Zea mays*) and Jute mallow (*Corchorius olitorius*)

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Soil contamination by spent engine oil is a major environmental concern due to its adverse effects on soil quality and food safety. This study investigated the impact of spent engine oil on soil physicochemical properties and the accumulation of heavy metals in *Zea mays* (maize) and *Corchorus olitorius* (jute mallow). Soil samples were treated with varying concentrations of spent engine oil (0 ml, 50 ml, 100 ml, and 150 ml), and changes in soil properties, including nutrient content and total hydrocarbon levels, were assessed alongside heavy metal concentrations in plant tissues. The results revealed that spent engine oil contamination significantly altered soil physicochemical properties, characterised by a reduction in available phosphorus and total nitrogen, and a marked increase in total hydrocarbon content with increasing oil concentration. Furthermore, concentrations of heavy metals such as cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), and nickel (Ni) were significantly higher in contaminated soils and were correspondingly accumulated in the roots and shoots of both plant species. Copper exhibited the highest accumulation, while cadmium showed the lowest levels. Although heavy metal concentrations remained within permissible limits, their presence in edible plant parts raises concerns regarding long-term bioaccumulation and potential health risks. The findings demonstrate that spent engine oil contamination degrades soil quality and facilitates heavy metal transfer into crops, highlighting the need for improved waste management practices to protect agricultural productivity and environmental health

EIBSD-23

Seed Protein Hydrolysates from *Cajanus cajan*, *Sphenostylis stenocarpa*, and *Vigna subterranea*: Potentials to Ameliorate Oxidative Stress, Inflammation and Diabetes Mellitus *in vitro*

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Proteins are repositories of therapeutic peptides whose bioactivities remain largely latent until hydrolysed into short-chain peptides. Protein hydrolysates derived from plant proteins have been reported to exhibit diverse biological activities. This study evaluated the *in vitro* radical scavenging, anti-inflammatory and diabetes mellitus-linked enzymes inhibitory potentials of protein hydrolysates from *Cajanus cajan, Sphenostylis stenocarpa*, and *Vigna subterranea*, commonly known as Pigeon pea (PP), African yam bean (AYB), and Bambara groundnut (BGN), respectively. Seeds were sorted, dried, and pulverised. Samples (300 g each) of the seed powders were repeatedly defatted using 600 ml of n-hexane, and protein isolates were obtained from the defatted meals by acid-base precipitation using 0.1 M NaOH and 0.1 M HCl. The lyophilised seed protein isolates were enzymatically hydrolysed using trypsin and pepsin to obtain seed protein pepsin and trypsin hydrolysates of AYB, PP and BGN. The hydrolysates were evaluated for their radical scavenging (DPPH, ABTS, OH*, and NO*), antidiabetic potentials (α-amylase and α-glucosidase inhibition), and anti-inflammatory activities (protein denaturation inhibition and membrane stabilisation) using standard *in vitro* methods. The AYB protein isolates inhibited alpha amylase (IC50 214 µg/ml), proteinase (IC50 195 µg/ml), scavenged DPPH* (IC50 266 µg/ml). PP protein isolate demonstrated additional ABTS* scavenging (112 µg/ml) and membrane stabilising (152 µg/ml) potentials. BG protein isolate significantly inhibited alpha glucosidase (97 µg/ml) and scavenged DPPH* (158 µg/ml). These seed protein isolates' potentials were significantly improved on hydrolysis with pepsin and trypsin. The seed protein hydrolysates exhibited significantly increased bioactivities compared with those of the seed protein isolates. Enzymatic hydrolysis enhanced bioactive properties of the seed proteins. Protein hydrolysates from PP, AYB, and BGN possess significant radical scavenging, antidiabetic, and anti-inflammatory properties. These findings highlight their potential application as functional food ingredients and nutraceuticals for the management of oxidative stress and inflammation-related metabolic diseases and complications.

EIBSD-24

Nutraceutical and Industrial Potentials of Unripe *Musa paradisiaca* Peels Revealed through Preliminary Phytochemical Profiling and *in vitro* Antioxidant Potential Evaluation

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This study investigated the preliminary phytochemical profiling and *in vitro* antioxidant evaluation of hydroethanolic extract of plantain peels, which is regarded as waste and disposed of or consumed by animals. Plant waste materials are rich sources of bioactive compounds with significant health-promoting properties. One of the important health benefits associated with plant-derived waste materials is their antioxidant activity. Plant wastes are also sources of chemicals for various industrial applications. The preparation of unripe plantain peel extracts was done using standardised phytochemical extraction procedures. The resultant extract was labelled as Unripe Hydroethanolic Plantain Peel Extract (URHEPPE). Gas Chromatography Mass Spectrometry (GCMS) and High-Performance Liquid Chromatography (HPLC) analyses of URHEPPE were done using standard procedures to identify phytochemicals and phenolic phytocompounds present. Previously documented standard methods were employed to investigate the antioxidant potentials of the extract. GCMS analysis revealed the occurrence of various phytocompound including β-Sitosterol (known for antioxidant and anti-inflammatory properties), Estragole (known for culinary and cosmetics applications), Precocene (important for insecticide and pesticide applications). Eugenol (known for anaesthetic, antiseptic, and antioxidant properties) and Oleic acid methyl ester (useful in biodiesel, lubricants, cosmetics, and agricultural products applications). Several important phenolic compounds with great antioxidant potentials were also detected through HPLC analysis including; Gallic acid, Quercetin, Ferulic acid, p-coumaric acid and Caffeic acid. Plantain peels constitutes vital phytochemicals worthy of further investigation towards use as nutraceuticals and for industrial applications. The isolation, purification and further processing of the identified phytochemicals will contribute to sustainable healthcare and industrialisation.

EIBSD-25

Effect of Cashew Nut (*Anacardium occidentale*) and Brazil Nut (*Bertholletia excelsa*) Ethanol Extracts on Antioxidant Status and Neuro-Chemical Markers in Reserpine-Induced Depression in Rat Models

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Depression continues to pose a major challenge to global health, sparking the need for innovative and effective treatment options. This study investigates the potential antidepressant properties of cashew (*Anacardium occidentale*) and Brazil nut (*Bertholletia excelsa*) ethanol extracts using a reserpine-induced depression model in albino rats. Phytochemical screening revealed the presence of bioactive compounds such as saponins, steroids, terpenoids, flavonoids, alkaloids, and cardiac glycosides in both extracts. Experimental animals were assigned to five groups: Normal Control (non-depressed), Depression Control (reserpine-induced), Depression + Amitriptyline (10 mg/kg), Depression + Brazil Nut extract (200 mg/kg), and Depression + Cashew Nut extract (200 mg/kg). Reserpine was administered at 0.5 mg/kg in 1% Tween 80 to induce depressive-like behaviours. Antioxidant assays revealed that the Brazil nut ethanol extract exhibited stronger DPPH scavenging activity compared to the cashew ethanol extract, with efficacy increasing at higher concentrations (BN: 43% at 100 µg/mL, 59% at 400 µg/mL; CN: 25% at 100 µg/mL, 45% at 400 µg/mL). Both extracts demonstrated substantial ABTS and nitric oxide scavenging activities, with Brazil nut consistently outperforming cashew nut. Enzymatic inhibition analysis showed notable inhibition of butyrylcholinesterase (BN: 62%, CN: 52%) and increasing acetylcholinesterase inhibition with higher extract concentrations. Behavioural tests highlighted significant antidepressant-like and cognitive benefits in extract-treated groups. Both extracts reduced escape latency in the Morris water maze, improved memory performance in the Y-maze, and lowered immobility in the tail suspension test compared to untreated depressed rats. Additionally, treatment with these extracts enhanced the activity of antioxidant enzymes such as catalase, glutathione S-transferase (GST), and superoxide dismutase (SOD). In summary, cashew and Brazil nut ethanol extracts exhibit potent antioxidant, neuroprotective, and mood-enhancing effects. These findings support their potential as natural therapeutic agents for mitigating depression-related symptoms and cognitive impairment.

EIBSD-26

Nutritional Properties and Phenolic Composition of Functional Cookies Enriched with Plantain (*Musa paradisiaca*) Peel Flour and Amla (*Phyllanthus emblica*)

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Frequent consumption of cookies produced from refined all-purpose flour has been associated with an increased risk of hypertension and hyperlipidaemia due to their low dietary fibre and phenolic content. This study investigated the functional properties and phenolic profile of cookies formulated from plantain (*Musa paradisiaca*) peel flour and enriched with amla (*Phyllanthus emblica*), both recognised for their cardioprotective potential. A total of eleven cookie formulations including a commercial control sample were developed and evaluated. Proximate composition was determined using standard analytical methods, while phenolic compounds were identified and quantified using high performance liquid chromatography. The results revealed that the formulation containing 47.5 percent all-purpose flour, 47.5 percent plantain peel flour and 5 percent amla exhibited significantly higher ash and dietary fibre contents alongside the lowest carbohydrate levels among all samples. Phenolic profiling indicated that key bioactive compounds such as kaempferol, rutin and quercetin were most abundant in this formulation. These compounds are well documented for their antioxidant and antihypertensive properties. Overall, the optimised formulation demonstrated approximately twofold higher total phenolic content compared to the commercial control, highlighting its superior functional quality. The findings suggest that incorporation of plantain peel and amla into cookie formulations presents a promising strategy for developing functional foods with enhanced cardioprotective benefits while promoting the utilisation of underexploited agricultural by products.

EIBSD-27

Phytochemical Determinants, Antioxidant and Cytotoxic Activities of Selected Plant Extracts against PC-3 Prostate Cancer Cells

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Prostate cancer remains a major global health challenge, necessitating the discovery of novel bioactive compounds with therapeutic potential. In this study, methanolic and aqueous extracts of *Prosopis africana, Ocimum gratissimum,* and *Vernonia amygdalina* were evaluated for their phytochemical composition, antioxidant properties, and cytotoxic activity against the human prostate cancer cell line (PC-3). Qualitative and quantitative phytochemical analyses revealed distinct phytochemical profiles among the extracts, with notable variation in flavonoid, alkaloid, terpenoid, saponin, tannin, and cardiac glycoside contents. Antioxidant assessment using DPPH radical scavenging, reducing power, nitric oxide scavenging, and total antioxidant capacity assays demonstrated concentration-dependent activities across all extracts, although the most active extracts varied according to the assay employed. Cytotoxicity evaluation revealed marked differences in anticancer activity. Aqueous extract *Prosopis africana* exhibited the strongest inhibition of PC-3 cell growth (86.5%), while aqueous extract *Ocimum gratissimum* and methanol extract of *Vernonia amygdalina* also demonstrated substantial cytotoxic effects. Consistently, aqueous extract *Prosopis africana*, extract *Ocimum gratissimum*, and methanol extract of *Vernonia amygdalina* produced IC_{50} values below 10 µg/mL, indicating promising anticancer potential. In contrast, methanol extract of *Ocimum gratissimum* and aqueous extract of *Vernonia amygdalina* showed limited cytotoxic activity despite exhibiting strong antioxidant properties. Correlation analyses revealed no significant association between total antioxidant capacity and cytotoxicity ($r = 0.2045$, $P = 0.7414$) or between flavonoid content and cytotoxicity ($r = 0.6965$, $P = 0.1913$). Notably, DPPH radical scavenging activity exhibited a strong inverse correlation with PC-3 cytotoxicity ($r = -0.9728$, $P = 0.0054$), indicating that extracts with greater free-radical scavenging activity were not necessarily the most effective against prostate cancer cells. Collectively, these findings demonstrate that antioxidant capacity alone is insufficient to predict anticancer efficacy and suggest that specific phytochemical constituents or synergistic interactions among bioactive compounds may play more important roles in determining cytotoxic activity. The identified active extracts warrant further investigation as potential sources of novel therapeutic agents for prostate cancer management.

EIBSD-30

Spectroscopic and Molecular Docking Analysis of Silibinin Binding to *Streptococcus mutans* Glucosyltransferases (GtfB)

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Streptococcus mutans glucosyltransferase B (GtfB) is a key virulence enzyme responsible for synthesising extracellular glucans that mediate bacterial adhesion and biofilm formation in dental caries. The non-catalytic but cellular interaction between GtfB and silibinin, a bioflavonoid with a high therapeutic promise, was sought through various spectroscopic approaches and molecular docking studies under simulated physiological conditions to elucidate its inhibitory mechanism against *S. mutans*. Silibinin effectively quenched the intrinsic fluorescence of GtfB with an effective quenching constant (Ksv) of 1.64 x 10^4 L.mol^{-1} at 25^0C. The enzyme has one binding site for silibinin with a binding constant (*K*a) of 2.23 x 10^4 L.mol^{-1}. The values of enthalpy change (ΔH) and entropy change (ΔS) were found to be 14.22 kJ mol^{-1} and 56.68 J.mol^{-1}K^{-1}, at pH 7.4, which indicated that the formation of the GtfB-silibinin complex was an endothermic reaction and entropy-driven process, perturbing the secondary and tertiary structures of GtfB. Molecular docking suggested that silibinin prefentially bind, with high energy of -10.2 kcal/mol, forming conventional hydrogen bonds, π–π stacking and van der Waals contacts with residues within GtfB binding pocket. Molecular dynamics simulation demonstrated the structural stability of the complex, with an average protein RMSD of 2.84 ± 0.30 Å and low residue fluctuations. These findings demonstrate a strong and stable complex formation, suggesting silibinin as a promising natural inhibitor of GtfB and a potential lead compound for the prevention and management of dental caries.

EIBSD-31

In silico Identification of Phytochemicals Derived from *Camellia sinensis* For Multi-target and Selective Inhibition of Isocitrate Lyase and Malate Synthase in *Mycobacterium tuberculosis* H37Rv

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Mycobacterium tuberculosis H37Rv, the reference virulent laboratory strain of the *M. tuberculosis* complex, remains the primary causative agent of tuberculosis (TB). Its remarkable metabolic adaptability facilitates persistence within the host, particularly during latent infection, where the glyoxylate shunt enzymes isocitrate lyase (ICL) and malate synthase (MS) are essential for fatty acid metabolism and bacterial survival. Although several inhibitors of ICL and MS have been reported, their clinical application is limited by adverse effects, and no dual-target inhibitors have been identified. Therefore, the discovery of selective and multi-target inhibitors with improved safety profiles is of considerable therapeutic interest. This study employed an *in silico* approach to identify phytochemicals from *Camellia sinensis* with selective and dual inhibitory potential against ICL and MS. Phytochemicals were evaluated using molecular docking, binding free energy analysis, absorption, distribution, metabolism, excretion, and toxicity (ADMET) prediction, density functional theory (DFT) calculations, and molecular dynamics simulation. Ascorbic acid emerged as a promising dual-target inhibitor of both ICL and MS. For ICL, L-(+)-Arabinose, Ascorbic acid, Inosine 5′-monophosphate, and D-Galactose exhibited strong binding affinities and XP docking scores comparable to, and better than the reference inhibitor, Cis-2,3-epoxysuccinic acid (ΔG = −7.746 kcal/mol). Against MS, (+)-Gallocatechin, Epigallocatechin, Benzyl β-D-glucopyranoside, and Ascorbic acid demonstrated superior XP docking scores relative to the reference inhibitor, Nordihydroguaiaretic acid (ΔG = −6.115 kcal/mol). ADMET and DFT analyses further supported the drug-likeness and chemical reactivity of the identified hit compounds, while molecular dynamics simulations are ongoing to assess complex stability. These findings suggest *Camellia sinensis* phytochemicals, particularly Ascorbic acid, as promising lead candidates for developing novel anti-tubercular agents targeting the glyoxylate shunt. However, further *in vitro* and *in vivo* studies are required to validate their efficacy and therapeutic potential.

EIBSD-32

Comparative Analysis of Date and Aspartame as Sweeteners in Ginger, Turmeric and Cocoa Powder Enriched Breads from Vitamin-A Cassava Flour

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The growing incidence of diabetes mellitus and other oxidative stress-related disorders has increased the demand for functional foods with improved glycaemic and antioxidant properties. This study comparatively evaluated date and aspartame as sweeteners in ginger, turmeric, and cocoa powder-enriched breads produced from vitamin A cassava flour. All bread formulations were prepared using the same proportions, with aspartame or dates replacing sugar and unfermented yoghurt replacing butter. Nine bread formulations, including commercial bread as the control, were evaluated. Glycaemic index (GI), amylose, amylopectin, αamylase, α-glucosidase, lipid peroxidation, phytochemicals, and antioxidant activities were determined using standard methods. The results showed the formulated breads exhibited GI values of 40–60 %, compared with 100 % for commercial bread. Cocoa powder bread sweetened with dates had the lowest GI (40 %), highest amylose (78 %), and lowest amylopectin (22 %), indicating slower starch digestion and glucose release. Date-sweetened breads also showed stronger α-amylase and α-glucosidase inhibitory activities than aspartame-sweetened breads, with ginger bread with dates exhibiting the greatest inhibition (22.59 % and 25.28 %, respectively). Cocoa powder bread with dates contained the highest phenolic (18.29 mg GAE/g) and flavonoid (8.28 mg QUE/g) contents. Antioxidant analyses demonstrated superior free radical scavenging and reducing capacities in the formulated breads, with turmeric bread with dates showing the strongest antioxidant activities across multiple assays. Overall, incorporating dates into turmeric, ginger, and cocoa powder-enriched breads significantly improved their nutritional, antioxidant, and antidiabetic properties, highlighting their potential as functional foods for glycaemic control and protection against oxidative stress-related diseases.

EIBSD-33

Response Surface Methodology Based Optimisation of Xylanase Production from *Bacillus subtilis* CFB-09 Using Cassava Peels as Substrate

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Xylanase is an industrially important enzyme that catalyses the hydrolysis of xylan, the major hemicellulosic component of plant biomass. The high cost of enzyme production has increased interest in the use of inexpensive agricultural residues such as cassava peels as fermentation substrates. Hence, this study investigated the optimisation of xylanase production from *Bacillus subtilis* CFB-09 on cassava peels, and the characterisation of the enzyme. Xylanase production was optimised using the Box-Behnken Response Surface Methodology by evaluating the interactive effects of pH, temperature and substrate concentration. Incubation time for xylanase production was also evaluated. Effects of pH, temperature, selected metal ions and inhibitors on xylanase activity were determined. Results from the optimisation model showed good predictive ability (R^2 = 0.983). Optimum conditions for xylanase production were pH 4.0, 37.5°C and 10% substrate concentration with activity of 1.44 U/ml. Highest yield of xylanase was obtained at 48 h of incubation, with activity of 4.27 U/ml. Xylanase showed optimum activity at pH 5.0 and 40°C with an activity of 4.05 U/ml and 4.03 U/ml, respectively. Activity of xylanase increased significantly in the presence of Mn^{2+}. Findings demonstrate enhanced xylanase production and showed the potential of cassava peels as a sustainable substrate. The catalytic properties of xylanase demonstrate its potential application in lignocellulosic biomass conversion and biorefinery processes.

EIBSD-34

Structure-Informed Process Optimisation of Cassava-Based Bioethanol Production: A Review

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The growing demand for renewable energy has intensified interest in bioethanol as a sustainable alternative to fossil fuels. Cassava (*Manihot esculenta*) is a promising feedstock for bioethanol production due to its high starch content, wide availability, and adaptability to tropical environments. Conventional optimisation studies have largely focused on operational parameters such as temperature, pH, enzyme dosage, substrate concentration, and fermentation conditions to improve ethanol yield. While these approaches have enhanced process performance, they generally assume uniform feedstock characteristics and often overlook the influence of starch structural variability. This review examines the role of cassava starch structure in bioethanol production and highlights its significance in determining hydrolysis efficiency and fermentation performance. Key structural features, including crystallinity, thermal properties, and granule morphology, influence enzyme accessibility, starch digestibility, and sugar release during conversion processes. Analytical techniques such as X-ray diffraction (XRD), differential scanning calorimetry (DSC), and scanning electron microscopy (SEM) provide valuable insights into these structural attributes. The review identifies a critical knowledge gap in the integration of starch structural characteristics into process optimisation frameworks. It proposes a structure-informed approach that links feedstock properties with process behaviour to enable predictive and adaptive optimisation. Such an approach has the potential to improve conversion efficiency, reduce enzyme consumption, and enhance the robustness of cassava-based bioethanol production systems.

EIBSD-35

Nutritional Quality, Serum Biochemistry, and Histoarchitecture of Layer Hens Fed Varied Commercial Feed Brands in Offa, Nigeria

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Quality variations in commercial poultry feeds heavily influence the metabolic efficiency, organ function, and overall productivity of layer hens. This study evaluated the nutritional quality and standardisation of five commercial feed brands (AIF, BPF, and OPF) sourced from Offa, Nigeria, and investigated their subsequent effects on the renal and hepatic biochemical profiles and histoarchitecture of layer hens. Proximate analysis revealed distinct feed characteristics and significant heterogeneity ($p < 0.05$) across all parameters. The AIF diet contained the highest moisture and crude protein content, while OPF demonstrated superior fat and ash contents. The BPF diet was most abundant in crude fibre. These nutritional discrepancies directly induced distinct, brand-specific physiological and structural tissue responses ($p < 0.05$). Renal biomarkers (urea and uric acid) and serum creatinine were significantly elevated in birds fed the fibre-rich BPF and ash-heavy OPF diets. Hepatic biomarkers also fluctuated, with alanine aminotransferase rising significantly in BPF and OPF groups. Histopathological evaluation using Haematoxylin and Eosin (H&E) staining corroborated these metabolic alterations. Birds on the protein-rich AIF diet exhibited normal hepatic architecture but distinct dilation of renal capsular spaces. Conversely, the BPF diet triggered mild vacuolar degeneration and localised reactive changes in the liver, while the OPF diet induced mild architectural distortion in kidney tissues. The study concludes that conventional layer feeds exhibit substantial compositional variance, and recommends rigorous feed standardisation to prevent sub-clinical metabolic stress and ensure predictable production outcomes in poultry management.

EIBSD-36

Cipargamin Induces Temporal Reprogramming of Hepatic Inflammatory and Regulatory Cytokine Networks during Experimental Malaria Recovery

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Malaria-induced hepatic inflammation contributes to disease severity and recovery. Cipargamin, a novel PfATP4 inhibitor, is a fast-acting antimalarial, but its effects on host immune regulation remain poorly defined. This study investigated the temporal effects of cipargamin on hepatic cytokine expression during experimental malaria. Experimental malaria was established in mice assigned to seven groups: normal control, infected untreated control, artesunate (3 mg/kg/day), or cipargamin (1, 3, 6, or 10 mg/kg b.wt./day). Hepatic expression of tumour necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and interleukin-10 (IL-10) was quantified on Days 0, 3, 5, and 7 using PCR-based densitometric analysis. Data were analysed using two-way ANOVA, effect-size estimation, Holm-adjusted post-hoc tests, fold-change heatmaps, longitudinal profiling, and volcano plots. Time significantly influenced TNF-α ($F=6.46$, $p=7.82\times10^{-4}$) and IL-6 ($F=41.88$, $p<0.0001$), whereas treatment effects alone were not significant (all $p>0.05$). Time explained most variation in IL-6 ($\eta^2=0.569$) and TNF-α ($\eta^2=0.256$). TNF-α showed marked suppression during peak infection followed by partial recovery by Day 7. In contrast, IL-6 and IL-10 displayed pronounced recovery-associated induction, with maximum $\log_2$ fold changes of 2.02 and 3.34, respectively. Post-hoc analysis identified significantly higher IL-6 expression in the cipargamin 1 mg/kg b.wt./day group on Day 5 (adjusted $p=2.34\times10^{-4}$), while artesunate significantly increased IL-10 expression (adjusted $p=0.0038$). Cipargamin promoted temporal reprogramming of hepatic cytokine networks during malaria recovery, characterised by attenuation of TNF-α and enhanced IL-6- and IL-10-mediated recovery responses. These findings identify immunomodulation as a potential complementary mechanism underlying cipargamin efficacy and support further investigation of its host-directed therapeutic potential.

EIBSD-37

Assessing the Seasonal Variations of Methane Emission from Municipal Solid Waste Disposal Sites in Kano Metropolis, Nigeria

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Within the framework of environmental and industrial biochemistry for sustainable development, this study evaluated seasonal variations in methane emissions from two municipal solid waste disposal sites (Kuntau and Yankaba) in Kano metropolis. Methane generation in landfills is primarily driven by anaerobic microbial decomposition of degradable organic carbon (DOC), making it a critical biochemical process with significant environmental implications. Using the mass balance approach, methane emissions were estimated for the wet season (August 2024) and dry season (January 2024). The results indicated higher methane emissions during the wet season, with Kuntau recording 6,120.46 Gg/yr and Yankaba 919.71 Gg/yr, compared to 3,766.44 Gg/yr and 656.94 Gg/yr, respectively, during the dry season. The elevated emissions in the wet season may be attributed to increased moisture content, which enhances microbial activity and accelerates anaerobic biodegradation processes. Conversely, the relatively lower methane emissions at Yankaba may be associated with its lower DOC fraction (0.08), reflecting reduced substrate availability for methanogenic bacteria. From an industrial biochemistry and sustainability perspective, uncontrolled methane emissions contribute significantly to greenhouse gas accumulation and pose environmental and public health risks. The study therefore recommends the phased closure and relocation of existing disposal sites away from densely populated areas. Additionally, the Kano State Refuse Management and Sanitation Board should strengthen the implementation of integrated waste management strategies, particularly the 3Rs (Reduce, Reuse, and Recycle), and promote private sector participation in waste-to-energy, methane recovery, and recycling initiatives.

EIBSD-38

Biochemical Profiling and Antimicrobial Activity of Essential and Fixed Oils of *Monodora myristica* (Gaertn). Dunal Seeds

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Medicinal plants continue to serve as an essential healthcare resource for many African populations. Seeds of *Monodora myristica* (Gaertn.) Dunal are traditionally valued for their aromatic and therapeutic properties; however, limited information exists comparing their essential and fixed oils obtained from the same seed batch. This study evaluated the biochemical characteristics and antimicrobial activities of both oil fractions. Essential oil (EOMm) was extracted by hydrodistillation, while fixed oil (FOMm) was obtained through cold maceration. Phytochemical and physicochemical properties were assessed, and chemical profiling was performed using TLC, GC–MS, and FTIR techniques. Antimicrobial activity was determined using standard laboratory procedures. Results showed that the essential oil exhibited higher acid (6.42 mg KOH/g) and iodine values (30.54 g I_2/100 g). Conversely, the fixed oil demonstrated greater saponification (193.42 mg KOH/g) and ester values (170.15 mg KOH/g). FTIR analysis revealed a broad absorption peak at 3307.56 cm^{-1} and a weaker band at 1634.8 cm^{-1}. GC–MS profiling indicated a higher diversity of constituents in the essential oil. Antimicrobial screening showed that the fixed oil inhibited both Gram-positive and Gram-negative bacteria (8.00–11.25 mm), while the essential oil produced strong inhibition against *Streptococcus pneumoniae* (25.04 mm). These findings demonstrate distinct compositional and biological differences between the oils from *Monodora myristica* seeds and support their potential pharmaceutical and nutraceutical applications.

EIBSD-39

Harnessing *Bacteria rhodanese* for Green Cyanide Biodegradation

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Cyanide poisoning, whether intentional or unintentional, is a serious threat to both civilians and military personnel worldwide. Cyanide can be detoxified by the enzyme rhodanese into a less hazardous thiocyanate that is readily eliminated in the urine. This study characterises and evaluates rhodanese produced by bacteria for cyanide detoxification. The identification of the bacterium strain was achieved through 16S rRNA gene sequencing, while the production of extracellular rhodanese was facilitated by employing submerged fermentation techniques. Extracellular enzyme was immobilised on alginate-glutaraldehyde beads, and its potential for cyanide bioremediation as well as its kinetic and thermodynamic properties were examined. The thermal denaturation constant (*Kd*) for free enzyme and immobilised enzyme was 0.0333min^{-1} and 0.0204 min^{-1}, respectively, at temperatures between 30 and 80°C. The free enzyme's thermodynamic characteristics were Gibbs free energy (98.80 kJ.mol^{-1}), entropy (−197.50J.mol^{-1}K^{-1}), and enthalpy (29.06 kJ.mol^{-}1). Furthermore, we obtained enthalpy (40.07 kJ.mol^{-1}), entropy (−165.20J.mol^{-1}K^{-1}), and Gibbs free energy (98.40 kJ.mol^{-1}) for immobilised rhodanese. After five cycles, the enzyme was able to sustain 63% of its activity in terms of operational stability. The free and immobilised rhodanese demonstrated cyanide degradation efficiencies of 33 and 64.34%, respectively, after 180 minutes of incubation. When compared to free enzyme forms, immobilised rhodanese exhibited better cyanide degradation and a notable resistance to heat inactivation, making it extremely important in cyanide biodegradation processes.

EIBSD-40

Protective Effect of Iron against Cadmium-Induced Lesions in Rat Testis via Downregulation of NQO1/Nrf2 and NF-kb

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Cadmium (Cd), a ubiquitous environmental toxicant, can stimulate cytoprotective gene expression at low concentrations but induces oxidative stress and reproductive toxicity at higher exposures. This study evaluated the potential protective role of iron (Fe) against Cd-induced gonadal toxicity in male rats, with emphasis on oxidative stress markers, hormone regulation, and *Nrf2*-mediated gene expression. Twenty adult male albino rats were randomly assigned to four groups: control (Cd- and Fe-free water), Cd-exposed, Fe-exposed, and concomitant Cd+Fe-exposed groups. Animals received oral administration of 0.229 mg/L Cd and/or 1.900 mg/L Fe via drinking water for four weeks. Biochemical assays, hormone profiling, gene expression analyses, and histopathological examinations of serum and testicular tissues were conducted. Cadmium exposure significantly reduced catalase (CAT) activity and altered malondialdehyde (MDA) levels, indicating oxidative stress, while Fe exposure exhibited antioxidant effects. Concomitant Cd+Fe exposure reversed Cd-induced reductions in CAT activity. Plasma levels of luteinising hormone (LH) and follicle-stimulating hormone (FSH) were significantly elevated in Cd and Cd+Fe groups compared with controls, alongside significant modulation of testosterone and oestradiol levels. Cd exposure upregulated *NQO1*, *Nrf2*, and *NF-κB* mRNA expression, while HO-1 was downregulated. Notably, Fe co-exposure reversed Cd-induced alterations in *NQO1*, *Nrf2*, and *NF-κB* expression. Histopathological changes observed in Cd-exposed testes were markedly ameliorated by Fe. In conclusion, iron confers protective effects against Cd-induced lesions in rat testis, potentially via modulation of the *NQO1/Nrf2* and *NF-κB* signalling pathways.

EIBSD-41

Sustainable Cultivation of *Basella alba*: Socio-Economic and Environmental Impacts among Smallholder Farmers in Ekiti State

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This study highlights the socio-economic and environmental benefits of cultivating edible Indian spinach (*Basella alba*) as a sustainable agricultural practice for poverty reduction and livelihood improvement among rural communities in Ekiti State, Nigeria. A total of 100 small holder farming households involved in *B. alba* cultivation were assessed using Environmental Assessment, Sustainability Assessment Model (SAM), Economic Impact Analysis (Multiplier Effect), and Cost-Benefit Analysis. Findings revealed that 50% of respondents saved ₦5,000 or more monthly on vegetable expenses, while 70% expressed willingness to engage in *B. alba* cultivation. Nearly 20 farmers who invested more than ₦20,000 in production reported average monthly earnings of ₦1,160,000. The study demonstrates the contribution of *B. alba* cultivation to household income, food security, and rural economic development. However, a high incidence of fungal infections was observed, resulting in an estimated 48.05% harvest loss, indicating the need for improved crop health management strategies. The findings emphasise the potential of *B. alba* cultivation to support sustainable livelihoods while addressing key production challenges in rural farming communities.

EIBSD-42

Biochemical Characterisation of Thermostable Keratinase Produced from Novel *Klebsiella pneumoniae* 4*4 Via Response Surface Methodology Optimised Conditions

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Microbial keratinases have emerged as sustainable biocatalysts for valorisation of complex keratinous wastes into useful biomolecules of wide industrial significance. In this study, production of keratinase from *Klebsiella pneumoniae* 4*4 was optimised, and biochemical properties of the enzyme were determined. Newly isolated bacteria were investigated for proteolytic and keratinolytic activities. Bacterial isolate with the highest yield of keratinase was identified using 16S rRNA. Keratinase production was optimised using Box–Behnken Design and interactive effects of temperature, pH, and substrate concentration on enzyme yield were evaluated. Biochemical characteristics of keratinase were also determined. Molecular identification of bacterial isolates revealed 99.70% similarity with *Klebsiella pneumoniae*, with the sequence deposited at Genbank (Accession number, PX418106). Maximum keratinase production occurred at 48 h, yielding 18.86 U/mL and 11.43 U/mL using chicken feather and cow hoof substrates, respectively. Statistical optimisation yielded optimum keratinase activities of 28.10 U/mL using chicken feather at 30°C, pH 8.0, and 0.5% substrate concentration, and 45.72 U/mL using cow hoof at 35°C, pH 8.0, and 1.0% substrate concentration. Numerical optimisation of keratinase yielded 28.17 U/mL and 42.76 U/mL for chicken feather and cow hoof substrates, respectively, with desirability of 0.877. *K. pneumoniae* 4*4 keratinase exhibited optimal activity at 60°C and pH 7.0, while maintaining residual activities above 80% at 30-90°C, indicating remarkable thermostability. Keratinase activity was inhibited by metal ions, organic solvents and EDTA at 1 mM. The findings revealed *K. pneumoniae* 4*4 keratinase as a highly thermostable enzyme with potential applications in biotechnology, particularly in sustainable biodegradation of keratinous wastes.

EIBSD-43

Biochemical Characterisation of a Novel Acidophilic and Thermostable *Trichoderma laccase* from Leather Dye-Contaminated Soil for Sustainable Azo Dye Bioremediation

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Industrial effluents arising from oil spillage, agrochemical application, textile processing, and leather tanning have significantly contaminated Nigerian water bodies with recalcitrant organic pollutants, including phenolic compounds and azo dyes, posing serious environmental and public health risks. This study investigated the potential of an indigenous fungal laccase as a sustainable biocatalyst for pollutant oxidation and remediation. A laccase-producing *Trichoderma* sp. H4 was isolated from dye-contaminated soil at the Naraguta leather workshop, Jos, Nigeria, and evaluated for bioremediation potential. Using guaiacol screening, *Trichoderma* sp. H4 exhibited the highest extracellular laccase activity. The enzyme was produced through solid-state fermentation on sawdust and purified by ammonium sulphate precipitation (80% saturation), dialysis, and diethylaminoethyl (DEAE)-cellulose ion-exchange chromatography, resulting in a 2.169-fold purification, 6.696% yield, and specific activity of 314.788 U mg^{-1}. Biochemical characterisation revealed an acidophilic optimum at pH 3.5 and maximum activity at 40 °C, retaining over 46% residual activity after 30 min incubation. Enzyme activity was enhanced by Ca^{2+}, Mg^{2+}, and Cu^{2+} ions. Kinetic analysis using 2,2′-Azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) yielded Km and Vmax values of 4.015 mM and 2.654 mmol min^{-1}, respectively. The laccase demonstrated substrate specificity and mediator-free azo dye decolorisation, achieving 85.4% Congo Red removal after 15 h. These findings highlight the promise of indigenous *Trichoderma* laccase as an eco-friendly and cost-effective biocatalyst for sustainable bioremediation, advancing green chemistry initiatives and the UN Sustainable Development Goals on clean water, responsible production, and climate action. Ongoing molecular characterisation of *Trichoderma* genome/laccase gene will facilitate large-scale industrial applications for remediation of pollutant-contaminated wastewater.

EIBSD-44

Mixture Toxicodynamics on Microalgal Alkaline Phosphatase: Biochemical Insights for Sustainable Development

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Environmental and industrial biochemistry drives sustainable development by elucidating toxicodynamics of agro-industrial pollutants, enabling bioremediation and resource recovery in phosphorus-limited ecosystems. This abstract examines synergistic and antagonistic effects of senary mixtures heavy metals (Cu^{2+}, Zn^{2+}, Pb^{2+}, Cr^{2+}, Cd^{2+}) and 2,4-dichlorophenoxyacetic acid (2,4-D) on hydrolytic alkaline phosphatase (ALP) in fresh water algae such as *Chlorella vulgaris* and *Desmodesmus abundans*, a key microalga for wastewater treatment and biofuel feedstocks. ALP inhibition is quantified using p-nitrophenylphosphate (pNPP) substrate, measuring p-nitrophenol at 410 nm via spectrophotometry. Unary, binary, ternary, quaternary, quinary and senary exposures were tested in each of their dose-responses, with combination index (CI), toxicity units, and AI-assisted predictive modelling analysing mixture interactions. Unary to the senary heavy metals induced dose-dependent ALP suppression via catalytic site binding and oxidative stress while in all the mixtures, 2,4-D modulated the algae metabolic path through their active receptor pathways. Senary mixtures showed additive toxicity (independent actions), synergism (CI < 1), and antagonism (CI > 1) from competitive binding and bioavailability shifts. Artificial intelligence pattern recognition refined predictions of assay. These events disrupt phosphate metabolism, impairing algal nutrient cycling vital for biomass and bioremediation. From the findings, advance mixture toxicology in biochemistry initiates sustainable development through: CRISPR-engineered ALP-tolerant strains, enzyme biocatalysts for phosphate recovery, and AI-enhanced biosensors for real-time ecotoxicity monitoring. This supports circular economies, greener agrochemicals, environmental heath and food security and resilient freshwater systems in terms of stable climatic change which aligned with UN Sustainable Development Goals.

EIBSD-45

Comparison of domestic water samples sources in Ameka and Idembia Communities, Ezza South L.G.A. of Ebonyi State: A Physicochemical and Microbiological Analysis

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The physicochemical and microbiological analysis of domestic water quality from different sources in Ameka and Idembia communities, Ezza South L.G.A. of Ebonyi State were respectively compared against international standards set by the World Health Organization (WHO) and the Food and Drug Administration (FDA) to ascertain safety. Four domestic water sources— borehole, well, river, and rainwater were analysed using Atomic Absorption and UV spectrophotometers for physicochemical parameters (i.e. pH, alkalinity, nitrite, hardness, chloride, dissolved oxygen, dissolved oxygen (DO), biological oxygen demand (BOD), and presence of essential minerals and trace elements). The microbiological analysis was conducted using various agar broths, observed and assessed for parameters such as Faecal Coliform Count, Total Salmonella Count, Algae presence and Morphological Biochemical Identification of organisms in the water in comparison with WHO and FDA standards. Most physicochemical parameters fell within permissible limits, though there were deviations in pH, alkalinity, chloride, hardness, nitrate and BOD levels across the four water sources, with certain outcome potentially attributed to varying degree of environmental or anthropogenic influence. Microbiological indicators like coliforms and *Escherichia coli*, significantly exceeded permissible limits perhaps due to faecal contamination, indicating breaches in groundwater protection, surface runoff and poor storage hygiene. The huge microbial load raises public health concerns, as these communities lack adequate water treatment systems. In hydro-challenging communities of Ebonyi State and particularly Ezza South LGA, this study underscores the urgent need for improved water source protection, treatment, sanitation and public awareness to minimise contamination and safeguard public health.

EIBSD-46

Ameliorative Effects Of Ethylacetate Fraction Of *Senna occidentalis* Root Extract On Haematological Indices and Lipid Profile On Combined Cadmium and Lead Chloride-Induced Toxicity In Wistar Rats

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Lead and cadmium have been categorised among the ten major substances of health concern by World Health Organization. Effectiveness of ethylacetate fraction of *S. occidentalis* root extract was assessed on the lipids and haematological indices of lead-cadmium chloride-induced toxicity in Rats. The crude extract of the root was obtained with methanol through cold maceration after 72 hours. The crude methanol extract obtained was further subjected to solvent partitioning via vacuum liquid chromatography (VLC) using acetone, ethylacetate and 70% methanol. The mixture of cadmium chloride solution (5mg/kg body weight (bw)) and lead chloride solution (10 mg/kg bw) were administered orally to five groups of four Wistar rats each along with normal control group (0.5 ml of normal saline). After 1 hour of cadmium-lead chloride administration, 10 mg/kg bw of $CaNa_2$-Edetate, 10, 20, and 40 mg/kg bw of ethylacetate fraction of *S. occidentalis* root extract (EAF.SOR) were administered to four groups of the experimental animals respectively while 0.5mL/kg bw of normal saline was given to the remaining groups (negative control and normal control groups). On day 15, all the animals were euthanised and blood was collected for analysis. Administration of lead-cadmium chloride solution significantly ($p < 0.05$) increase total cholesterol level (421.06 mg/mL), triglyceride(232.64 mg/mL), low density lipoprotein cholesterol (LDL-c) (134.21 mg/mL), with significant ($p > 0.05$) decrease in the levels of high density lipoprotein cholesterol, Haemoglobin, Packed-cell volume, Red blood cell count, Lymphocytes, Total white blood count, mean corpuscular haemoglobin, Mean corpuscular volume in negative control animals when compared with normal control. Treatment with ethylacetate fraction of *S. occidentalis* root extract revert the lipids and haematological changes. Therefore, the extract from *S. occidentalis* can be explored for further for treatment of lipid and haematological alteration resulted from lead and cadmium-induced toxicity.

EIBSD-47

Thermoactivity of Ligninolytic Polyethylene-Degrading Enzymes Produced by *Pseudomonas aeruginosa*

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Enzymatic degradation represents a promising and sustainable approach for the biotransformation of polyethylene waste through the production of ligninolytic enzymes capable of altering recalcitrant polymer structures. This study investigated the screening, production, and characterisation of laccase, lignin peroxidase and manganese peroxidase which are ligninolytic enzymes produced by *Pseudomonas aeruginosa* treated with polyethylene. The bacterium was identified using biochemical characterisation and 16S rRNA gene sequencing. Ligninolytic enzymes (laccase, lignin peroxidase and manganese peroxidase) were characterised using standard assay methods. The bacterium was cultivated under polyethylene-induced conditions, and the result showed that *Pseudomonas aeruginosa* produced laccase, lignin peroxidase and manganese peroxidase with optimum activities on the second and fourth days. During enzyme characterisation laccase, lignin peroxidase and manganese peroxidase revealed optimum activities at an acidic pH (pH 2, pH 3 and pH 3 respectively). Laccase was observed with optimum activity at 40°C while lignin peroxidase and manganese peroxidase activity was optimum at 60°C. Enzymes produced from *Pseudomonas aeruginosa* was observed to exhibit thermoactive characteristics. This finding demonstrates the potential of thermoactive ligninolytic enzymes from *Pseudomonas aeruginosa* for application in sustainable polyethylene biodegradation.

EIBSD-48

Kinetic and Physicochemical Properties of an Extracellular Thermo-acidophilic β-D-glucosidase from *Fusarium oxysporum* CPOA-2 and its Application in Biomass Saccharification

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The saccharification of cellulosic biomasses requires the activity of rate-limiting enzyme, β-D-glucosidase amongst other hydrolytic enzymes. Here, we describe some biochemical properties of a purified fungal β-glucosidase and its usability in the production of fermentable sugars from agro-waste cassava peel biomass. Microorganisms identified by molecular gene sequence analysis were screened for cellulolytic activity. Optimally produced β-glucosidase was subjected to ammonium sulphate precipitation prior to apparent homogeneity purification on DEAE-Sephadex A-50 anion-exchanger and Sephadex G-100 gel filtration columns. Biochemical properties and inhibition of the purified enzyme were studied. The *Fusarium oxysporum* CPOA-2 β-D-glucosidase (*foxBGL*) was optimally produced at pH 5.5 and 37 °C on the 6^{th} day of submerged fermentation. The homogenously purified β-D-glucosidase has a subunit molecular mass of 86.5 kDa determined by SDS-PAGE and native molecular weight of 136.2 kDa as determined by gel filtration. The purified *foxBGL* was acidic-thermostable, remarkably retaining over 50% of initial activity after 120 min of incubation at 70 °C. Activity of *foxBGL* was stimulated by Na^{+}, K^{+}, Cu^{2+}, Mn^{2+}, Mg^{2+}, Co^{2+} but inhibited by Pb^{2+}, Al^{3+}, EDTA and SDS. This *foxBGL* was very active on pNPG and cellobiose; with moderate or low activity on salicin, maltose, methylcellulose, α-cellulose, carboxymethyl cellulose, Avicel® and trehalose. The *K*m and Vmax were 0.72 mM and 2.17 mM/min, respectively for pNPG and 0.85 mM and 1.25 mM/min for cellobiose. Glucose competitively inhibited *foxBGL* with *K*i value of 7.4 mM. This purified β-D-glucosidase possesses remarkable and desirable properties suitable for application in biomass valorisation and production of fermentable sugars.

EIBSD-49

Mycotoxin Research Needs In Nigeria: An Outcry for Improved Approach and Collaboration

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Mycotoxin contamination of food and feed remains a major public health challenge in Nigeria, where climatic conditions, poor post-harvest handling, and weak regulatory enforcement favour fungal growth and toxin production. Although numerous studies have reported the occurrence of aflatoxins, fumonisins, ochratoxin A and other mycotoxins in Nigerian commodities, research efforts remain fragmented and inadequately translated into policy and control programmes. This study aimed to systematically review published literature on mycotoxin research in Nigeria in order to identify major knowledge gaps, priority research needs, and opportunities for collaboration. A structured online literature search was conducted using scientific databases including PubMed, Scopus, Web of Science, and Google Scholar. Articles, conference proceedings, and technical reports published between 2000 and 2025 were screened using keywords related to mycotoxins, Nigeria, surveillance, exposure, health effects, and mitigation. Selected publications were analysed for geographical coverage, commodities studied, analytical methods, exposure assessment approaches, health impact data, and reported intervention strategies. Data were synthesised qualitatively to identify trends, strengths, and critical research gaps. The review revealed extensive documentation of aflatoxin contamination in foods, with limited but growing data on fumonisins and emerging mycotoxins. Most studies were cross-sectional surveys with restricted geographic scope and inconsistent analytical methodologies, limiting national risk assessment. Biomonitoring and epidemiological studies were scarce. Intervention studies were few and rarely evaluated at scale. Major gaps were identified in coordinated national surveillance, method harmonisation, longitudinal exposure assessment, and policy-oriented research. The review also highlighted limited inter-institutional collaboration and insufficient integration between researchers, regulators, and industry. Mycotoxin research in Nigeria is substantial but fragmented and insufficiently aligned with national control priorities. Establishing collaborative research networks, harmonised surveillance systems, standardised analytical platforms, and integrated health impact studies is essential to generate actionable evidence. Strengthened collaboration among academia, regulatory agencies, industry, and international partners will be critical for effective risk management, policy development, and protection of public health.

EIBSD-50

Comparative Assessment of Environmental Contaminants in Coal Mine Effluent and Nearby Agricultural Soil: A Case Study of Odagbo Mining Site, Kogi State, Nigeria

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This study evaluated the toxicity of coal mining effluent and agricultural soil located 50–70m from the Odagbo coal mining site in Ankpa, Kogi State, to determine potential environmental and health risks. Physicochemical properties of effluent and soil samples were analysed using standard methods, while heavy metals were quantified using atomic absorption spectrometry (AAS) and polycyclic aromatic hydrocarbons (PAHs) were determined using gas chromatography–mass spectrometry (GC–MS). Results showed that both effluent and soil were slightly acidic (pH 6.04 and 5.67, respectively). Soil exhibited higher concentrations of most physicochemical parameters, including alkalinity (143.87 mg/L), chloride (113.00 mg/L), and sulphate (67.26 mg/L), whereas effluent contained higher phosphate levels (6.672 mg/L). Heavy metal analysis revealed greater accumulation in soil, with significantly higher copper (2.067 mg/L) and zinc (3.267 mg/L) concentrations, and mercury levels seven times higher in soil (0.022 mg/L) than effluent. Nickel was slightly higher in effluent (0.018 mg/L). PAH analysis indicated minimal detection in effluent, except for benzo[b]fluoranthene, benzo[k]fluoranthene, and benzo[a]pyrene, whereas several PAHs, including naphthalene, acenaphthylene, and acenaphthene, were present in nearby farmland soil. These findings suggest that observed soil contamination may originate from multiple sources, including agricultural inputs and atmospheric deposition rather than coal mining alone. Information obtained from local inhabitants also indicates that mining activities had previously taken place on the current farmland area many years ago. The study generally highlights significant environmental contamination with potential ecological and public health implications.

EIBSD-51

In2O3 Nanoparticle Co-Doped N,S-RGO: Synthesis, Characterisation, and Visible Light Induced Degradation of Aqueous Methylene Blue

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Textile pollution is becoming a major contaminant and a concern that defies conventional water treatment procedures. Developing a method to remove these organic pollutants from the wastewater environment effectively is necessary. This study aims to synthesise In_2O_3 and enhance its fundamental properties by fabricating with nitrogen and sulfur-reduced graphene oxide (N,S-rGO) heterostructure for visible light removal methylene blue (MB) dye. Nanosised In_2O_3 was synthesised via a hydrothermal system. The prepared samples were subjected to various characterisation methods.XRD evaluation revealed that bare In_2O_3 has a rod-like structure with high crystallinity. FE-SEM and HR-TEM micrographs showed that In_2O_3 formed nanorods, N,S-rGO exhibited a thin-film layered structure, and In_2O_3/N,S-rGO presented a nanorod-layered structure. The nanorods had an average length of 200-500 nm, with particle sizes ranging from 1-4 µm. FT-IR spectra showed absorption peaks corresponding to In-O, O-H, C=N, C-N, and C-S bonds. A strong and broad absorption peak was observed in the UV-VIS DRS evaluation, with a visible absorption edge at 460 nm. Bandgap studies revealed a moderate reduction in bandgap from the bare to the ternary nanocomposite. In2O3-rGO nanoparticle doped with N,S exhibits the highest degradation efficiency of 94.8% after 60 minutes of exposure to visible light. This enhanced efficiency is due to the delocalisation of electrons within the carbon framework of rGO, facilitated by the nitrogen and sulfur co-dopants, leading to increased photoactivity.

EIBSD-52

Molecular investigation of Environmentally Contaminated Polyethylene Terephthalate Microplastics Toxicity in Kidneys of Male Wistar Rats

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Polyethylene terephthalate (PET) microplastics (MPs) are ubiquitous and pervasive environmental contaminants, yet toxicological studies predominantly utilise pristine, spherical particles that poorly represent real-world exposure scenarios. This study evaluated the effects of environmentally-acquired PET MPs on the kidneys of thirty-five (35) male Wistar rats following 90-day oral exposure at 1% and 5% w/w feed concentrations. The PET MPs are characterised by irregular morphology, heterogeneous size distribution (<420 µm to >841 µm), and surface-associated environmental contaminants. Comprehensive molecular analyses of renal injury were assessed through gene expression of kidney injury molecule-1 (KIM-1), neutrophil gelatinase-associated lipocalin (NGAL), osteopontin (OPN), cluster of differentiation 44 (CD44), cystatin C, paraoxonase, and inflammatory mediators (IFN-γ, TNF-α, IL-6, NF-κB), alongside oxidative stress markers. Renal injury was evidenced by upregulation of KIM-1, NGAL, OPN, and CD44 ($p < 0.05$ to $p < 0.0001$), alongside elevated pro-inflammatory cytokines IFN-γ, TNF-α, and IL-6. Oxidative stress was confirmed through the upregulation of Nrf2 and NF-κB pathways. Effects were size- and concentration-dependent, with smaller particles (<420 µm) eliciting the most pronounced responses. These findings demonstrate that environmentally-contaminated PET MPs induce nephron-toxicity through activation of inflammatory and oxidative stress pathways. The study highlights the critical importance of using environmentally-realistic particles in toxicological assessments, as particle characteristics and associated contaminants substantially influence biological outcomes. These results underscore the potential health risks posed by environmental PET MP pollution.

EIBSD-53

Thermal Inactivation Kinetics and Thermodynamic Stability of *Bacillus subtilis* CFB-09 Laccase

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Laccases are industrially vital enzymes whose thermal resilience determines their utility in high-temperature applications. This study evaluates the thermal inactivation kinetics and thermodynamic behaviour of purified *Bacillus subtilis* CFB-09 laccase to assess its industrial suitability. Residual enzyme activity was measured at 50–70°C and analysed using first-order kinetic and Arrhenius models. Key parameters such as inactivation rate constant (k), half-life ($t_{1/2}$), D-value, activation energy (E_a), Z-value, and thermodynamic variables (ΔG, ΔH, ΔS) were systematically determined. Thermal inactivation followed first-order kinetics (R^2 = 0.961 – 0.991), with k increasing from 3.6×10^{-3} to 1.49×10^{-2} min^{-1} as temperatures rose, reducing $t_{1/2}$ from 192.54 to 46.52 min and D-values from 639.61 to 154.54 min. The E_a (22.37 kJ/mol) and Z-value (66.69°C) indicated moderate thermal sensitivity compared to other microbial laccases. Thermodynamic analysis revealed spontaneous inactivation (ΔG = -88 to -96 kJ/mol), driven by endothermic energetics (ΔH = 19.68 kJ/mol) and significant entropy reduction (ΔS = -224.1 J/mol·K), reflecting increased structural order during denaturation. These findings demonstrate the capacity of laccase to retain its activity under moderate thermal stress, this is supported by its high Z-value which denotes its resistance to temperature fluctuations. The correlation of the kinetic and thermodynamic studies provides ample information on possible strategies to enhance laccase stability for applications in bioremediation, biosensing, and lignin processing.

EIBSD-55

Partial Purification and Physicochemical Properties of 3-Mercaptopyruvate Sulphurtransferase from the Liver of *Gallus Gallus domesticus*

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3-Mercaptopyruvate sulfurtransferase (3-MST) is an important enzyme involved in cyanide detoxification and cellular redox processes. However, information on its properties in avian systems remains limited. This study examined the partial purification and characterisation of the enzyme from the liver of broiler chickens (*Gallus Gallus domesticus*) to better understand its biochemical behaviour. The enzyme was extracted from liver homogenates and purified using ammonium sulphate precipitation followed by dialysis. Its activity and protein content were determined using established biochemical methods, while the effects of temperature, pH, metal ions, and selected inhibitors were evaluated together with substrate specificity and kinetic parameters. The enzyme displayed optimal activity at 60°C and pH 8.0, indicating stability under moderately alkaline and elevated temperature conditions. Metal ions produced little inhibitory effect within the tested range. Kinetic analysis showed apparent Km values of 0.867 mM and 0.604 mM for potassium cyanide and mercaptoethanol, with corresponding Vmax values of 4.19 and 2.30 µmol/min, reflecting efficient substrate interaction. The observed properties are consistent with those reported for similar enzymes in other organisms. Overall, these findings provide insight into the role of this enzyme in cyanide metabolism and its relevance in environmental toxicology and avian biochemical systems.

EIBSD-54

Assessment of Chemical Residues in Food Crops Grown on the Jos Plateau and Associated Human Health Risks

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The intensive use of pesticides and herbicides in agricultural production has significantly improved crop yield; however, concerns regarding chemical residue accumulation and potential health risks in food crops continue to increase. This study assessed the levels of heavy metals and pesticide residues in selected food crops cultivated on the Jos Plateau, Nigeria, and evaluated their associated human health risks. Soil and vegetable samples, including cabbage, tomatoes, cucumber, green beans, and Irish potatoes, were collected from Lamingo, Anglo Jos, and Bokkos. Heavy metal analysis was performed using Atomic Absorption Spectrophotometry (AAS), while pesticide residues were analysed using Gas Chromatography–Mass Spectrometry (GC-MS). Health risk assessment was conducted using Estimated Daily Intake (EDI), Hazard Quotient (HQ), and Hazard Index (HI). The results showed that several heavy metals, including Cd, Co, Ni, and Pb, exceeded World Health Organization permissible limits in many samples. Pesticide residues detected included Heptachlor, Chlorpyrifos, Dimethoate, Dichlorvos, Lindane, and Endosulfan, with Anglo Jos cucumber recording the highest Heptachlor abundance (62.8%). Bioaccumulation factors demonstrated significant uptake of Cd, Mn, and Cu by vegetables. Children exhibited consistently higher EDI, HQ, and HI values than adults, indicating greater vulnerability to dietary exposure. Overall hazard index values exceeded the safety threshold, suggesting potential non-carcinogenic health risks associated with long-term consumption of contaminated food crops. These findings highlight the need for continuous monitoring, regulatory enforcement, and safer agricultural practices to protect public health.

EIBSD-56

Sustainable Development for Renewable Energy Solutions and Food Security in the Digital Age

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Addressing climate change and food insecurity requires integrating renewable energy into sustainable agricultural practices. This paper examines the role of solar- powered irrigation systems in enhancing agricultural productivity, leading to increased yields and improved food security. Additionally, the adoption of such systems has been associated with higher household incomes and better nutritional intake. This paper also explores the application of digital technologies, such as the internet of Things (loT) and smart grids, in optimising the efficiency and reliability of renewable energy systems. These innovations facilitate real- time monitoring and management of energy resources, ensuring a stable power supply for agricultural operations and reducing post-harvest losses through enhanced storage solutions. Through a comprehensive analysis of case studies and current research, this paper underscores the transformative potential of integrating renewable energy Technologies into agricultural practices. It advocates collaborative efforts among engineers, policymakers and the agricultural community to address Implamention challenges, including high initial investment costs and the need for capacity building. The findings suggest that such interdisciplinary approaches are crucial for achieving sustainable development goals and ensuring food security in the face of climate change.

EIBSD-57

Immobilised Bromelain in Calcium Alginate Beads for Enhanced Destaining Application

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Bromelain, a proteolytic enzyme derived from *Ananas comosus* (pineapple), exhibits significant potential for industrial applications due to its ability to degrade protein-based substrates. This study evaluated the destaining efficacy of bromelain immobilised in calcium alginate beads, with emphasis on enhancing enzyme stability and cleaning performance. Bromelain was extracted and partially purified using ammonium sulfate precipitation and dialysis, followed by immobilisation via entrapment in calcium alginate beads. Structural characterisation using Scanning Electron Microscopy (SEM), Energy-Dispersive X-ray Spectroscopy (EDS), and Fourier-Transform Infrared (FTIR) spectroscopy confirmed successful immobilisation. SEM analysis showed a reduction in particle size from 32.73 nm (control) to 30.73 nm (enzyme beads), alongside increased bulk density (2.97 g/cm³ vs 2.71 g/cm³) and reduced bead height (2.29 mm vs 2.71 mm), indicating matrix densification. EDS revealed compositional changes, including increased oxygen content (37.20%) and reduced nitrogen content (4.26%), while FTIR spectra showed a shift in O–H stretching from 3300.09 cm^{-1} to 3010.85 cm^{-1}, confirming enzyme–matrix interactions. The immobilised bromelain achieved stain removal efficiency exceeding 70%, with near-complete removal (~85–95%) of protein- and sugar-based stains such as blood and chocolate. Lower efficiencies (<50%) were observed for oil and ink stains due to substrate resistance. The addition of detergent further enhanced cleaning performance through synergistic effects. These findings demonstrate that calcium alginate is an effective immobilisation matrix that improves bromelain stability and functional efficiency, supporting its application in detergent and industrial cleaning formulations.

EIBSD-58

Sub-chronic inhalation of wood smoke PM2.5 induces ocular and pulmonary inflammation via upregulation of TNF-α/IL-6 in a rat model

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Inflammation and oxidative stress triggered by oculo-pulmonary injury caused by wood smoke PM2.5 (WSPM2.5) exposures are still poorly investigated. The purpose of this study was to investigate the cytotoxicity mechanism of PM2.5 exposure in the eyes and lungs of experimental rats. Thirty-two adult male Wistar rats were arbitrarily divided into four (n = 8) groups. The inaugural group (control) was excluded from WS exposure, whereas Groups II (WS10mins), III (WS 20mins) and IV (WS30mins) were exposed to WSPM2.5 (1234.8±1.0 μg/m³) for 10, 20, and 30 minutes/day, respectively, for 30 days. Histological, biochemical, and gene expression analyses were conducted to evaluate oxidative stress, inflammation, and tissue injury using markers such as pro-inflammatory cytokines, Tumour Necrosis Factor-α (TNF-α) and Interleukin-6 (IL-6), and malondialdehyde (MDA). Thirty days of subchronic exposure to wood smoke PM2.5 caused eye and lung toxicity characterised by keratinisation, complete loss of the retinal layers, hyperplasia of alveolar cells, enlargement of air spaces, thrombosis, and inflammation of the alveoli and perivascular space as a result of cellular injury. This was correlated with increased MDA levels and inflammatory cytokines (IL-6 and TNF-α) expression in exposed rats compared with the unexposed group. These findings imply that WSPM2.5 exposure can trigger inflammation and oxidative damage, leading to ocular and pulmonary toxicity in exposed rats.

EIBSD-60

Enhancing tomato (*Solanum lycopersicum* L.) Growth through Synergy of Neem-Zinc Oxide Nanoparticles and Plant Growth-Promoting Bacteria

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Plant growth-promoting bacteria (PGPB) are utilised in improving plant growth in place of conventional fertilisers which have harmful effects on the soil and environment as reported in literature. They have potential as biostimulants, biofertilisers, and biocontrol agents; these potentials could be enhanced when combined with nanoparticles. This research investigated the synergy between zinc oxide nanoparticles (ZnO-NPs) and two plant growth-promoting bacteria species (*Acinetobacter*): IST 4 and IST 5 on tomato plant. A total of 6 treatments: the control, ZnO-NPs alone, PGPB alone, and in combination with ZnO-NPs was evaluated, each of the treatments was in three replicates, resulting in 18 experimental units. The treatments were applied to the SAYO FI tomato variety for 8 weeks. Morphological characters such as plant height, length of stem, girt of stem, and root length were measured and data analysed with one-way ANOVA. One of the most remarkable results in this work was observed in the root length of tomato plants treated with IST 4 + ZnO-NP. Among the treatments, IST 4 + NP seemed to have a significant effect on the length of the stem, plant height, fresh weight, dry weight, and root length. ZnO-NP alone had favourable outcomes and similar results in some cases in some of the yield parameters when compared with IST 4, IST 5, and IST 5 + NP treatments. The findings revealed a probable synergistic effect between PGPB and ZnO-NP in the promotion of growth parameters in tomato plants, with the potential to improve the productivity of tomato plants.

EIBSD-61

Ecological Risk Assessment and Spatial Dynamics of Emerging Heavy Metal Contamination in Urban Auto-Mechanic Clusters of Port Harcourt, Nigeria

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Informal auto-mechanic clusters in Port Harcourt, Nigeria, represent significant unregulated sources of heavy metal pollution, presenting a critical environmental concern. This study assessed concentrations and ecological risks of emerging heavy metals (Co, V, Ni, Sb) and legacy pollutants in cluster soils at Ikokwu, Rumugba, and Choba. A cross-sectional research design utilised stratified random sampling to collect topsoil (0–20 cm) alongside a control site. Samples were analysed via Atomic Absorption Spectrophotometry after aqua regia digestion. Risk metrics included the Contamination Factor (CF), Pollution Load Index (PLI), Geo-accumulation Index (Igeo), and Potential Ecological Risk Index (PERI). Results indicated a clear contamination gradient of Ikokwu > Rumugba > Choba, with metal levels significantly higher than the control, except for geogenic Vanadium. Mean concentrations reached 8.41 mg/kg for Cd and 112.33 mg/kg for Pb at Ikokwu, exceeding WHO permissible guidelines. Mercury showed dramatic enrichment, reaching 43 times control levels. Ecological risk indices confirmed severe degradation; the PLI (4.73–6.50) indicated progressive deterioration across all sites. The Igeo classified Mercury as "heavily to extremely polluted" (Class 4–5), while Quantification of Anthropogenic Concentration confirmed that Hg (>96%), Sb (~89%), and Cd (82–87%) were overwhelmingly technogenic. The PERI revealed a "very high" cumulative risk index, with Ikokwu (1908.88) being the most impacted. Mercury and Cadmium together contributed over 90% of total ecological risk. These findings highlight a severe ecological threat from intense anthropogenic activities and improper waste disposal. Immediate regulatory enforcement and remediation are required to mitigate health impacts within these urban occupational environments.

EIBSD-62

Comparative Analysis of Physicochemical Properties and Heavy Metal Levels of Drinking Water Sources in Gombe Metropolis, Nigeria

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Access to safe drinking water remains a major public health concern in many developing regions, including northern Nigeria. This study carried out a comparative assessment of the physicochemical properties and selected heavy metal concentrations of water consumed within Mallam Inna, Kwadam, and Arawa areas of Gombe Metropolis, Nigeria. Water samples were collected from borehole, well, and tap water sources and analysed using standard analytical procedures. Physicochemical parameters assessed included temperature, pH, electrical conductivity, total dissolved solids, salinity, nitrate, sulfate, phosphate, and chloride, while heavy metals such as iron, manganese, magnesium, copper, zinc, and lead were determined using atomic absorption spectrophotometry. The results revealed variations in water quality across locations and sources. Most parameters were within permissible limits; however, borehole and well water samples showed slightly acidic pH values and elevated concentrations of certain heavy metals, particularly iron, manganese, and lead in some locations. Tap water generally exhibited better compliance with recommended standards compared to groundwater sources. These findings indicate potential health risks associated with untreated groundwater consumption. Regular water quality monitoring, improved treatment practices, public awareness, and infrastructural upgrades are recommended to ensure safe and sustainable drinking water supply in the study areas.

EIBSD-63

Bioprospecting Indigenous Fungi for Agro-Waste-Based Enzyme Production and Fermentation Processes

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The increasing demand for sustainable bioprocesses has driven interest in indigenous fungi as low-cost platforms for enzyme production and bioethanol fermentation using agro-wastes. This study evaluated fungi isolated from diverse ecological niches in Minna, Niger State, Nigeria, for lignocellulolytic enzyme production and fermentation potential. Isolates obtained from refuse dumps, agro-waste dump, decayed plant materials, palm wine, fermented foods, and termite hills were qualitatively screened using Congo red assays on microwave–alkaline pretreated sugarcane bagasse, plantain pseudostem, and corncob biomass. Quantitative submerged fermentation identified isolate FBL as the highest cellulase producer (15.35 ± 0.48 IU/mL) using sugarcane bagasse, while isolate RD5 produced maximum xylanase activity (38.04 ± 0.17 IU/mL) using plantain pseudostem biomass, confirming the efficiency of lignocellulosic substrates over commercial carbon sources. Fermentation screening revealed efficient utilisation of hexose and pentose sugars by selected yeast isolates. Quantitative fermentation studies showed maximum sugar consumption and ethanol production at 96 h. Isolate PP yielded the highest ethanol concentration from glucose, whereas isolate RB6 demonstrated superior ethanol production from xylose. Ethanol tolerance assays indicated that PP and RB6 remained metabolically active at ethanol concentrations up to 12%, highlighting their industrial suitability. Molecular identification confirmed the enzyme-producing fungi as *Aspergillus flavus* (cellulase) and *Aspergillus niger* (xylanase), while fermentative isolates were identified as *Saccharomyces cerevisiae* (glucose fermentation) and *Mucor indicus* (xylose fermentation). Overall, this study demonstrates the strong potential of indigenous fungi for integrated agro-waste valorisation, enzyme production, and bioethanol fermentation within sustainability. Further optimisation of indigenous fungal consortia for large-scale agro-waste bioprocessing is recommended.

EIBSD-64

Assessment of Water Quality within Ahmadu Bello University Zaria Environment

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Access to safe and portable water remains a critical public health challenge in many Nigerian tertiary institutions. This study presents a comprehensive assessment of the physicochemical and microbiological quality of water sources within Ahmadu Bello University, Zaria, to evaluate their suitability for human consumption and identify health risks to the university community. Water samples were collected from various locations across the university environment and analysed for key parameters, including temperature, turbidity, pH, chloride concentration and microbial load. Results revealed temperatures ranging from 19-27°C, an average turbidity of 2.2 NTU, and a near-natural pH of 7.5. Chloride levels were generally low, ranging from 3.5 to 10.9 mg/l, indicating minimal salinity concerns. However, microbiological analysis showed significant contamination, with total coliform counts ranging from 100-149 cfu/500 µl. Three major pathogenic bacteria were isolated and identified: *Klebsiella pneumoniae, Escherichia coli,* and *Staphylococcus aureus*. The presence of these organisms, particularly *E. coli*, points to faecal contamination and raises serious concerns regarding the potential transmission of waterborne disease within the campus. This study highlights that although the physicochemical properties of the water largely comply with WHO standards, the elevated microbial load poses a substantial risk to students and staff. Urgent interventions, including improved water treatment and regular monitoring, are recommended to safeguard public health and ensure the university environment supports safe learning.

EIBSD-65

Synergistic Effects of Methanol Extracts of *Ocimum gratissimum* and *Vernonia amygdalina* on Some Liver Markers and Antioxidant Status of CCl4-Induced Toxicity in Rats

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The present study assessed the synergistic effects of methanolic extracts of *Ocimum gratissimum* and *Vernonia amygdalina* leaves on some liver markers and antioxidant status of CCl4-induced-toxicity in experimental rats. Thirty rats grouped into six of five rats each were used for the study. Group 1 served as normal control while group 2 was induced with CCL4 without treatment (positive control). Groups 3, 4, 5 and 6 were pretreated with 100 mg/kg b.w. of silymarin (standard drug), 400 mg/kg b.w. of *Vernonia amygdalina* leaf extract, 400 mg/kg b.w. of *Ocimum gratissimum* leaf extract and 400 mg/kg b.w. of mixtures of *Vernonia amygdalina* and *Ocimum gratissimum* extracts respectively for 14 days prior to CCL4-induction to cause toxicity. Results: The result revealed that both *Ocimum gratissimum* and *Vernonia amygdalina* extracts were rich in phytochemicals. Pretreatment with *V. amygdalina* and *O. gratissimum* extracts significantly ($p < 0.05$) reduced the activities of liver enzyme markers (ALT and AST) compared to group 2. Pretreatment of the animals with the extracts significantly ($p<0.05$) reduced the malondialdehyde concentrations with a corresponding increase in superoxide dismutase, catalase and glutathione peroxidase activities of groups 4-6 compared to group 2. The present study revealed that both *V. amygdalina* and *O. gratissimum* extracts when used together possess synergistic effect against CCl4-induced toxicity in rats which could be attributed to their rich bioactive components. Isolation and characterisation of the bioactive components responsible for the synergistic activities of the extracts are recommended.

EIBSD-66

Soil Enzyme Activities and Implications for Plant Growth in Mining and Non-Mining Sites of Edo State, Nigeria

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Soil enzymes are critical indicators of soil health, directly influencing nutrient cycling and plant productivity. This study evaluated the impact of mining on soil enzyme activities at six sites in Edo State, Nigeria: Afuze A and Afuze B (non-mining areas), and Okpella A, Okpella B, Ikpeshi A, and Ikpeshi B (mining areas). Soil samples were homogenised, sieved (2 mm), air-dried, and enzyme activities were extracted using toluene-buffer methods and quantified spectrophotometrically. Results revealed that non-mining soils (Afuze) exhibited high enzyme activities, with α-amylase (14.64–12.82mg/ml/min), β-amylase (10.76–9.32mg/ml/min), urease (7.71–9.91mg/ml/min), acid phosphatase (8.87–8.73mg/ml/min), β-glucosidase (8.50–8.80mg/ml/min), and dehydrogenase (7.04–9.37mg/ml/min). In contrast, mining soils showed drastic reductions, with α-amylase (1.61–2.89mg/ml/min), β-amylase (0.01–0.11mg/ml/min), urease (0.01–0.12mg/ml/min), acid phosphatase absent or minimal (0.00–0.01mg/ml/min), β-glucosidase (1.86–3.15mg/ml/min), and dehydrogenase (1.41–2.84mg/ml/min). The decline in enzyme activities in mining soils indicates impaired organic matter decomposition, reduced microbial function, and disrupted nutrient cycling all of which can suggest that Although plant growth was not directly assessed, these biochemical deficiencies suggest that plants cultivated in mining soils would experience poor germination, stunted growth, and reduced biomass due to limited nutrient availability and heavy metal contamination. This study highlights the detrimental impact of mining on soil ecological integrity and its indirect consequences for agricultural productivity, emphasising the need for remediation strategies and sustainable land management in mineral-rich regions.

EIBSD-67

Molecular Identification of Keratinolytic Fungi Isolated from Poultry Farm Soil in Gombe Metropolis

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Microorganisms play a crucial role in shaping the environment and are increasingly recognised as valuable tools for studying biological processes and promoting sustainable practices. The diverse enzymes that fungi naturally make are effective catalysts for a wide range of chemical processes. The increased production of the recalcitrant keratin containing waste from poultry farms and slaughter houses have contributed significantly to the pollution problem around the world. Therefore, this study is aimed at identifying fungi with keratin degrading ability from a poultry farm soil in Gombe metropolis. Soil sample was collected from an intensive poultry farm in Gombe. Fungi were isolated using PDA and their keratinolytic ability were observed using feather meal enriched culture media. The fungus with the best feather degrading ability was further identified using molecular techniques. Macroscopic examination of the fungus isolated showed a yellow-green coloration. Under the microscope, a colourless, rough thick-walled conidiophores were observed. The PCR product of the extracted DNA was sequenced using its Internal transcribed spacer (ITS) region. The morphological features suspected the fungi to be *Aspergillus flavus* and the molecular studies confirmed it with the BLAST results of 99.13% similarity with a biological sequence in the NCBI database (accession KP131556.1). This result confirmed the presences of *Aspergillus flavus* as one of the fungi that can convert keratin containing waste into valuable products and further studies to isolate and characterise enzymes responsible for this keratinolytic activity is ongoing.

EIBSD-68

Phytochemical Profiling of Annato and Pterocarpus Natural Dyes: Potential for Sustainable Textile Application

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The textile industry is a significant contributor to environment pollution, with synthetic dyes being a major concern due to their toxic effects, leading to the use of natural dyes as sustainable and eco-friendly alternatives. Annato (*Bixa orellana*) and (*Pterocarpus spp*) are plant sources of natural dyes with potential therapeutic properties. This study investigated the phytochemical composition of these dyes, exploring their potential for sustainable textile applications and therapeutic benefits. Extraction of dye was carried out using various solvents such as ethanol, dilute alkali and dilute acid, and were tested for various bioactive compounds. Annato acid extract contained flavonoids (21.46mg/g), Saponin (12.93mg/g), and phenols (46.32mg/g). The ethanolic extract contained flavonoids (15.15mg/g), Saponin (180.42mg/g) and phenols (34.85mg/g) while the alkaline extract contained flavonoids (98.91mg/g), Saponin (55.91mg/g) and phenols (27.57mg/g). Pterocarpus acid extract contained flavonoids (40.62mg/g), Saponin (136.91mg/g) and Phenols (174.64mg/g), Pterocarpus ethanolic extract contained flavonoid (35.14mg/g), saponin (133.54mg/g), and phenols (111.74mg/g). While the alkaline extract contained flavonoids (40.62mg/g), saponin (136.91mg/g) and phenols (40.62mg/g). Therefore, both dyes exhibited antimicrobial, and antioxidant properties. The presence of bioactive phytochemicals in annatto and pterocarpus dye suggests their potential as sustainable, eco-friendly alternatives to synthetic dyes, with added therapeutic benefits for textile and medicinal applications. These natural dyes could contribute to sustainable development in the textile industry, leveraging Nigeria's rich plant biodiversity.

EIBSD-69

Using Biochemical and Quantitative Proteomic Analyses to Predict the Mechanisms of Anti-*Alternaria* Activities of Biogenic Silver, Zinc Oxide and Silver/Zinc Oxide Nanoparticles

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The aim of this study is to explore the mechanism of biogenic silver (Ag-NPs), zinc oxide (ZnO-NPs) and silver/zinc oxide (Ag/ZnO-NPs) nanoparticles as anti-*Alternaria* agents using proteomic approaches. *Alternaria alternata* was cultured in potato dextrose broth containing 200 ppm each of the nanoparticles for 10-days. The effect of the nanoparticles on H2O2 content, malondialdehyde (MDA) levels, superoxide dismutase (SOD), and ascorbate peroxidase (APx) of *A. alternata* was measured. Total soluble protein was extracted using trichloroacetic acid/acetone and protein identification was carried out using a Label Free Quantitative (LFQ) liquid chromatography mass spectrometer (LC-MS). Differential protein expression (DPE) analysis was carried out using the DESeq2 package in RStudio. For each nanoparticle treatment, there was a significant increase ($p<0.05$) in H2O2 content, MDA levels and SOD activity in the mycelia of *A. alternata*. Nineteen (19) differentially expressed proteins (6 downregulated and 13 upregulated) were identified from all the treatments with a log fold change (LFC) >=1 at $p<0.05$. Gene enrichment analysis showed that the differential proteins were associated with catalytic, antioxidant, transcription regulatory and ATP-dependent activities. Thus, this study provides insight into the mechanisms of anti-*Alternaria* activities of biogenic Ag-NPs, ZnO-NPs, and Ag/Zn-NPs towards the development of targeted and/or broad-spectrum novel antifungal compounds for treatment of disease causing phytopathogens.

EIBSD-70

Exploratory Molecular Docking Insight of Lauraceae Essential Oils on Antimicrobial Protein Targets

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The *Lauraceae* family is a group of pantropical plants that includes approximately 55 genera and 3000 species of trees and shrubs. Some of the species are widely used in culinary applications to improve organoleptic properties while others are known for their medicinal importance. The current study explores the mechanistic insight of *Laureceae* essential oils via molecular docking study on antimicrobial protein targets. Gas chromatography–mass spectrometry (GC–MS) analysis was carried out on the oil which revealed distinct chemotypes that were dominated by oxygenated monoterpenes. The inhibitory effects of the identified compounds in the *Lauraceae* essential oils were assessed *in silico* against protein targets of microorganisms using the AutoDock software. The docking scores revealed binding affinities of the bioactive compounds towards DNA-binding protein (4.3–5.8 kcal/mol), DNA gyrase (4.7–7.1 kcal/mol), mono-diacylglycerol lipase (4.4–6.2 kcal/mol), CYP51 (5.8–8.0 kcal/mol), phage-encoded quorum sensing anti-activator (5.8–8.0 kcal/mol) and Chondroitin ABC lyase I (4.8–6.3 kcal/mol). Two (2) hit compounds, α-citral and β-citral were finely involved in both strong hydrophobic and hydrophilic interactions with the bacterial and fungal protein targets, respectively. Particularly, these interactions were mainly defined by the hydrogen bonds formed between the β-citral and the amino acid residues of DNA-binding protein (Ala A: 89, Asn A: 33), DNA gyrase (Gly A: 85), mono-diacylglycerol lipase (Tyr A: 260), and chondroitin ABC I enzyme (Ser A: 431). In the same fashion, α-citral formed hydrogen bonds with the residues of cytochrome p51 (CYP51) enzyme (His A: 377, Ser A: 378), carbon-hydrogen bond (Met A: 508), while a carbon-hydrogen bond was observed with quorum-sensing anti-activator protein (Leu B: 110). All of these interactions were supported by alkyl, pi-alkyl, pi-sigma and van der Waals bonds around the binding complex of the protein targets. The present study contributes to the understanding of the mechanism of action of *Laureceae* essential oils and could be paramount in the emerging knowledge on the use of natural antimicrobial agents.

EIBSD-71

Brand-Dependent Hepatorenal, Metabolic, and Histopathological Toxicity of Pyrethroid-Containing Insecticides in Mice

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Pyrethroid insecticides are widely used in households and agricultural settings and are generally considered to have low toxicity in mammals. However, growing evidence suggests that sub-chronic exposure may induce biochemical and structural alterations in multiple organ systems. Despite their extensive use in low- and middle-income countries, often with limited regulatory oversight, comparative toxicity data on commercially available formulations remain scarce. This study evaluated the sub-acute toxicity of five commercial pyrethroid-based insecticides; Goodknight, Insecticidal, Kill-All, Read A Dream, and Doom in mice. Toxicity was assessed using organ-to-body-weight ratios, hepatorenal biochemical indices, lipid profile, tissue enzyme activities, and histopathological examinations. Mice (mean body weight: 25 g) were randomly assigned to six groups, comprising five treatment groups and one control group. Following exposure, serum liver and kidney function markers, lipid profile parameters, tissue enzyme activities (liver, kidney, lung, and brain), organ-to-body-weight ratios, and histopathological changes were evaluated ($p < 0.05$). Goodknight and Insecticidal significantly increased kidney and lung to body weight ratios. Elevated alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activities, accompanied by reduced alkaline phosphatase (ALP) activity, were observed in most treatment groups, indicating hepatocellular injury and cholestatic dysfunction. Goodknight and Kill-All treatments resulted in increased serum creatinine and urea concentrations, suggesting renal impairment. Tissue enzyme activities varied across organs, indicating organ-specific cytotoxic effects. Furthermore, elevated triacylglycerol levels were observed in most exposed groups. Histopathological examination revealed inflammatory and degenerative lesions in all treated groups. The findings demonstrate that pyrethroid toxicity is not uniform across commercial formulations, highlighting the need for formulation-specific risk assessment and strengthened public health policies regarding the unregulated household use of these products.

EIBSD-72

In silico Evaluation of Phytocompounds Identified From Crude Plant Lectin Extracts against Neurodegenerative Diseases

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Neurodegenerative diseases, particularly Alzheimer's disease and Parkinson's disease, are progressive disorders associated with cholinergic dysfunction, amyloidogenic processing, oxidative stress, dopaminergic impairment, kinase dysregulation and neuroinflammation. This study evaluated the neurotherapeutic potential of selected phytocompounds from crude plant lectin extracts using molecular docking and ADMET prediction. The lectin extracts were obtained from *Stachytarpheta cayennensis*, *Phyllanthus niruri*, *Hibiscus sabdariffa* and *Gnetum africanum*. Eight phytocompounds were assessed: 1,3-benzenedicarboxylic acid bis(2-ethylhexyl) ester, 9,12-octadecadienoic acid, 9-hexadecenoic acid, 9-octadecenamide, apiole, chalcone, hexadecanoic acid methyl ester and oleic acid. The compounds were docked against Alzheimer's disease targets, acetylcholinesterase and BACE1, and Parkinson's disease targets, monoamine oxidase-B and leucine-rich repeat kinase 2. Donepezil and levodopa served as standard reference drugs. The docking results showed that chalcone had the most consistent multi-target interaction profile, with favourable binding affinities against acetylcholinesterase, BACE1, monoamine oxidase-B and leucine-rich repeat kinase 2. Chalcone also showed stronger predicted binding to monoamine oxidase-B than levodopa, suggesting possible relevance in dopaminergic metabolism and oxidative-stress-associated pathways. 1,3-Benzenedicarboxylic acid bis(2-ethylhexyl) ester demonstrated strong interaction with acetylcholinesterase and moderate affinity for other targets, while 9-octadecenamide showed notable binding to monoamine oxidase-B. ADMET prediction indicated that chalcone possessed acceptable molecular weight, topological polar surface area and predicted blood-brain barrier permeability; however, possible toxicity liabilities require cautious interpretation. Some fatty acid derivatives showed weaker binding but may still contribute indirectly through lipid-mediated neuroinflammatory or antioxidant mechanisms. The findings suggest that selected phytocompounds from crude lectin extracts, especially chalcone and 9-octadecenamide, may have potential neuroprotective relevance through interaction with key molecular targets implicated in Alzheimer's and Parkinson's diseases. These findings remain predictive and require validation through molecular dynamics simulation, enzyme inhibition assays, cytotoxicity testing, blood-brain barrier-related assays and neuroinflammatory cell-based studies before therapeutic relevance can be inferred. Thus, this study provides a rational computational basis for selecting promising compounds for further mechanistic and experimental validation in future studies.

EIBSD-73

Insight into Oestrogen Receptor Inhibitory Activity of *Zingiber officinale*-Derived Compounds: *In silico* Studies

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Breast cancer is one of the most commonly diagnosed forms of the disease, and it is also the leading cause of cancer-related deaths among women worldwide. One of the most important contributors to the development of breast cancer in women is the presence of hormones dependent on oestrogen. As a result, there is an urgent need for drugs that are more successful in the fight against this disease. Oestrogen receptor (ER) is becoming a target in the therapy of endocrine disorders. Molecular docking and other computational analysis procedures using Schrodinger suite were used to predict *in silico*, the ability of *Zingiber officinale* derived compounds to bind effectively to Oestrogen Receptor (ER). The purpose of this research is to identify the most bioactive compounds that can be extracted from *Zingiber officinale*, namely (1R, 3S, 5R)-1, 5-epoxy-3-hydroxy-1-(3, 4-dihydroxy-5-methoxyphenyl)-7-(4-dihydroxyphenyl)-heptane,(3S, 5S)-3, 5-dihydroxy-1-(4-hydroxy-3-methoxyphenyl)-7-(4-hydroxy-3, 5-dimethoxyphenyl)-heptane,(R)-linalyl-bD-glucopyranoside, hexahydrocircumin and 10-gingerol which show promise as ER inhibitors in the search for a breast cancer drug. The compounds have drug-like abilities and good ADME properties, and they also displayed satisfactory inhibitory (pIC50 values) ranging from 6.807 to 7.792; as a result, they may be considered as potential therapeutic alternatives for the treatment of breast cancer.

EIBSD-110

Mechanism of Action of *Peperomia pellucida* Extract on Alpha-Glucosidase Activity In Relation to the Management of Diabetes

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Peperomia pellucida is a natural medicinal plant with numerous therapeutic prospects. Its extract has been used in managing and treating diseases, including diabetes, particularly for its inhibitory effects on alpha-glucosidase. This research investigates the molecular interaction of its ethanolic extract with alpha-glucosidase using multi-spectroscopic approaches under simulated physiological intestinal conditions. Antidiabetic activities were assessed by α-glucosidase and α-amylase inhibition assays. Fluorescence quenching studies revealed significant interaction between the plant extract and the enzyme. HPLC analysis identified Pellucidin A, Tris(hydroxymethyl)methane, Luteolin, syringic acid, and Sesamin as major bioactive components, correlating their concentrations with inhibitory effects on alpha-glucosidase. *Peperomia pellucida* quenches the intrinsic fluorescence of alpha-glucosidase via a mixed quenching mechanism with an effective quenching constant (Ksv) of 1.61 x 10^4 $L.mol^{-1}$ at 25 °C and moderate interaction (Ka in the order of 10^4 $L.mol^{-1}$), accompanied by hydrophobic interactions ($\Delta S°> 0$ and $\Delta H°>0$), with enthalpy change (ΔH) and entropy change (ΔS) values of 14.28 kJ mol^{-1} and 34.60 $J.mol^{-1}K^{-1}$ at pH 6.0. This indicates that the formation of the alpha-glucosidase–*Peperomia pellucida* complex was an endothermic and entropy-driven process. The reaction was spontaneous and mainly tryptophan-gated. The hydrophobicity around alpha-glucosidase intrinsic fluorophores was perturbed, compromising its structural conformation, as revealed by synchronous and UV-absorption FT-IR spectroscopy. This study provides preliminary data for the plant's use in managing hyperglycaemia and alpha-glucosidase-implicated conditions.

EIBSD-74

Assessment of Petroleum Contamination in Boreholes of Residences Close to Petrol Filling Stations in Sagamu, Ogun state

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Groundwater contamination associated with petroleum filling stations remains an important environmental and public health concern, particularly in urban communities where residential boreholes are located close to fuel retail facilities. This study assessed the concentrations of selected heavy metals in groundwater samples collected from residential boreholes situated near petrol filling stations in Sagamu, Ogun State, Nigeria. Samples obtained from Stations G, I, J, K, and M were analysed for iron (Fe), nickel (Ni), cadmium (Cd), lead (Pb), chromium (Cr), and arsenic (As) using standard analytical procedures. Potential health risks were evaluated using Hazard Index (HI) and Lifetime Cancer Risk (LCR) models, while overall water quality was assessed using the Water Quality Index (WQI). The results revealed elevated concentrations of several heavy metals across the study locations, with cadmium and arsenic contributing substantially to the observed health risks. Hazard Index values exceeded the acceptable threshold of 1 in Stations J, K, and M, indicating the possibility of adverse non-carcinogenic health effects following prolonged exposure. Lifetime Cancer Risk values for all investigated stations were above the acceptable limit of 1×10^{-6}, suggesting elevated carcinogenic risks associated with long-term consumption of the groundwater, particularly due to cadmium contamination. Water Quality Index assessment classified one station as having good water quality, three stations as fairly good, and one station as poor. The findings suggest that groundwater sources located near petrol filling stations in Sagamu may pose significant public health risks and highlight the need for continuous environmental monitoring and appropriate remediation measures.

EIBSD-75

Some Biochemical Properties of Purified Butyrycholinesterase from Hide Beetle (*Dermestes maculatus*) Larvae

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Hide Beetle (*Dermestes maculatus*), is a necrophagous insect often associated with stored products with a huge economic importance. This research work focuses on the biochemical characterisation of butyrylcholinesterase (BChE) from *D. maculatus* larvae. A collection of the insect larvae from dried fish purchased from the Akure main market, Akure, Ondo State was made and were quickly stored in the freezer. The larvae were homogenised in a 50 mM potassium phosphate buffer (pH 7.4), followed by centrifugation at 12,000 rpm for 15 minutes at 4°C to obtain the crude enzyme. Butyrylcholinesterase activity was assayed using the modified Ellman's colorimetric method with butyrylthiocholine iodide as substrate. The crude enzyme was purified by DEAE-sephacel ion-exchange chromatography and Sephadex G100 gel filtration chromatography. Some physicochemical properties of the purified enzyme were evaluated. The level of butyrylcholinesterase in the crude enzyme from *D. maculatus* larvae was 2.74 µmol/min/mg which increased after the 2-step purification to 23.54 µmol/min/mg.The activity of the purified enzyme was optimum at pH 9 and 40°C. Its maximum velocity of 217 µmol/min was effected by Michaelis Menten constant of 2.67 mM. Plant based inhibitors, anisaldehyde, terpineol and onion shaft extract, show comparable inhibitory potential to dichrovos for the inhibition of the purified enzyme. The overall evaluation of properties of butyrylcholinesterase may open sources for developing targeted control for *Dermestes maculatus* larvae through inhibition of BChE resulting in neuromuscular paralysis and death of this pest.

EIBSD-76

Therapeutic Efficacy of Guava Leaves Extract against Neem- Induced Perturbation in Sperm and Sex Hormones of Male Wistar Rats

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Male infertility is increasingly linked to environmental factors. Although *Azadirachta indica* (neem) has medicinal benefits, it may impair male fertility. *Psidium guajava* (guava) leaf extract possesses antioxidant properties, but its protective role against neem-induced reproductive toxicity is unclear. Hence this study evaluated its therapeutic effects on sperm quality and reproductive hormones in male Wistar rats. Thirty-six male Wistar rats were randomly assigned to six groups. Group 1 received distilled water. Groups 2 and 3 were administered 200 and 400 mg/kg bodyweight of neem leaf extract. Group 4, 5 and 6 received 200 mg/kg each of neem leaf extract, followed by 1000 mg/kg of a standard fertility drug (Addyzoa), 250 and 500 mg/kg bodyweight of guava leaf extract after 8hours, respectively. All treatments were administered orally for 32 days. Sperm, hormonal and statistical (graph prism10.0) analysis were conducted. Sperm motility showed significantly higher rapid forward progression in groups 5 and 6, while 2 and 3 did not differ significantly from the control. Negative forward progression decreased significantly in groups 4–6 but increased in 2 and 3. Normal sperm morphology improved significantly across all treatment groups. The life/death ratio increased significantly in groups 4–6. Luteinising and follicle-stimulating hormones increased significantly in group 5, while testosterone levels decreased in all treatment groups.

Psidium guajava leaf extract dose-dependently ameliorates neem-induced reproductive toxicity, demonstrating promising therapeutic potential. Its mechanisms and clinical application in male fertility management is recommended.

EIBSD-77

Ameliorative Effects of *Cocos nucifera* Husk Extract on Metabolic and Molecular Dysregulation in Obese-Diabetic Wistar Rats

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Type 2 diabetes mellitus (T2DM) is a complex metabolic disorder driven by progressive insulin resistance and persistent hyperglycaemia arising from multi-organ transcriptional dysregulation. This study investigated the molecular mechanisms underlying the therapeutic efficacy of *Cocos nucifera* husk ethanolic extract (CocoH) using an obese-diabetic female Wistar rat model. One hundred animals were subdivided into ten groups (n=10) and treated orally for 21 days with CocoH (125–1000 mg/kg) or Metformin (75 mg/kg). Quantitative RT-PCR mapped multi-organ mRNA profiles of key glucose transporters (SGLT1, GLUT2) and transcription factors (FOXO1, CREB) across hepatic, pancreatic, renal, and intestinal tissues. Transcriptional analysis revealed that CocoH restored glucose homeostasis through coordinated, tissue-specific modulations. CocoH significantly ($p \leqslant 0.05$) upregulated bidirectional GLUT2 expression across all studied organs, optimising pancreatic glucose-sensing and driving hepatic glucose clearance, while accelerating renal basolateral exit fluxes to prevent glucotoxicity. High-dose CocoH successfully downregulated intestinal SGLT1 transcripts, restricting glucose absorption. Furthermore, CocoH significantly ($p \leqslant 0.05$) upregulated hepatic and pancreatic FOXO1 mRNA, activating crucial genetic survival pathways. Crucially, CocoH uniformly and significantly ($p \leqslant 0.05$) downregulated both hepatic and pancreatic CREB transcription across all doses, silencing the master nuclear switch responsible for uninhibited hepatic gluconeogenesis and excessive pancreatic glucagon synthesis. In conclusion, *Cocos nucifera* husk serves as a potent transcriptional rheostat that corrects systemic hyperglycaemia by re-engineering key glucose transporters and nuclear transcription networks. It is recommended that future studies focus on isolating the specific bioactive principles responsible for these multi-organ genetic modulations and evaluating long-term safety profiles for clinical transition.

EIBSD-78

Marine Algal Metabolites as Novel Therapeutics for Oxalate-Induced Renal Injury: Insights from *Sargassum euryphyllum* Phytochemical Profiling and Renoprotective Studies

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Marine algae contain a diverse array of phytoconstituents acknowledged for their broad pharmacological properties. Evaluation of the possible nephroprotective effects of *Sargassum euryphyllum* aqueous methanolic (SEAM) extract in sodium oxalate–toxified rats is the aim of this study, using biochemical indicators such as renal function markers, oxidative stress parameters, and markers of membrane integrity and renal injury. SEAM was assessed for its phytochemical composition and bioactive compounds through GC–MS analysis. Thirty-six Wistar rats (male) weighing 180 ± 20 g were divided into six (6) groups and treated with or without sodium oxalate (70 mg/kg), SEAM (100 or 250 mg/kg), or the standard drug Cystone (500 mg/kg) for seven (7) consecutive days. Plasma and urinary renal function markers, antioxidant parameters (GSH, GPx), and markers of membrane integrity and damage (Na/K ATPase activity and MDA levels) were evaluated. SEAM extract exhibited strong antioxidant capacity (120 ± 14.84 mg/g TEAC). The administration of sodium oxalate significantly ($p < 0.05$) reduced creatinine and urea clearance, increased urinary protein and albumin, disrupted electrolyte balance, decreased renal antioxidant defences, elevated lipid peroxidation, and reduced ATPase activity. SEAM treatment restored renal function markers, normalised electrolyte and protein levels, improved antioxidant status, and stabilised membrane integrity in a dose-dependent manner, with effects comparable to Cystone. GC–MS analysis revealed several sterols, most prominently Ergost-5-en-3-ol (3β-), alongside various fatty acids and their esters. In conclusion, SEAM confers renal protection by scavenging reactive oxygen species, enhancing antioxidant defences, stabilising cellular membranes, and ultimately preserving kidney function.

EIBSD-79

Anti-Ulcer Potential of *Ziziphus jujuba* Fruit-Meal Diet In Ethanol Induced Albino-Rat

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Gastric ulcer remains a significant global health challenge resulting from an imbalance between aggressive factors such as gastric acid, ethanol, nonsteroidal anti-inflammatory drugs, and oxidative stress, and the defensive mechanisms of the gastric mucosa. Although conventional anti-ulcer drugs are effective, their use is often limited by recurrence, adverse effects, and high cost, necessitating safer and more accessible therapeutic options. *Ziziphus jujuba* (Indian jujube), locally known as *magarya* or *kurna* (Hausa) and *Ayo* (Yoruba), is widely consumed in northern Nigeria and is rich in bioactive phytochemicals with potential mucosal healing and antisecretory properties. This study evaluated the therapeutic effect of *Ziziphus jujuba* fruit on ethanol-induced gastric ulcer in albino rats, focusing on its ulcer-healing and acidmodulating activities. Thirty-two male albino rats (190 ± 20 g) were divided into five groups (n = 6) and the control (n = 7). Gastric ulcer was induced using 70% ethanol (1 ml/rat). A rat from both the control group were sacrificed 48 hours after ethanol induction. Dried *Ziziphus jujuba* fruit powder were incorporated into feed at 50%, 75%, and 85% proportions as treatment doses for fourteen days. Cimetidine served as the standard anti-ulcer drug. Gastric pH, stomach gastrin levels, and histopathological changes were evaluated following treatment. Ethanol administration significantly increased stomach gastrin levels in the positive control(41.50 pmol/L) compared to the negative control (27.80 ±0.69 pmol/L). Treatment with *Ziziphus jujuba* resulted in dose-dependent ulcer healing, characterised by normalisation of stomach gastrin levels, a significant elevation of gastric pH, and a marked improvement in gastric mucosal architecture. Higher inclusions (75% and 85%) demonstrated pronounced therapeutic effects comparable to those of the standard drug, which increased gastrin due to feedback stimulation despite acid suppression. *Ziziphus jujuba* fruit exhibits significant ulcer-healing, antisecretory, and gastro-protective activities against ethanol-induced gastric injury. These findings support its potential use as a natural therapeutic agent in the treatment and management of gastric ulcers.

EIBSD-81

Integrating Omics, Bioinformatics, and Network Pharmacology for Diabetes Mellitus Drug Development and Diagnostics: A Comprehensive Review

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Diabetes mellitus (DM) is a metabolic disease that challenges traditional "one-drug–one-target" discovery and diagnostic paradigms. It is characterised by hyperglycaemia, protein and lipid metabolism abnormalities, and complex interactions between genetic, molecular, and environmental factors. Novel methods in network pharmacology (NP), bioinformatics, and multiomics allow for the systems-level characterisation of disease processes and treatment responses in DM and its complications. Through the discovery of dysregulated pathways and drug-omics associations, integrated genomics, proteomics and other omics support the development of early biomarkers, molecular subtyping, and precision diagnosis of diabetes and diabetic complications. Similarly, NP and molecular docking have been widely applied to natural products and traditional formulations, mapping multi-component–multi-target interactions and pathways (such as PI3K–Akt, NF-κB and insulin signalling). Thus, leading to prediction of small molecule and phytochemical candidates that modulate insulin resistance, β-cell dysfunction, inflammation, and oxidative stress. The emergence of bioinformatics and machine learning tools further integrate omics-derived networks with experimental validation to identify drug targets, construct prognostic models, and nominate repurposable drugs through *in silico* screening and molecular docking. This integrative framework supports a bidirectional workflow which encompasses the omics-guided target and biomarker discovery feeding into rational drug design and repurposing. However, these integrating platforms are not without obstacles such as data standardisation, cross-platform harmonisation, causal inference, and clinical validation of candidate biomarkers and targets in large, diverse cohorts. Nonetheless, integrating omics, bioinformatics, and NP is poised to accelerate precision drug development and diagnostics in diabetes, enabling mechanism-based, individualised therapies and earlier detection of high-risk states as x-rayed in this review.

Keywords: Diabetes mellitus, bioinformatics, network pharmacology, drug development, multi-omics

EIBSD-82

In vitro Sensitivity of *Acinetobacter baumannii* Strain Ab 5075 (Wild Type) and Mutant Strains to Some Antibiotics

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Reactive oxygen species (ROS) serve as powerful agents in both antibiotic-induced killing and host-mediated defence mechanisms. The study aimed to assess the *in vitro* sensitivity of *A. baumannii* strain AB5075 (Wild Type, WT) and mutant strains (MS) to the four antibiotics. *Acinetobacter baumannii* (wild- type) and mutant strains lacking the H2O2 and O2-scavenging enzymes *(*Δ*katE,* Δ*katG,* Δ*ahpC,* Δ*ahpF,* Δ*soxR* Δ*sodB and* Δ*sodC*) were procured from *A. baumannii* AB5075 transposon mutant library. The *in vitro* studies of these oxidative genes on the sensitivity of *A. baumannii* to colistin, gentamicin, rifampicin and tigecycline were evaluated using biochemical methods. Both the WT and MS of *A. baumannii* were treated with these four antibiotics to determine the most effective and sensitive antibiotic to *A. baumannii*. Mutant strains have a lowered minimum inhibitory concentration (MIC) of antibiotics, thereby increased the susceptibility of *Acinetobacter baumannii* to antibiotics. The MIC of gentamicin showed the lowest MIC values in both the WT and MS, indicating that it is the most effective in inhibiting the growth of the test organism. The antibiotics increased H2O2 and $O2^{\cdot-}$ production, thereby reduced the enzymatic activities of catalase, superoxide dismutase and reduced glutathione in MS compared with WT. Colistin, gentamicin and rifampicin but not tigecycline increased ROS generation, NAD^+/NADH and ADP/ATP ratios. Inactivation of these genes in *A. baumannii* facilitate bacterial lethality. It is evident from this study that gentamicin produced the most pronounced lethality effect by generating high levels of ROS and by inhibiting bacterial growth at the smallest concentration.

EIBSD-83

Membrane-Targeted Antibacterial Activity and Antioxidant Profiling of a Polyherbal Extract

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The antimicrobial resistance to conventional drugs has prompted search for the development of natural alternative antimicrobial agents. Medicinal plants have been shown to contain bioactive compounds potential against wide spectrum of bacterial strains. This study was carried out to assess the methanol and ethanol extracts of a polyherbal formulation containing the roots of *Allium sativum*, *Securidaca longipedunculata* and *Rauvolfia vomitoria* for their *in vitro* antioxidant and bacteria membrane redox activities. The natural flavonoid content, and antioxidant capacity were assessed using hydroxyl and 1,1-diphenyl-2-picrylhydrazyl (DPPH) radicals scavenging activities. Lipid peroxidation was also evaluated through microbial membrane redox activity. Agar well diffusion method was used to test antibacterial effectiveness against *B. subtilis*, *S.aureus* (gram positive) and *E.coli*, *S. typhi* (gram negative) bacteria. Transmission electron microscopy was used to observe changes in bacteria membrane structure. The total flavonoid of methanol and ethanol extracts of the polyherbal formulation showed increase in a concentration dependent manner. The highest percentage hydroxyl and DPPH radical scavenging activities were expressed as 57.43%, 55.42 % and 78.82 %, 86.82 % respectively at a concentration of 500 µg/ml and the extract also inhibited lipid peroxidation *in vitro*. Both extracts also displayed high inhibition zones against *E.coli* (30.5mm) and *B. subtilis* (28.5mm). Transmission electron microscopy displayed significant cellular damage. These findings suggest that the antibacterial effects of the formulation arise from its ability to disrupt membrane lipid balance through redox processes, and the combination of biochemical studies with ultrastructural research also confirms it's ability to provide bioactive compounds that can help create antimicrobial agents.

EIBSD-84

Toxicological Implications of Combinational Administration of Ivermectin and Hydroxychloroquine: Evidence from an *in vivo* Study

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The combined use of ivermectin and hydroxychloroquine for disease management is well documented. Despite their relative safety individually, there are concerns about their safety if used in combination due to the half-life of both drugs and their ability to bind plasma proteins. This study examined the hepato-renal effects of ivermectin and hydroxychloroquine coadministration in a rodent model. 20 healthy male Wistar rats weighing 160 ± 10 grams were randomly distributed into four treatment groups of five rats each. Group I and II were treated with 400 µg/kg ivermectin and 6.5 mg/kg hydroxychloroquine respectively. Group III received a combination of both ivermectin and hydroxychloroquine, while group IV served as control and was administered distilled water only. Feed and water were provided ad libitum, while treatment lasted for 5 days. Significantly ($p<0.05$) higher levels of aspartate aminotransferase, alanine aminotransferase, urea and creatinine in serum was observed while comparatively lower blood levels of red blood cells, haemoglobin, packed cell volume and white blood cells were observed in the combined treatment group. Significantly ($p<0.05$) lower levels of glutathione and higher levels of malondialdehyde were also observed in liver and kidney tissue homogenates in the combined treatment group. Histological examination revealed hepatic and renal congestion in the combined treatment group. Collectively, the findings suggest that co-administration of ivermectin and hydroxychloroquine caused hepatic and renal perturbations, which could result in hepato-renal toxicity. The observations necessitate further studies in disease models as the observed toxicities could be more aggravated in disease conditions especially following prolonged co-administration.

EIBSD-85

Induction Of Ca^{2+}-Induced Rat Liver Mitochondrial Membrane Permeability Transition and Succinate Dehydrogenase Activity by Aqueous Extracts of *Annona senegalensis*

Alteration Of Mitochondrial Functions Such As Permeability Transition (Pt), A Process Associated With The Uncoupling Of Oxidative Phosphorylation, Has Been Found To Play A Vital Role In The Apoptotic Process Induced By Certain Anti-Cancer Agents. When Triggered, Pt Facilitates The Release Of Mitochondrial Apoptogenic Proteins Which In Turn Activate The Caspase Cascade Of Apoptosis. Thus, This Study Investigated The *in vitro* Effects Of Varying Concentrations (0.5mg//Ml,1.0mg/Ml,1.5mg/Ml,2.0mg/Ml,2.5mg/Ml,3.0mg/Ml) Of Different Extracts (Aqueous, Aqueous 2 and Chloroform) Of *Annona senegalensis* (*A. senegalensis*), A Purported Anti-Cancer Plant Of The Family Annonaceae On Normal Rat Liver Mitochondria. Opening Of Mitochondrial Membrane Permeability Transition Pore (Mmptp) Was Spectrophotometrically Assayed Under Succinate Energised Condition. Also, *in vitro* Study On The Effects Of *A. senegalensis* Extracts On The Activity Of Succinate Dehydrogenase Was Demonstrated. Results Obtained Showed Concentration-Dependent and Significant (P≪0.05) Increases In The Extents To Which Mmptp Opening Was Induced By The Three Extract Types When Compared With The Control Group. The Aqueous Extract (3.0mg/Ml) Was The Most Potent As Evidenced By Its Induction Of Mmptp Opening Up To About 20-Fold Increase In Comparison With The Control Group and The Highest Inductions Seen With The Other Two Extracts (17.5 and 18.8–Folds For Aqueous 2 3.0mg/Ml and Chloroform 3.0mg/Ml, Respectively) and The Least Induction Observed At 10µl Aqueous 2 Extract (3.7-Fold Increase) Compared With Control Group. Aqueous Extract Decreased The Activity Of Succinate Dehydrogenase In A Dose-Dependent Manner. These Results Indicate That The Tested Extracts Of *A. senegalensis* Are Potent Mmptp Opening Inducers and The Pathway By Which *A. senegalensis* Causes Apoptosis In Cancer Cells Is Probably Mitochondrial-Mediated (Intrinsic).

EIBSD-86

Bioactive Compounds and Antioxidants Profiling of *Garcinia Kola* and *Annona muricata* through Different Solvent Extraction

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Garcinia kola and *Annona muricata* are medicinal plants widely used in ethnomedicine for their antioxidant and therapeutic properties. This study investigated the phytochemical constituents, proximate analysis, mineral composition, antioxidant profiles, and potential therapeutic relevance of extracts from *Garcinia. kola* seeds and leaves, and *Annona. muricata* leaves using ethanol, water, and 50 % hydroethanol. The influence of solvents on extraction yield, bioactive composition, and *in vitro* bioactivity was evaluated. Standard quantitative phytochemical, antioxidant, and atomic absorption spectrophotometric methods were used to determine phenolics, flavonoids, tannins, steroids, terpenoids, cyanogenic glycosides, antioxidant activities (DPPH, nitric oxide, hydrogen peroxide, lipid peroxidation), proximate composition and selected minerals.

Aqueous extract gave the highest yield for *Garcinia kola* seed (22.38%), while hydroethanol yielded most for *Garcinia kola* leaf (20.20%) and *Annona muricata* (17.33%), indicating solvent and plant-part influence. Ethanol extracts generally showed the highest phytochemical, proximate, and mineral concentrations in all the three plant extracts. In *Garcinia kola* seed, ethanol extract recorded the highest phenolic (863.63±0.51), flavonoid (287.29±0.92), and steroid (124.85±0.07) contents, with strong DPPH (89.01±0.04) and nitric oxide (75.53±0.07) scavenging activities. Similar trends were observed in *Garcinia kola* leaf, though at lower levels. Hydroethanol enhanced flavonoid and steroid extraction in *Garcinia. kola* leaf compared to aqueous extract. For *Annona muricata*, ethanol extract showed similar trend; however, hydroethanol extract showed superior antioxidant activity (DPPH 95.17±0.01, nitric oxide 87.62±0.04, hydrogen peroxide 78.19±0.05, lipid peroxidation 7.12±0.01 inhibition). Extraction solvent significantly influences phytochemical yield and antioxidant activity. Ethanol is optimal for maximising bioactive compounds, particularly in *Garcinia kola* seed, while hydroethanol enhances antioxidant activity in *A. muricata*. These findings support solvent-specific applications in nutraceutical development.

EIBSD-87

Dietary inclusion of *Aframomum daniellii* and *Aframomum melegueta* Seeds Mitigate Erectile Dysfunction in Scopolamine-Treated Rats

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Erectile dysfunction is a common complication of neurological disorders, often linked to impaired neurotransmission and vascular function. This study aimed to evaluate the effects of dietary inclusion of *Aframomum daniellii* and *Aframomum melegueta* seeds on scopolamine-induced erectile dysfunction in male rats, as potential natural protective interventions. Mature male rats (190-220g) were divided randomly into seven groups: 1-normal control fed basal diet; 2-untreated scopolamine-induced group; 3-donepezil (5mg/kg body weight) treated group; 4 and 5- Scopolamine-induced rats fed 4% and 8% *Aframomum melegueta* diets respectively; 6 and 7- Scopolamine-induced rats fed 4% and 8% *Aframomum daniellii* diets respectively. Sexual behaviour was assessed after 14 days dietary pretreatment and scopolamine induction (3mg/kg i.p., days 12-14). Penile tissues collected post-euthanasia were analysed for major biochemical indices and antioxidant enzyme activities. Untreated scopolamine-induced rats exhibited impaired sexual behaviour characterised by reduced mounting frequency ($P < 0.05$) and complete absence of intromission. Dietary supplementation with *Aframomum species* (especially 8% inclusion) significantly improved intromission and mounting parameters ($P < 0.05$), with effects comparable to the donepezil-treated group. These improvements were accompanied by significantly reduced penile phosphodiesterase-5, acetylcholinesterase, and arginase activities ($P < 0.05$), increased nitric oxide and total thiol levels, and decreased reactive oxygen species levels compared with untreated scopolamine-induced rats, indicating restoration of antioxidant status. Dietary inclusion of *Aframomum daniellii* and *Aframomum melegueta* mitigated scopolamine-induced erectile dysfunction through modulation of cholinergic signalling, increased nitric oxide bioavailability and reinforced antioxidant defence mechanisms. These findings suggest that these dietary *Aframomum* species may serve as functional dietary components to improve erectile function under conditions of neurological impairment.

EIBSD-88

Effect of Ethanol Stem Bark Extract of *Annona muricata* On Some *in vivo* Antioxidant Parameters Of Alloxan-Induced Diabetic Rats

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Antioxidant properties of ethanol stem bark extract of *Annona muricata* (soursop) in alloxan-induced diabetic rats were investigated. Thirty (30) wistar albino rats ranging between 130–150g were carefully shared into five (5) groups of six (6) rats each. Group B-E was intraperitoneally administered with 60mg/kg b.w single dose of alloxan monohydrate, whereas group A was normal control and was given distilled water and feed. Group C was further administered with 5 mg/kg of glibenclamide to act as positive control, while D and E groups were administered with 100 and 400mg/kg b.w of *Annona muricata* stem bark extract. After administration, the rats were sacrificed and blood samples collected via ocular puncture, then *in vivo* antioxidant enzymes and phytochemistry were assayed. The result showed that *Annona muricata* ethanol stem bark had phenol, alkaloids, saponins, cardiac glycoside, anthocyanin and tannin in appreciable quantity. Antioxidant enzymes analysed showed that CAT for the group treated with 100 and 400mg/kg b.w extract were 24.074±0.002 and 29.164±0.198 (Umole/ml) against the control group that had 29.190±35.295 (Umole/ml). GPX value for the group treated with 100 and 400mg/kg b.w of extract were 124.291±0.001 and 112.808±1.462 (Umole/ml) respectively against the control that had value of 120.876±0.556 (Umole/ml). %SOD for the group treated with 100 and 400mg/kg b.w of extract were 66.541±0.001 and 54.572±10.394 respectively meanwhile the control group was 53.095±13.04. This result showed that there was a significant reduction between groups when compared to control group. In conclusion, the plant contains some phytochemicals and invivo antioxidant enzymes which could assist in mopping up free radicals generated as a result of *diabetes mellitus*.

EIBSD-90

Nutraceutical, Nutrient Composition, and Sensory Qualities of Dehydrated Bio-Yoghurt Supplemented With Natural Additives Blend

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Yoghurt consumption is on the increase due to consumers' awareness of its rich nutrient and health-promoting qualities. However, liquid yoghurt is susceptible to microbial and chemical spoilage, limiting its shelf life, especially in rural areas without electric-powered food preservation facilities. Hence, a dehydrated bio-yoghurt supplemented with natural additives was formulated, and its nutraceutical, nutrient and sensory qualities were evaluated in this study. Bio-yoghurt was produced from powdered milk fermented with a mixture of *Lactobacillus bulgaricus*, *Streptococcus thermophilus*, and *Lactobacillus acidophilus*. Natural additives blend (sweet detar seed, ginger, hibiscus calyx powders) and artificial additives blend (sodium carboxymethylcellulose, vanilla flavour, red colourant) were formulated at a proportion (5:5:3.63, respectively) derived from the Design Expert software. The bio-yoghurt was divided into three portions - portion one, supplemented with the natural additives blend; portion two, supplemented with the artificial additives blend; and portion three, control without additives. The bio-yoghurts were freeze-dried to yield dehydrated bio-yoghurts. Thereafter, the bio-yoghurts' bioactive (total phenolics, flavonoids, tannins, saponins) composition, α-glucosidase, α-amylase, angiotensin 1-converting enzyme, and pancreatic lipase inhibitory, and antioxidant activities, nutrient composition and sensory attributes were determined. The natural additives-supplemented bio-yoghurt had higher ($p<0.05$) bioactive levels and more potent enzyme-inhibitory and antioxidant activities than the artificial additives-supplemented bio-yoghurt and the control. Also, it had the highest protein and the lowest fat content. Overall, the natural additive-supplemented bio-yoghurt had higher sensory ratings than the artificial additives-supplemented bio-yoghurt and the control. Hence, supplementing dehydrated bio-yoghurt with natural additives blend enhanced its nutraceutical, nutrient composition, and sensory qualities.

EIBSD-91

Anthropometric, Biochemical and Haematological Parameters of Male Drivers Consuming Herbal Aphrodisiac Formulations in Ibadan

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The consumption of herbal aphrodisiac formulations has become increasingly prevalent among adult males in Nigeria, particularly among occupational groups such as commercial drivers, with ample data to back up their efficacy or safety. This study assessed the anthropometric, biochemical and haematological profiles of male commercial drivers in Ibadan, Nigeria, who habitually consume herbal aphrodisiacs. A cross-sectional study was conducted amongst 100 randomly selected, male commercial drivers, between March and May, 2024, at the Challenge Bus Terminal, Ibadan and were categorised into 50 users and 50 non-users of herbal aphrodisiacs. Blood pressure, height, weight and body mass index were measured; blood samples were analysed for random blood glucose, lipid and haematological profiles. The consumers of aphrodisiac drinks exhibited significantly ($p < 0.05$) lower mean values of red blood cell count, mean corpuscular haemoglobin, packed cell volume, white blood cell count, lymphocytes, and neutrophils; and significantly ($p < 0.05$) higher platelet count, random blood sugar levels, triglycerides, and low-density lipoprotein were observed when compared with non-consumers. However, pulse rate, blood pressure and body mass index did not differ significantly ($p > 0.05$) between both groups. Consumers of aphrodisiac formulations do so for sexual enhancement, however, these results imply that the formulations have a tendency to elevate the risk of metabolic disorders such as hyperglycaemia, dyslipidaemia and anaemia, which may further complicate diabetes and cardiovascular diseases. This study underscores the urgent need for public health education and regulatory oversight, in order to the safety of herbal aphrodisiacs drinks.

EIBSD-93

Modelling Stress-Induced Depression-Related Responses in *Drosophila melanogaster*

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Depression is a multifactorial neuropsychiatric disorder in which chronic stress is a major risk factor. Despite the widespread use of antidepressants, treatment responses vary considerably among individuals, suggesting that prior biological state may influence therapeutic outcome. This study used *Drosophila melanogaster* as an *in vivo* model to investigate stress-induced depression-related responses and establish a platform for examining their underlying cellular mechanisms. Adult flies were exposed to chronic mild stress using heat and cold stress paradigms before treatment with fluoxetine, amitriptyline, or *Mucuna pruriens* extracts. Biochemical assays, including acetylcholinesterase activity, catalase activity, and lipid peroxidation, were used to evaluate neuronal function and oxidative stress following treatment. Chronic stress significantly altered these biochemical markers, while treatment improved stress-induced changes. However, the magnitude of recovery differed according to the type of stress experienced before treatment, indicating that prior stress history influences antidepressant response. To extend these findings beyond biochemical measurements, a confocal immunofluorescence workflow was established using adult Drosophila brains to investigate serotonergic neurons. Serotonergic neurons were genetically labelled using the TRH-GAL4/UAS-Stinger system and visualised by confocal microscopy following whole-mount immunofluorescence staining. This provides a foundation for future studies linking biochemical alterations with changes in neuronal organisation. Together, these findings demonstrate that prior stress history shapes antidepressant response in *Drosophila melanogaster*. This work establishes an integrated biochemical and imaging framework for investigating how chronic stress influences neuronal function across multiple biological levels.

EIBSD-94

Structural Integrity and Artificial Chaperone-Assisted Refolding of Urea Induced Unfolded β-Amylase

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β-amylase is an important starch degrading enzyme widely utilised in food, brewing and biotechnology industries. This study investigated the structural integrity and refolding behaviour of β-amylase following 5 M urea-induced unfolding and assessed the effectiveness of dilution additive using α-Cyclodextrin (α-CD) and an artificial chaperone system in restoring enzyme function. The effects of residual urea concentration, pH, detergent systems, α-CD concentration, and α-CD/detergent ratios on enzyme recovery and aggregation suppression were evaluated. Native α-glucosidase was denatured using 5 M urea for 2 h at room temperature, resulting in substantial loss of catalytic activity and structural destabilisation. Refolding studies showed that α-CD significantly enhanced recovered enzyme activity by suppressing aggregation through transient interaction with hydrophobic regions of unfolded intermediates. The dilution additive method improved enzyme recovery from 32.5 ± 1.8 % in unassisted samples to 89.6 ± 2.5 % at 100 mM α-CD. However, increasing α-CD concentration decreased refolding rate constants, suggesting stabilisation of folding intermediates in relatively rigid conformations. Artificial chaperone-assisted refolding using cetyltrimethylammonium bromide (CTAB) produced superior recovery efficiency with maximum recovered activity of 93.4 ± 2.3 % and minimal aggregation. Fluorescence spectroscopy analysis demonstrated progressive restoration of tertiary and secondary structures during renaturation. Kinetic analyses revealed that catalytic activity recovery occurred before complete structural reorganisation of the enzyme. The findings demonstrate that α-CD-assisted refolding systems effectively improve the recovery of denatured α-glucosidase and may provide useful strategies for enzyme biotechnology, industrial enzyme recovery, and protein engineering applications.

EIBSD-97

Bryophyllum pinnatum and *Vernonia amygdalina* Ethanolic Extracts Modulate L-NAME-Induced Neurotoxicity in Wistar Rats

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Neurotoxicity, driven by agents like Nω-Nitro-L-arginine methyl ester (LNAME), induces oxidative stress, inflammation, and neuronal damage, leading to neurodegenerative disorders. *Bryophyllum pinnatum* (BryP) and *Vernonia amygdalina* (VerA) were investigated in this study for their neuroprotective potential in an L-NAME-induced brain damage in rat. The combine extracts of BryP and VerA were characterised by GC-MS, identifying 20 compounds, including 9-octadecenamide. 36 male Wistar rats (100–160 g) were divided into six groups (n=6): Control, LNAME (40 mg/kg), Captopril (100 mg/kg), LNAME+BryP200 (200 mg/kg of BryP), LNAME+VerA200 (200 mg/kg of VerA) and LNAME+(BryP + VerA)200 (200mg/kg of BryP and VerA). LNAME was administered for 28 days with 14 days of treatment; brain homogenates were assessed for oxidative stress markers (malondialdehyde (MDA), superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH)), nitric oxide (NO), inducible NO synthase (iNOS), inflammatory biomarkers (NF-κB, C-reactive protein [CRP]), neurotransmitters (GABA, dopamine, serotonin), acetylcholinesterase (AChE) activities, and histopathological evaluations. LNAME significantly increased ($p<0.05$) MDA and NO but caused reduction of SOD, CAT, GSH, GABA, dopamine, serotonin, and AChE, and caused severe neuronal degeneration (histopathology score: 2.7 ± 0.3). BryP and VerA significantly ($p<0.05$) lowered MDA, enhanced SOD ($p<0.05$), and restored CAT, GSH, and neurotransmitters. The combined extract group also exhibited neuroprotection with near-normal histopathology (score: 0.8±0.2), reduced NO, NF-κB, and CRP as well as neurotransmitter levels, some comparable to captopril. BryP and VerA demonstrate potent neuroprotective effects against LNAME-induced neurotoxicity, reducing oxidative stress and inflammation while preserving neuronal integrity, supporting their potential as cost-effective therapeutics for neurodegenerative diseases.

EIBSD-99

Effect of Ethanol Leaf Extract of *Moringa oleifera* On D-Galactose Induced Changes in Kidney Function Markers of Wistar Albino Rats

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Aging is characterised by progressive physiological decline accompanied by increased oxidative stress and metabolic dysfunction. Chronic administration of D-galactose has been widely employed as an experimental model of accelerated aging due to its ability to induce oxidative damage and age-associated biochemical alterations. *Moringa oleifera* is a medicinal plant rich in bioactive phytochemicals with potent antioxidant and cytoprotective properties that may ameliorate aging-related metabolic disturbances. This study investigated the effect of ethanol leaf extract of *Moringa oleifera* on body weight, body weight change, and Lee's Index in D-galactose-induced aging-associated changes in albino rats. Thirty adult albino rats were randomly assigned into five groups (n = 6): young control, aged control, D-galactose control (150 mg/kg), D-galactose plus low-dose *Moringa oleifera* extract (200 mg/kg), and D-galactose plus high-dose *Moringa oleifera* extract (400 mg/kg). Aging was induced by intraperitoneal administration of D-galactose for eight weeks, while the extract was administered orally throughout the experimental period. Body weight was monitored weekly, body weight change was calculated at the end of the study, and Lee's Index was determined during Weeks Six and Seven. Data were analysed using one-way ANOVA followed by Duncan's Multiple Range Test at a significance level of $p < 0.05$. Weekly body weight increased progressively in all experimental groups throughout the study. Although rats treated with *Moringa oleifera* extract, particularly the high-dose group, exhibited numerically lower body weights, reduced Lee's Index, and improved body weight change compared with the D-galactose-only group, these differences were not statistically significant ($p > 0.05$). The extract maintained normal physiological growth without evidence of treatment-related toxicity. Ethanol leaf extract of *Moringa oleifera* demonstrated a favourable safety profile and showed a tendency to improve body weight regulation and adiposity in D-galactose-induced aged rats. These findings suggest that *Moringa oleifera* may serve as a promising natural therapeutic agent for mitigating aging-associated metabolic alterations.

EIBSD-100

Ameliorative Effect of Methanolic Extract of *Ananas comosus* (Pineapple) Peel on CCl_4-Induced Oxidative Stress in Wistar Albino Rats

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Oxidative stress caused by toxic chemicals such as carbon tetrachloride (CCl_4) is known to induce severe liver damage through the generation of reactive oxygen species and lipid peroxidation. Natural plant products rich in bioactive compounds have gained increasing attention as potential protective agents against such oxidative injury. This study evaluated the protective effect of methanolic extract of *Ananas comosus* (pineapple) peel against CCl_4-induced oxidative stress in Wistar albino rats. Pineapple peels were dried, pulverised, and extracted using 80% methanol through cold maceration. Twenty-five male Wistar rats were randomly assigned into five groups: a normal control group, two extract-treated groups (200 mg/kg and 500 mg/kg) exposed to CCl_4, a standard treatment group receiving silymarin (100 mg/kg) plus CCl_4, and a group treated with CCl_4 alone. Oxidative stress biomarkers including superoxide dismutase (SOD), catalase (CAT), and malondialdehyde (MDA) were analysed. Results indicated that CCl_4 significantly reduced SOD and CAT activities while markedly increasing MDA levels compared with the normal control group. Administration of *Ananas comosus* peel extract significantly restored antioxidant enzyme activities and reduced lipid peroxidation in treated groups, with the 500 mg/kg dose showing the most pronounced effect. These findings suggest that pineapple peel extract exhibits notable antioxidant and hepatoprotective properties, likely attributed to its phytochemical constituents, and may represent a potential natural therapeutic agent for managing oxidative liver injury.

EIBSD-101

In silico Identification of CDK1 as a Candidate Target in Breast Cancer Via Integrative Transcriptomic and Docking Analysis of *Moringa oleifera* Compounds

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We combined transcriptomic profiling, network biology, and structure-based computational modelling to explore potential therapeutic targets in breast cancer. Analysis of GEO dataset GSE134359 identified 4,140 genes significantly upregulated in tumour samples (FDR<0.05; $|\log_2 FC| > 1$). Network clustering (MCODE) revealed nine functional modules, with the top module (49 nodes, 1,114 edges) enriched for mitotic control. Hub analysis (MCC) highlighted CDK1 as a key regulator of the G_2/M transition, supported by GO enrichment in chromosome segregation, spindle assembly, and immune modulation. A curated library of 137 *Moringa oleifera*–derived phytochemicals was docked against CDK1 using a GLIDE XP–Induced-Fit–MMGBSA pipeline. Among these, gossypetin, quercetagetin, and luteolin demonstrated favourable docking scores (⩽ −11.578 kcal/mol), binding energies (up to −44.83 kcal/mol), and predicted pIC_{50} values. ADME profiling and QSAR modelling further suggested their drug-likeness and potential bioactivity. While this study is entirely computational, it provides predictive insights that support the prioritisation of CDK1 and selected phytochemicals for future *in vitro* validation and preclinical exploration in breast cancer research.

EIBSD-102

Federated Learning and Explainable Artificial Intelligence in Cancer Diagnosis: A Systematic Literature Review

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Patient data privacy and limited model interpretability remain key challenges in applying artificial intelligence (AI) to cancer diagnosis. While federated learning (FL) and explainable AI (XAI) have been proposed to address these issues independently, their integration in oncology has not been systematically examined. This study presents a PRISMA-ScR–guided scoping review of literature published between 2020 and 2026 across PubMed, IEEE Xplore, Scopus, and Google Scholar. Following deduplication and screening, 28 primary empirical studies were included. Breast cancer was the most frequently studied malignancy. FedAvg was the predominant aggregation method, while Grad-CAM, SHAP, and LIME were the most commonly used XAI techniques. Reported classification accuracy ranged from 83.3% to 100%. However, 96.4% of studies relied on simulated federated settings, with only one incorporating external validation, limiting evidence for real-world applicability. Overall, FL–XAI integration in oncology shows promising technical potential, but remains constrained by reliance on simulated environments, limited validation of model explanations, and a narrow focus on classification tasks. Addressing these limitations is essential for clinical translation.

EIBSD-103

Molecular Detection of H*elicobacter pylori* Amongst Patients with Peptic Ulcer Disease in Nigeria

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Helicobacter pylori is a widespread bacterium linked to gastritis and peptic ulcers, with higher prevalence in developing countries. This study investigated the prevalence of *H. pylori* from blood and saliva collected from patients with peptic ulcer disease attending specialist hospital in Sokoto metropolis using serological and molecular methods. Purposive sampling was used to collect blood and saliva samples from patients presenting with peptic ulcer disease symptoms between March and April 2024, totaling 103 participants. Blood samples were initially screened for *H. pylori* antibodies using rapid diagnostic tests (RDT). For patients with antibody positivity detected using RDT, both their blood and saliva samples were subsequently subjected to PCR amplification targeting the *ConsH* gene. Of the 103 study participants, 53.4 % were female and 46.6 % male, with the majority being Hausa (40.8 %) and aged 16–25 years (68.9 %). RDT showed an overall *H. pylori* antibody detection rate of 76 %. Females had a significantly higher seroprevalence (46.6 %) than males (29.1 %) (p = 0.003). Antibody detection was most common among participants with tertiary education (52.4 %, p = 0.004). In the results of PCR analysis of blood and saliva samples from the 78 RDT-positive individuals, it was detected in 8.7 % of blood samples and 5.8 % of saliva samples for *H. pylori*. This study detects the presence of *H. pylori* in both blood and saliva samples of patients with ulcers, highlighting the urgent need for medical intervention and effective management of the infection.

EIBSD-104

Ethnobotanical Survey of Medicinal Plants in Ogbomoso used in the treatment of Benign Prostate Hyperplasia

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Benign Prostate Hyperplasia (BPH) is a non-cancerous enlargement of the prostate gland that obstructs the passage of urine from the bladder. BPH is prevalent among Nigerian men, with the highest prevalence above 50 years of age at 23%. In Nigeria, as in other developing countries, due to unaffordability, inaccessibility, and undesirable side effects, such as weight gain and dizziness, of orthodox therapeutic options, natural plant materials are gaining momentum as alternatives to conventional medicine. The bioactive compounds in plant constituents are linked to their biomedical roles in folk treatment. These phytochemicals are less toxic and may play a significant role in the management of BPH. In this study, an ethnobotanical survey was conducted across the five Local Governments in Ogbomoso to document the medicinal plants used to treat prostate enlargement. Data were collected using a semi-structured questionnaire administered to 63 respondents with knowledge of herbal practice, including Farmers (36.5%), Herbalists (23.33%), Herb Sellers (22.22%), and others. The survey identified various medicinal plant names in the local dialect, the plant parts used, such as leaves, roots, stems, and bark, commonly used preparations, and the route of administration. The oral route was the predominant route of administration. This survey documented the biodiversity of plant species used by the Ogbomoso people to treat prostate enlargement. The results showed the relevance of traditional medicine in primary healthcare and served as a baseline for further studies to validate the therapeutic efficacy of the identified plants.

EIBSD-105

Dryopteris erythrosora Attenuates Diesel Exhaust Particle–Induced Hepatic Oxidative Stress and NF-κB–Mediated Inflammation in Wistar Rats

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Diesel exhaust particles (DEPs), a major component of fine particulate matter (PM), are increasingly associated with systemic oxidative stress and inflammatory disorders, including hepatic injury. *Dryopteris erythrosora*, a fern rich in polyphenolic compounds, possesses documented antioxidant and anti-inflammatory properties. This study evaluated the effects of aqueous leaf extract of *D. erythrosora* against DEP-induced hepato-inflammation and oxidative stress in Wistar rats. Phytochemical screening and HPLC-DAD characterisation were conducted to identify bioactive constituents. *In vitro* antioxidant activities were assessed using DPPH, ABTS, FRAP, and redox potential assays. Thirty (30) male Wistar rats were divided into six groups and treated with DEP (0.64 mg/kg) and *D. erythrosora* extract (250 and 500 mg/kg) for 14 days. Hepatic oxidative stress markers (GSH, GSSG, MDA, SOD), liver function enzymes (ALT, AST, ALP), and inflammatory gene expression (IKKβ, IκB, NF-κB, TNF-α, IL-1β) were evaluated. Molecular docking analysis was performed to assess interactions between identified phytocompounds and TNF-α. The extract contained abundant saponins, terpenoids, phenols, and flavonoids, with HPLC confirming quercetin and kaempferol derivatives. DEP exposure significantly depleted GSH, elevated GSSG and MDA, suppressed SOD activity, and increased serum ALT, AST, and ALP levels ($p < 0.0001$). DEP markedly upregulated NF-κB pathway–related inflammatory genes. However, co-administration ofD. erythrosora extract significantly restored antioxidant balance, reduced lipid peroxidation, normalised liver enzymes, and downregulated inflammatory gene expression ($p < 0.0001$ vs DEP). Docking analysis showed strong binding affinity of rutin (−7.255 kcal/mol) and other flavonoids to TNF-α. *D. erythrosora* confers significant hepatoprotection against DEP-induced oxidative and inflammatory damage via modulation of redox homeostasis and suppression of NF-κB signalling.

EIBSD-106

Pharmacobiochemical Effects of *Canarium schweinfurthii* Pulp and Seed and Their Combinations on Alloxan-Induced Diabetic Rats

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Diabetes mellitus is a chronic metabolic disorder affecting millions worldwide and its incidence is increasingly alarming, especially in developing nations. This study investigated the effects of ethanol extracts of *Canarium schweinfurthii* pulp and seed on biochemical parameters of alloxan-induced diabetic rats. Acute toxicity testing was done using Lorke's method. Diabetes was induced intraperitoneally using 150 mg/kg of alloxan monohydrate. Biochemical parameters were analysed using standard diagnostic methods. The result of acute toxicity test indicated that the extract was not very toxic. The diabetic untreated group exhibited significant (p<0.05) decrease in body weight and increases in fasting blood glucose, total cholesterol, triglycerides, low-density lipoprotein cholesterol, very low-density lipoprotein cholesterol, aspartate transaminase, alanine transaminase, alkaline phosphatase, creatinine, urea, and malondialdehyde (MDA) levels compared to the normal control and the treated groups. Treatment with *C. schweinfurthii* extracts significantly improved these alterations in a dose-dependent manner, restoring bodyweight, lowering blood glucose and lipid levels, and reducing oxidative stress markers. The seed extract, particularly at 100 mg/kg, produced the most pronounced hypoglycaemic, hypolipidaemic, hepatoprotective, nephroprotective, and antioxidant effects compared to glucophage, while the pulp extract exhibited moderate activity. The combined pulp and seed extracts also demonstrated synergistic benefits. These findings suggest that *C. schweinfurthii* possesses potent antidiabetic and antioxidant properties, supporting its ethnomedicinal use in diabetes management and its potential as a natural source of bioactive compounds for developing novel therapeutic agents.

EIBSD-108

Computational Investigation of *Azadirachta indica* Compounds as Novel Antimalarials against *Plasmodium falciparum* using a Multi-target Approach

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The incidence of malaria caused by *Plasmodium falciparum* continues to be on the increase globally, affecting 150 million people and resulting in 350,000 deaths annually. The parasite has developed drug resistance over the years, necessitating the development of novel drugs. *Azadirachta indica* has been traditionally used to treat malaria in Nigeria and worldwide, but there is a paucity of information on its mechanisms and bioactive compounds. This study investigated the antimalarial potential of 243 neem phytocompounds against four critical *Plasmodium falciparum* proteins (pfCRT, pfPK5, MSP1, and AMA1) using computational methods. Molecular docking, binding energy analysis, ADMET profiling, AutoQSAR, and molecular dynamics (MD) simulation (100 ns) of the hit compounds were performed on the four proteins. Docking results demonstrated that eleven neem-derived compounds, particularly cianidanol, quercetin, kaempferol, and epicatechin, formed multiple hydrogen bonds with key residues [LYS 32, GLN 129, ASP 85, LEU 82(pFK5), ASN 395, THR 344 (pfCRT), LYS 39, SER 167, LEU 104, THR 85 (MSP1), and GLN 342, LYS 351, GLY 259, ASN 257 (AMA1)]of the four proteins, with binding energies ranging from -33.7 to -60 kcal/mol, surpassing those of artemisinin, artesunate, and quinidine (standard anti-malaria drugs). Cianadanol and quercetin consistently demonstrated superior stability and potency, supported by docking and standard free binding energy analyses, favourable ADMET profiles, and potent QSARS predictions on the proteins. These findings suggest that cianadanol and quercetin seem promising among the neem phytocompounds as potent multi-target antimalarial agents against the four proteins. MD Simulations further affirm the predicted inhibitory potential of the lead compounds. These compounds possess significant potential as novel antimalarial agents, capable of inhibiting the parasite proteins and mitigating drug resistance.

EIBSD-109

Biochemical Characterisation of Browning-Associated Polyphenol Oxidase from Date Palm Fruit (*Phoenix dactylifera*)

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Date palm fruit (*Phoenix dactylifera*), valued for its nutritional and health benefits, is susceptible to enzymatic browning during processing and storage. This study aimed to purify and biochemically characterise polyphenol oxidase (PPO) from *P. dactylifera* to provide insight into controlling enzymatic browning. PPO was purified using ammonium sulfate precipitation followed by ion-exchange and gel-filtration chromatography, resulting in a 14.01-fold purification, 6.53% yield, and a specific activity of 12.54 U/mg. SDS-PAGE revealed a single protein band with a molecular weight of 30.82 kDa. The purified enzyme exhibited optimum activity at pH 8.0 and 50°C and remained stable at pH 8–9 and 40–50°C, but showed reduced stability under acidic conditions and at higher temperatures. SDS completely inhibited PPO activity at all concentrations tested. Tyrosine was the preferred substrate, whereas catechol showed the lowest relative activity. Kinetic analysis using L-DOPA yielded a Km of 7.04 mM and a Vmax of 0.20 µmol/min. These findings provide valuable information for controlling enzymatic browning and improving the processing, quality, and shelf life of date palm fruit products.

TRACK 8 · BMDSWP

Biochemical and Molecular Determinants of Social Welfare and Public Health

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BMDSWP-01

Characterisation and Evaluations of Anti-Ulcer and Anti-Inflammatory Activities of Aqueous Fraction of *Brassica oleracea* L

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Chronic inflammation is the primary driver of the formation, progression, and delayed healing of peptic ulcer disease. This study evaluated *in vitro* anti-ulcer and anti-inflammatory activities of *B. oleracea* aqueous fraction and characterised its constituents via Fourier Transform-Infrared (FT-IR) and UV-visible spectroscopic methods. The pulverised *B. oleracea* (6500 g) was extracted in 80% methanol for 72 h. The filtrate was concentrated to give the methanolic crude extract which was partitioned into n-hexane (500 ml x 3) to give n-hexane and aqueous fractions. Following concentration, the aqueous fraction was evaluated for anti-ulcer (pH, preliminary antacid test PAT, acid neutralisation capacity ANC, buffering capacity BC, acid neutralisation ANC, and pepsin inhibition) and anti-inflammatory (membrane stabilisation, anti-trypsin, anti-denaturant, and anti-haemolysis) activities, and total alkaloid content. The results showed 2.27% yield and 56.09 and 0.4 % recoveries for aqueous and n-hexane fractions, respectively. FT-IR and UV-Visible spectra showed absorption peaks at 613.15 cm^{-1} (glucosinolates) and 220-260 nm (phenols), respectively. The aqueous fraction demonstrated comparable anti-ulcer (pH 6.15 vs. 9.63; PAT 6.51 vs. 7.35, ANC 5.71 vs. 6.82, BC 3.11 vs. 3.20, pepsin inhibition IC50 - 0.28±0.00 vs. 1.44±0.17 mg/ml) and anti-inflammatory (membrane stabilisation IC50 - 0.09±0.03 vs. 0.01±0.01 mg/ml; trypsin IC50 - 0.13± 0.02 vs. 0.73±0.01 mg/ml; anti-denaturant IC50 - 0.10±0.09 vs. 0.12±0.03 mg/ml; and anti-haemolytic activity IC50 - 0.28±0.00 vs. 0.78±0.00 mg/ml) activities; and alkaloids (0.64±0.01 mg/100 g). The study concludes that the aqueous fraction of *B. oleracea* possesses robust anti-ulcer and anti-inflammatory properties attributable to the glucosinolates, phenols, and alkaloid contents.

BMDSWP-03

Protective Effects of *Vernonia amygdalina*-Supplemented Diet on Chronic D-Galactose-Induced Organ Histopathological Changes in Male Wistar Rats

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Oxidative stress induced aging can be experimentally induced by chronic administration of D-galactose, leading to metabolic and structural tissue changes. This study evaluated the effect of dietary incorporation *Vernonia amygdalina (V.A)* on body, organ weights and organ histopathological changes in D-galactose–administered in albino rats. Thirty male albino rats were assigned into five groups (n=5. The treatments were as follows: Group- 1 basal diet (control), Group 2- D galactose (300 mg/kg), Groups 3 and 4- D-galactose plus 5% and 10% *V. amygdalina* diets respectively, and Group 5 standard drug plus D-galactose (100 mg/kg). Treatments lasted six weeks. Results revealed a significantly($p \leqslant 0.05$) lower weight gain in all experimental groups relative to basal diet group (92.50 16.8; 69.17 4.92; 82.00 32.14; 73.17 10.76; 75.83 21.08 in groups 1-5 respectively). There were no significant changes in relative weights of liver, spleen, paired kidney and lungs. Relative heart weight was significantly lower in the group 5 administered aspirin while abdominal fat was significantly higher in all D-galactose administered groups (0.89 ± 0.31; 0.61 ± 0.32; 0.60 ± 0.33; 0.94 ± 0.50 groups 2-5 respectively) relative to group I (0.41 ± 0.34). *V. amygdalina* supplementation normalised abdominal fat accumulation and maintained heart weight within intermediate ranges and normalised liver, kidney and heart histology. In conclusion, *V. amygdalina* dietary incorporation mitigated D-galactose-induced abdominal fat accumulation and helped maintain cardiac and kidney tissue integrity without adversely affecting other organ weights, supporting its potential as a dietary antioxidant for oxidative stress–related tissue damage.

BMDSWP-04

In vitro Evaluation of the Antioxidant Potential of *Senna tora* (L.) Roxb. Seed Extract: Implications for Oxidative Stress ManagementOgba, Raphael Umeh*, Tarfa, F. D. and Okere, O. S

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Oxidative stress plays a pivotal role in the pathogenesis of diabetes mellitus and its complications, necessitating the exploration of natural antioxidant agents from medicinal plants. *Senna tora* (L.) Roxb. is a medicinal plant traditionally used for diabetes management, though its antioxidant potential requires scientific validation. This study evaluated the *in vitro* antioxidant potential of *S. tora* seed solvent fractions (ethanol, ethyl acetate, dichloromethane, and n-hexane) through DPPH, ABTS, and FRAP assays, alongside α-amylase and α-glucosidase inhibitory activities. Solvent fractions were prepared by sequential maceration and assessed for radical scavenging activity using DPPH and ABTS assays, reducing power via FRAP assay, and carbohydrate-digesting enzyme inhibition using α-amylase and α-glucosidase assays, with ascorbic acid and acarbose as respective standards. The DCM fraction exhibited the most potent DPPH scavenging (IC_{50} = 815.0 µg/mL), while the ethanol fraction showed superior ABTS scavenging (IC_{50} = 383.5 µg/mL). FRAP assay revealed that the ethyl acetate fraction (1.76 mM Fe^{3+} at 1000 µg/mL) was comparable to ascorbic acid (1.71 mM Fe^{3+}). For enzyme inhibition, the ethanol fraction demonstrated moderate α-amylase inhibition (IC_{50} = 1962 µg/mL), while the ethyl acetate fraction exhibited potent α-glucosidase inhibition (IC_{50} = 321.2 µg/mL), approaching acarbose (49.70 µg/mL). Findings indicates that all fractions showed concentration-dependent activity, with polar to mid-polar solvents demonstrating superior performance. *S. tora* seeds possess significant antioxidant and carbohydrate-digesting enzyme inhibitory activities, validating their traditional use for diabetes management. The differential solvent activity provides a basis for bioassay-guided fractionation to identify active compounds, positioning *S. tora* as a promising natural source for oxidative stress management and glycaemic control.

BMDSWP-05

In vitro Anti-Inflammatory Activities and Phytochemical Fingerprints of Fractions of *Detarium microcarpum* Stem Bark

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Chronic inflammation represents a significant global health burden implicated in the pathogenesis of various diseases, including cardiovascular disorders, cancer, type 2 diabetes, and autoimmune conditions. The limitations of conventional non-steroidal anti-inflammatory drugs (NSAIDs), such as adverse effects and diminishing efficacy, necessitate the exploration of alternative therapies, particular those derived from medicinal plants. This study investigated the anti-inflammatory activity and chemical composition of petroleum ether (PE), dichloromethane (DCM), and hydro-methanol (HMF) fractions of *D. microcarpum* stem bark using *in vitro* models and HPLC fingerprinting. Anti-inflammatory activity was assessed via erythrocyte membrane stabilisation, inhibition of protein denaturation, and heat-induced albumin denaturation assays, with aspirin serving as the standard control. HPLC was employed to identify phyto-constituents in each fraction. All fractions exhibited significant ($p < 0.0$) dose-dependent anti-inflammatory activity, with the DCM fraction demonstrating the most potent membrane stabilisation effect with IC50 value of 0.9524 mg/mL and the HMF fraction showing the greatest heat-induced protein denaturation inhibition (IC_{50} = 0.4920 mg/mL). HPLC profiling revealed key anti-inflammatory phyto-constituents such as quercetin, kaempferol, lupeol, betulinic acid, methyl gallate, stigmasterol, and β-sitosterol, variably distributed across the fractions. The findings demonstrate that fractions of *D. microcarpum* possess significant anti-inflammatory properties, likely attributable to their rich content of flavonoids, triterpenoids, sterols, and phenolic compounds. The results support the plant's traditional medicinal use and underscore its potential as a source of novel anti-inflammatory agent.

BMDSWP-06

Effect of the Stem-Bark and Leaf Extract of *Ficus exasperata* on Oxidative stress, Electrolytes, and Lipid Profile in 1, 2 Dimethylhydrazine-Induced Toxicity

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This study examined the effects of the stem-bark and leaf extract of *Ficus exasperata* on antioxidants, electrolytes, creatinine, urea, and lipid profile in colorectal cancer. Cancer was induced subcutaneously in Wistar rats using a potent carcinogen, 1,2-dimethylhydrazine (DMH), administered at a dose of 30mg/kg body weight twice a week. Thirty-five rats were used in this study, and were divided into seven groups of 5 rats each. Group 1 maintained normal rat feed (control). Group 2 received the leaf extract of *Ficus exasperata* only. and group 3 received the stem-bark extract of the plant. DMH-only was given to group 4, while groups 5 and 6 were administered DMH for 8 weeks before the commencement of treatment with the leaf extract and stem-bark extract, respectively. Rats in group 7 received the carcinogen for 8 weeks as well, before being treated with the combination of both the leaf and stem-bark of *Ficus exasperata*. After 12 weeks, the animals were sacrificed. The results clearly showed that the DMH administration significantly ($p<0.05$) increased the MDA level of group 4 rats compared to other groups, but this was reversed in other groups that were treated with the different extracts of *Ficus exasperata*. The enzymatic antioxidants of group 4 rats were significantly ($p<0.05$) reduced compared to other groups. There were no significant differences in kidney function markers. Chloride showed no significant difference across the seven groups, but sodium and potassium levels of groups 6 and 7 were significantly reduced compared to other groups. The cholesterol levels of groups 5, 6, and 7 were statistically different from those of group 3. Both the leaf and stem bark of *Ficus exasperata* have the potential to reduce oxidative stress, improve enzymatic antioxidants, and mitigate the effects of DMH in colorectal cancer induction.

BMDSWP-08

Phytochemical Profiling, Antioxidant Capacity and Antidiabetic Potential of Methanolic Extract of *Alstonia boonei* Stem Bark: Implications for Type 1 Diabetes Mellitus (TIDM) Management

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Type 1 diabetes mellitus (T1DM) is an autoimmune disorder characterised by pancreatic β-cell destruction, chronic hyperglycaemia and oxidative stress, leading to severe vascular and metabolic complications. Medicinal plants such as *Alstonia boonei*, long valued in African ethnomedicine, are increasingly explored as potential therapeutic adjuncts, yet their role in T1DM remains understudied. This study evaluated the phytochemicals and antidiabetic potential of methanolic extract of *A. boonei* stem bark. The stem bark of the plant was macerated in methanol and the resulting extract was qualitatively and quantitatively analysed for phytochemicals using standard procedures. The antioxidant and antidiabetic potentials were assessed using standard procedures. From the result, the phytochemical screening of the extract revealed significant levels of alkaloids (1.0 g), flavonoids (0.2 g) and tannins (1.06 g). More so, twenty-two bioactive compounds were identified, with chlorogenic acid (8.51 mg/g) and alstonidine (3.29 mg/g) as the most abundant. Antioxidant assays demonstrated robust concentration-dependent scavenging activities while the enzyme inhibition study revealed significant inhibitory effects on α-amylase and α-glucosidase, underscoring its capacity to attenuate postprandial hyperglycaemia. The synergistic pharmacological actions of flavonoids, phenolics, alkaloids and saponins within the extract suggests a multi-targeted approach in mitigating oxidative stress, inflammation and metabolic dysregulation associated with T1DM. These findings highlight the therapeutic promise of *A. boonei* as a potent plant herb for the management of T1DM, particularly in addressing the dual challenges of oxidative injury and glycaemic disorders. Hence this study expands the pharmacological scope of *A. boonei*, positioning it as a candidate for integrative diabetes therapy.

BMDSWP-11

Entandrophragma utile Stem Bark Ameliorates Hepatic Injury through Antioxidant, Anti-inflammatory and Apoptotic Mechanisms in Wistar Rats

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This study investigated the effect of *Entandrophragma utile* (EU) crude stem bark extract (EUCSE) on selected biochemical, inflammatory, and apoptotic markers in Carbon tetrachloride-CCl_4-mediated liver damage in rats. Thirty male Wistar rats were randomly assigned into six groups (n = 5). Group I (normal control) received distilled water orally and olive oil intraperitoneally-*ip*, while Group II – VI received CCl_4 (0.5 mL/kg bw in olive oil, 1:1 (v/v); *ip*) to induce hepatic injury. Groups III–VI were administered silymarin (50 mg/kg bw), EUCSE (200 mg/kg bw), EUCSE ethylacetate fraction (200 mg/kg bw), and EUCSE ethanol residue fraction (200 mg/kg bw), respectively. All treatments lasted 28 days, except silymarin that was administered post-CCl_4 intoxication (performed within the last 7 days of the study). At the end of the experiment, fasting blood and liver samples were collected for biochemical analyses. CCl_4 administration caused significant ($p < 0.05$) alterations in serum ALT, AST, GGT, and ALP activities, elevated bilirubin, and reduced serum albumin levels, compared to normal control. Also, there was increased malondialdehyde-MDA levels and decreased antioxidant activities including superoxide dismutase-SOD, catalase-CAT, glutathione peroxidase-GPx, and reduced glutathione-GSH concentration. A down-regulation of SOD, CAT and Bcl-2 genes was recorded, with an up-regulation of COX-2, IL-1β, TNF-α and BAX genes in Group II rats. However, the treatments significantly ($p < 0.05$) attenuated these biochemical and molecular alterations to levels comparable to silymarin. Phytochemistry revealed terpenoids, phenolics, flavonoids, and sterols. These findings suggest a hepatoprotective potential for EUCSE exerted through antioxidant, anti-inflammatory and apoptotic mechanisms.

BMDSWP-12

Soursop Seed Ethanol Extract Significantly Improved both Systolic and Diastolic Blood Pressure, Lipid Profiles and Oxidative Stress Biomarkers in Hypertensive Male Wistar Rats

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Extracts from soursop fruits and seeds have been found to have a number of therapeutic applications and pharmacological functions, including antioxidant, anti-inflammatory, and analgesic properties. This study was designed to explore the antihypertensive effect of soursop seed ethanol extract (ANSET) on dexamethasone salt-induced hypertension in male Wistar rats. 25 male rats, weighing 180 – 200 g were randomly distributed into 5 Groups (n = 5). Group 1 served as control while groups 2 - 5 were induced with hypertension by administering a single subcutaneous dose of dexamethasone (2 mg/kg/rat/day), and their water was replaced with 4% salt for 14 days. Group 2 was left untreated, while groups 3 - 5 were treated with Nifedipine (3 mg/kg), 200 and 400 mg/kg of ANSET for 7 days, respectively. Following treatments, the rats were fasted overnight and sacrificed via cervical dislocation. Blood and tissues were collected, weighed and processed for histological and biochemical analysis. Total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), and sodium were determined using RandOX assay kits. Creatinine kinase, angiotensin converting enzyme (ACE) in serum, malondialdehyde (MDA), superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH), glutathione-s-transferase (GST), xanthine oxidase and total proteins (TP) in tissues were measured through standard procedures. ANSET at low and high doses reversed hypertension, boosted the immune system by increasing antioxidant enzymes and reducing oxidative stress, and restored normal hepatocellular, cardiac, and renal functions, this was supported by improvements in hypertension-induced histological changes in the rats liver, heart, and kidneys. This study indicated the efficacy and safety of ANSET in combating hypertension, and more clinical investigations are needed to prove its incorporation into hypertension therapy regimens.

BMDSWP-13

Supplementation of Tomato and Carrot Prevents Hepatic Damage and Oxidative Stress in DMBA Induced Breast Cancer Rats

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Cancer is not a new disease and has afflicted people all over the world. Breast cancer refers to an uninhibited growth and proliferation of cells initiating from breast tissue. This research aimed at exploring the potentials of tomato and/or carrot-supplemented diets in mitigating against breast cancer carcinogen, DMBA in rats. Forty-eight female rats were randomly distributed into 8 groups. Groups 1 and 2 comprised of unexposed rats fed standard diet and DMBA-administered group fed standard diet respectively. Groups 3-5 were DMBA-administered groups fed diets containing 20% tomato, 20% carrot, and 20% of an equally mixed tomato and carrot respectively. For groups 6-8, unexposed rats fed diets containing 20% tomato, carrot, and 20% of an equally mixed tomato and carrot respectively. The feeding was for a period of 10 weeks. Changes in hepatoprotection and oxidative stress markers were determined. Feeding on tomato and carrot supplemented diet resulted in the significant decrease ($p<0.05$) in the activities of ALT, AST, ALP and concentration of TB but an increase in the concentration of TP and ALB in comparison with the breast carcinogen-administered group. and also, there was significant increase($p<0.05$) in the activity of SOD and CAT but significant decrease ($p<0.05$) in MDA concentration in comparison with the breast carcinogen-administered group. Supplementation of diets with either carrot or tomato ameliorates liver dysfunction and increase the antioxidative defence system in rats exposed to breast carcinogen.

BMDSWP-14

Gliricidium Sepium Aqueous Leaf Extract Inhibits Arginase and Angiotensin Converting Enzyme and Elevated Nitric Oxide level in Sodium Fluoride–Induced Hypertension in Wistar Rats

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Hypertension, a known risk factor for cardiovascular diseases, responsible for deaths globally. Sodium fluoride (NaF) has been implicated in hypertension. This study investigated antihypertensive and antioxidant potentials of *Gliricidium sepium* (*GS*) aqueous leaf extract on sodium fluoride-induced hypertension in Wistar rats. Forthy-nine (49) male rats randomly divided into seven groups (n = 7). Hypertension was induced using sodium fluoride (100 mg/kg) with co-administration of *GS* aqueous extract treatment orally. Group I: Normal control; group II: NaF-only, group III: NaF + Lisinopril (10 mg/kg), group IV and V: NaF + 250 and 500 mg/kg extract; group VI and VII: 250 and 500 mg/kg extract respectively. Blood pressures of rats were taken using tail cuff. Activities of arginase and angiotensin converting enzyme (ACE) and nitric oxide (NO) level were determined. Antioxidants were also determined using standard methods. Results showed that aqueous extract of *G. sepium* significantly ($p<0.05$) reduced blood pressures, activities of arginase and ACE in hypertensive and normotensive rats compared to untreated group; nitric oxide level was significantly ($p<0.05$) increased compared to the untreated group. However, there was significant increase in the activities of enzymatic and non-enzymatic antioxidants in the treated groups compared to the untreated group. The findings suggest that aqueous leaf extract of *G. sepium* demonstrated antihypertensive and antioxidant capacities and hence can be used as an alternative therapeutic agent in the management of hypertension and oxidative stress related diseases.

BMDSWP-17

Antioxidant Potential of *Pleurotus ostreatus* Ethanol Extract in Alloxan-Induced Diabetic Male Wisar Rats

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Oxidative stress plays a crucial role in the development and progression of diabetic complications *Pleurotusostreatus* (oyster mushroom) is a nutritionally valuable edible mushroom known to contain bioactive compounds which possess potent antioxidant properties. This study evaluated the antioxidant potential of *Pleurotusostreatus* ethanol extract in alloxan-induced diabetic Wistar rats. The ethanol extract of *Pleurotusostreatus* was administered orally to alloxan-induced diabetic rats for a period of 14 days at 250 mg/kg and 500 mg/kg body weights respectively. Experimental animals were divided into normal control, diabetic control, standard drug-treated and extract-treated groups. Oxidative stress and antioxidant biomarkers evaluated include malondialdehyde (MDA), reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx), using standard biochemical methods. The extract-treated groups significantlyameliorate MDA levels compared with the diabetic control group, indicating decreased lipid peroxidation and oxidative damage. Furthermore, treatment with *Pleurotusostreatus* ethanol extract significantly enhanced the activities of endogenous antioxidant enzymes (SOD, CAT and GPx) and increased GSH levels, indicating restoration of antioxidant defence systems. These effects were dose-dependent and comparable to those observed in the standard drug-treated group. The findings demonstrate that *Pleurotusostreatus* ethanol extract possesses substantial antioxidant activity capable of mitigating oxidative stress associated with alloxan-induced diabetes. Also, *Pleurotusostreatus* ethanol extractaugment the endogenous antioxidant defence system by scavenging free radicals. Therefore, *Pleurotusostreatus* shows promise as a natural therapeutic agent for the management of oxidative stress and prevention of diabetes-related complications.

BMDSWP-18

Phytochemical, Antidiabetic and Antioxidant Activities of Methanol Leaf Extract of *Annona muricata*

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Medicinal plants are increasingly recognised for their therapeutic potential in managing diabetes mellitus and related oxidative stress disorders, mainly due to their rich phytochemical content. *Annona muricata* (soursop) is one such plant with established ethnomedicinal relevance. This study evaluated the phytochemical profile, antioxidant capacity, and alpha-amylase inhibitory (antidiabetic) activity of the methanol leaf extract of *A. muricata*. Qualitative phytochemical screening revealed the presence of alkaloids, phenols, flavonoids, reducing sugars, amino acids, and carbohydrates. The extract demonstrated significant antioxidant potential, exhibiting a dose-dependent ferric-reducing antioxidant power (FRAP) and an IC50 value of 2.331 µg/mL in the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) assay, compared to the standard's (ascorbic acid) IC50 value of 0.548 µg/mL. Alpha-amylase inhibition was observed with an IC_{50} of 2.466 µg/mL, compared to the standard (acarbose) with an IC_{50} value of 0.918 µg/mL, suggesting potential antidiabetic properties. Gas Chromatography-Mass Spectrometry (GC-MS) and High-Performance Liquid Chromatography (HPLC) analyses identified key bioactive compounds, including kaempferol, catechin, phytol, and linoleic acid derivatives, which are known for their antioxidant and antidiabetic properties. These findings substantiate the traditional use of *A. muricata* in diabetes management and suggest its potential as a source of natural therapeutic agents.

BMDSWP-19

Integrative *in vitro* and *in silico* Assessment of Antioxidant Phytochemicals from *Ageratum conyzoides*: Implications for Oxidative Stress-Related Therapeutics

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Oxidative stress is a major contributor to the pathogenesis of numerous chronic diseases, including hepatic, renal, inflammatory, and degenerative disorders. Medicinal plants rich in bioactive phytochemicals represent promising sources of natural antioxidants and therapeutic agents. This study investigated the antioxidant potential of methanolic leaf extract of *Ageratum conyzoides* L. through *in vitro* assays and explored the molecular interactions of its phytoconstituents with selected therapeutic targets using *in silico* molecular docking. The molecular docking was performed on the phytochemicals compounds identified in this plant using autodock Vina, and data analysis was performed using Microsoft excel and Graphpad prism 5. Quantitative phytochemical analysis revealed the presence of significant levels of flavonoids (7.616 ± 0.17 mg QE/g), phenolics (2.482 ± 0.17 mg GAE/g), tannins (1.947 ± 0.02 mg GAE/g), saponins (1.52 ± 0.32%), and alkaloids (1.36 ± 0.01%). Antioxidant activity was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH), hydrogen peroxide (H_2O_2) scavenging, and ferric reducing antioxidant power (FRAP) assays. The extract demonstrated concentration-dependent antioxidant activity, with DPPH radical inhibition increasing from 5.03% to 75.22% and an estimated IC_{50} of approximately 160 µg/mL. H_2O_2 scavenging activity reached 85% inhibition, indicating effective neutralisation of reactive oxygen species. Furthermore, the extract exhibited strong ferric reducing capacity, reflecting substantial electron-donating potential. To elucidate potential mechanisms underlying the observed bioactivity, fifteen phytochemicals identified from *A. conyzoides* were docked against ten protein targets implicated in oxidative stress, inflammation, and hepatic and renal dysfunction. Among the compounds evaluated, luteolin, quercetin, and kaempferol demonstrated the strongest binding affinities across multiple receptors. Luteolin exhibited the highest affinity toward COX-2 (−9.8 kcal/mol) and catalase (−9.5 kcal/mol), while quercetin and kaempferol also showed robust interactions with catalase, CYP2E1, NOS, and NF-κB-related targets. These binding energies surpassed those of the reference drug, suggesting favourable molecular interactions and potential therapeutic relevance. The combined experimental and computational findings demonstrate that *Ageratum conyzoides* is a rich source of antioxidant phytochemicals with significant free-radical scavenging, reducing, and target-binding activities. These results support its potential application in the development of natural antioxidant and anti-inflammatory therapeutics and provide a strong rationale for further pharmacological and *in vivo* investigations.

BMDSWP-20

Hypolipidaemic Effects of Ethanol Leaf Extract of *Hyptis suaveolens* in Paracetamol-Induced Toxicity

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Paracetamol-induced toxicity is a major cause of tissue damage and is frequently associated with disruptions in lipid metabolism, resulting in abnormal serum lipid profiles and an increased risk of cardiovascular complications. This study evaluated the hypolipidaemic effects of the ethanol leaf extract of *Hyptis suaveolens* in an experimental model of paracetamol-induced toxicity. Fresh leaves of *Hyptis suaveolens* were collected, authenticated, air-dried, pulverised, and extracted using ethanol. Experimental animals were divided into groups, and toxicity was induced using paracetamol. Thereafter, varying doses of the ethanol leaf extract were administered, alongside a standard reference drug (silymarin). Serum lipid profile parameters, including total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL), and high-density lipoprotein (HDL) were determined using standard biochemical methods. The results revealed that TC ranged from 1.38 ± 0.49 to 3.97 ± 1.07 mmol/L, TG from 0.66 ± 0.19 to 1.48 ± 0.43 mmol/L, HDL from 0.44 ± 0.08 to 0.83 ± 0.12 mmol/L, and LDL from 0.81 ± 0.12 to 2.96 ± 0.25 mmol/L across the experimental groups. The low-dose extract group (Group D) recorded the highest levels of TC (3.97 ± 1.07 mmol/L), TG (1.48 ± 0.43 mmol/L), and LDL (2.96 ± 0.25 mmol/L), alongside comparatively lower HDL levels (0.71 ± 0.14 mmol/L), indicating pronounced lipid profile disruption. However, treatment groups exhibited significant reductions in TC, TG, and LDL levels, with a concomitant increase in HDL levels compared to the untreated toxic group. The findings suggest that the ethanol leaf extract of *Hyptis suaveolens* possesses hypolipidaemic properties, evidenced by its ability to reduce elevated serum cholesterol, triglycerides, and LDL levels while enhancing HDL levels in paracetamol-induced toxicity. This study provides scientific support for the traditional use of *Hyptis suaveolens* in managing toxicity and lipid abnormalities and highlights its potential as a cost-effective plant-based therapeutic agent.

BMDSWP-21

Biochemical Indices of Wistar Rats Sub-Acutely Exposed to Volatile Organic Compounds

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Petroleum hydrocarbons' exposure has been associated with the development of non-communicable diseases including cardiovascular diseases, allergies, cancers, immune toxicities and reproductive problems. However, little is known about their effects on metabolic dysregulation especially glucose homeostasis. This study therefore investigated the effect of volatile organic compounds (VOCs) on glycaemic dysregulation in Wistar rats. A total of 30 adult albino rats were used and grouped into 5 groups of 6 rats each. The rats were exposed to the individual VOCs by preparing 5%v/v for a period of four weeks. Effects on body weight, lipid profile, antioxidant enzymes, fasting plasma insulin, β-cell function, insulin resistance, inflammatory markers were evaluated and histological studies carried out. The result indicated significant ($p<0.05$) increase total cholesterol, triglyceride, and low density lipoprotein cholesterol in all VOCs exposed rats compared to control rats. There was no difference in SOD activity of all VOCs exposed rats compared with control rats. Catalase activity was significantly ($p<0.05$) low in control rats compared to all VOCs exposed rats. Malondialdehyde was significantly high in all VOCs exposed rats compared to control. β cell dysfunction and insulin resistance were significantly ($p<0.05$) high in all VOCs exposed rats with benzene exposed rats having the highest β cell dysfunction. IL-6 and TNFα level were significantly ($p<0.05$) increased in all VOCs exposed rats. There was high VEGF in xylene, benzene and hexane exposed rats. Histological examination of pancreas revealed changes in the cyto-architecture of pancreas of all VOCs exposed rats except toluene exposed rats where the pancreas was intact. Therefore, exposure to benzene, hexane and xylene components of crude oil could cause glycaemic dysregulation.

BMDSWP-22

In vitro Antioxidant Potential of Fractions of Methanol and Flavonoid-Rich Extracts of *Kigelia Africana* Fruits

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Oxidative stress plays a critical role in the pathogenesis of several chronic diseases, necessitating the search for natural antioxidants with potent free radical scavenging properties. This study evaluated the antioxidant activities of fractions of methanolic extract (ME) and fflavonoid-rich extract (FRE) of *Kigelia africana* fruits, partitioned into ethyl acetate (EA), dichloromethane (DCM), and n-hexane (N-HEX) fractions. The antioxidant potential of the fractions was assessed using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging, nitric oxide (NO) scavenging, reducing power, ferric reducing antioxidant power (FRAP), and thiobarbituric acid reactive substances (TBARS) assays. In the DPPH assay, antioxidant potency decreased in the following order: FRE-DCM > ME-N-HEX > ME-DCM > FRE-EA > FRE- N-HEX > ME-EA. Nitric oxide scavenging activity followed the order: ME-EA > ME-DCM > FRE-EA > FRE-DCM > ME- N-HEX > FRE-n-hex. No significant differences ($p > 0.05$) were observed among the fractions of both extracts in the FRAP and reducing power assays, indicating comparable ferric reducing capacities and reducing power. In the TBARS assay, inhibition of lipid peroxidation was ranked as follows: ME-n-hex > FRE-DCM > FRE-EA > FRE- N-HEX > ME-EA > ME-DCM. Overall, the findings demonstrate that antioxidant activity varied considerably depending on the extraction method, solvent fraction, and assay employed. The DCM and n-hexane fractions exhibited superior activity in DPPH and TBARS assays, while the EA fractions showed enhanced nitric oxide scavenging potential. These results suggest that both ME and FRE fractions contain bioactive compounds with diverse antioxidant mechanisms, supporting their potential application as natural sources of antioxidant agents.

BMDSWP-24

Relationship Between Viral Serological Markers, Triglyceride-Glucose Index, and Genetic Polymorphisms among Adults in Warri, Nigeria

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Chronic viral infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) are associated with metabolic disturbances that increase cardiometabolic risk. This study investigated the relationship between viral serological markers, triglyceride-glucose (TyG) index, and selected genetic polymorphisms among adults in Warri, Nigeria. A cross-sectional study was conducted among 400 participants aged 18–65 years recruited from healthcare facilities and community outreach programs. Serological markers (anti-HCV, anti-HBe, HBeAg, and HIV p24 antigen) were assessed using ELISA, while fasting triglycerides and glucose were measured enzymatically to compute the TyG index. Genotyping of Apolipoprotein E (APOE) and Cholesteryl Ester Transfer Protein (CETP) polymorphisms was performed using PCR and sequencing. Data were analysed using descriptive statistics, t-tests, and logistic regression at $p < 0.05$. Seropositivity rates were 18.0% (anti-HCV), 14.5% (HBeAg), 22.5% (anti-HBe), and 12.0% (HIV p24). Seropositive individuals exhibited significantly higher TyG index values compared to seronegative controls ($p < 0.05$). Carriage of APOE ε4 and CETP TaqIB variants was independently associated with elevated TyG index (OR = 2.15 and 2.98, respectively). These findings demonstrate that viral infections are associated with increased insulin resistance and cardiometabolic risk, with genetic factors further modulating this relationship. Integrating metabolic monitoring and genetic risk assessment into routine management of chronic viral infections is recommended to improve patient outcomes in Nigeria.

BMDSWP-25

Socio-Economic Status as a Determinant of Anthropometric Outcomes Among Male School-Going Adolescents in Rimi Town, Katsina State, Nigeria

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This study investigates the socio-economic determinants of anthropometric outcomes among school-going adolescent boys in Rimi Town, Katsina State, Nigeria. Employing a cross-sectional design, 120 participants were assessed for height, weight, BMI, and MUAC, alongside parental SES indicators such as education and employment. Results revealed significant variations in nutritional status across age groups, with low SES strongly correlated with undernutrition. Parental education and employment emerged as critical determinants of adolescents' health outcomes, underscoring the socio-economic challenges in the region. The findings emphasise the need for multi-sectoral interventions, including educational programs, economic empowerment initiatives, and school feeding schemes, to address the socio-economic and cultural barriers to optimal adolescent health. This study provides a foundation for evidence-based policymaking aimed at improving the well-being of adolescents in similar rural settings.

BMDSWP-26

Relationship between Socio-Economic Status and Anthropometric Outcomes among School-Going Adolescent Boys and Girls in Rimi Town, Katsina State, Nigeria

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Socioeconomic status (SES) is a critical determinant of health outcomes, particularly among adolescents. This study aimed to investigate the relationship between SES and anthropometric outcomes among school-going adolescent boys and girls in Rimi Town. A cross-sectional study was conducted among 500 adolescent boys and girls (ages 12-18) from public and private schools in Rimi Town. SES was assessed using a composite index of parental education, occupation, and household income. Anthropometric outcomes, including height, weight, body mass index (BMI), and waist circumference, were measured using standardised protocols. The results showed significant differences in anthropometric outcomes by SES. Adolescents from lower SES backgrounds had higher rates of underweight (87.5%) and normal weight (12.5%), while those from higher SES backgrounds had higher rates of overweight (25.0%) and obesity (25.0%). Girls from lower SES backgrounds had higher rates of stunting and underweight compared to boys. This study highlights the significant relationship between SES and anthropometric outcomes among school-going adolescent boys and girls in Rimi Town. The findings suggest that targeted interventions are needed to address malnutrition and promote healthy lifestyles among adolescents from disadvantaged backgrounds.

BMDSWP-27

Haematological Evaluation of Haemoparasite in Relation To Sex of Cattle and Goats Slaughtered in Ado Ekiti Central Abattoir

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Haemoparasitic infections are a significant threat to livestock health and productivity in tropical regions such as Nigeria. These infections often lead to anaemia and reduced performance in ruminants. This study was therefore conducted to determine their prevalence and associated haematological changes in cattle and goats in relation to sex in Ado Ekiti central Abattoir. A total of 100 blood samples (65 cattle and 35 goats) were randomly collected from both sexes. Giemsa stained blood smears were examined microscopically for haemoparasites. Packed cell volume (PCV), haemoglobin concentration (Hb), and red and white blood cell counts were determined using standard haematological techniques. Data were analysed using Chi-square version 23 while the student T-test was used to determine the difference. The overall prevalence of infection of 15.0% was encountered out of 100 ruminants examined while the cattle had higher prevalence of infection (16.9%) than goats (11.4%). In cattle, *Anaplasma spp* was the only haemoparasite genus observed with 16.9%, while two genera of haemoparasites, *Anaplasmaspp* (11.4%) and *Trypanosomaspp* (2.9%) co-infection were observed in goats. Among sexes, female cattle and goats had a significantly higher prevalence of infection of 22.7% and 13.8% than males 4.7% and 0.0% respectively. PCV, RBC, HB values were higher in *Anaplasma spp* uninfected ruminants while WBC values were higher in the infected ruminants. In conclusion, *Anaplasma spp* is predominant in cattle and goat's population and therefore, a routine check is hereby recommended to put the haemoparasite under control in Ado Ekiti central Abattoir.

BMDSWP-28

Immunological Reprogramming in Helminth–Protozoan Coinfections in Rural Nigeria

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Concurrent helminth and protozoan infections are highly prevalent in tropical regions and are known to modulate host immune responses. This study investigated immunological profiles and associated environmental determinants of helminth–protozoan coinfections in rural Oke-Ogun, Nigeria. A cross-sectional study involving 400 participants aged 2–60 years was conducted. Parasitological analysis was performed using microscopy, while serum cytokines (IL-4, IL-5, IL-10, TGF-β, IFN-γ, and IL-12) were quantified using enzyme-linked immunosorbent assay. Sociodemographic and environmental data were obtained using structured questionnaires. Helminth-only, protozoan-only, and coinfections were observed in 45.3%, 20.8%, and 14.5% of participants, respectively. Coinfected individuals showed significantly elevated Th2 and regulatory cytokines (IL-4, IL-5, IL-10, TGF-β) with concomitant suppression of Th1 cytokines (IFN-γ and IL-12) ($p < 0.001$). Multivariate analysis identified younger age, poor sanitation, and barefoot walking as significant predictors of immune skewing. These findings indicate that helminth–protozoan coinfections induce immunological reprogramming characterised by enhanced regulatory and Th2 responses and diminished Th1 immunity. This altered immune profile may compromise pathogen clearance and influence vaccine responsiveness. Integrated control strategies targeting environmental risk factors and parasitic burden are essential to mitigate immune dysregulation and improve health outcomes in endemic communities.

BMDSWP-30

Evaluation of Anti-inflammatory Protective Activity of Aqueous-Methanolic Extract of Soursop (*Annona muricata*) Leaves on Kidney Function Parameters and Electrolytes Balance in Formalin Induced Pain Model

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This study evaluated the anti-inflammatory protective activity of aqueous-methanolic extract of *Annona muricata* (soursop) leaves on kidney function parameters and electrolytes balance in formalin induced pain model, a model commonly used to mimic inflammatory kidney dysfunction. Analysis of creatinine, urea, electrolytes (potassium, sodium, and chloride), and bicarbonate concentrations were carried out using methods in the recommended kits. Anti-inflammatory activity was assessed on thirty (30) male wistar rats. Male wistar rats were divided into six groups (n=5), normal control, induced/formalin control, references groups treated with diclofenac sodium (10 mg/kg) and aspirin (10 mg/kg); and groups treated with aqueous-methanolic extract of *Annona muricata* leaves at 100 mg/kg and 300 mg/kg. Data were presented as a mean ± standard error of mean of five determinations. Statistical analysis was carried out using one way analysis of variance (ANOVA). Difference were statistically significant at $p<0.001$. The result showed that the formalin-induced group recorded significantly lower sodium concentration ($131.73 \pm 0.98^{c,d}$) and elevated potassium concentration ($4.47 \pm 0.24^{c,d}$), indicating that an electrolyte imbalance is likely due to inflammation-induced cellular and renal dysfunction. Additionally, increased urea (6.57 ± 0.43^{e}) and creatinine levels (102.07 ± 1.07^{f}) suggested compromised kidney function, a common inflammatory response, especially in nephrotoxic scenarios. Treatment with aqueous - methanolic extract of *Annona muricata* leaves at 100 mg/kg and 300 mg/kg showed improvements in these parameters. Sodium levels increased compared to the induced/formalin not treated group, approaching normal levels in the higher dose group (138.90 ± 0.70^{b}), while potassium levels decreased (3.87 ± 0.18^{ab}), indicating a potential regulatory effect on electrolyte balance. Furthermore, creatinine and urea levels decreased significantly in both dosages, with the 300 mg/kg dose showing a stronger effect for urea (3.77 ± 0.09^{b}) and creatinine (85.97 ± 2.8^{c}) suggesting that leaves of *A. muricata* may support renal function under inflammatory conditions.

BMDSWP-31

Phytochemical Analysis and Antioxidant-Mediated Hepatoprotective Effects of *Solanum erianthum* Leaf Extract against Carbon Tetrachloride–Induced Liver Injury in Wistar Rats

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Solanum erianthum is gaining recognition as a local therapy for diverse diseases, including liver impairment caused by environmental pollutants. This study examines the antioxidant and hepatoprotective effect of the aqueous extract from *S. erianthum* leaves in ameliorating liver aberration induced by carbon tetrachloride (CCl_4). The aqueous leaf extract of *S. erianthum* was obtained by a known method. The rats were orally induced with 100mg/kg of CCl4, except the normal control group. Thereafter, treatment was administered at varying doses of 100mg/kg and 200mg/kg orally with the aid of oral gavage for a period of 14 days, while the positive control group received 100mg/kg body weight of silymarin. The blood and the liver tissue were extracted after sacrificing the rats for biochemical and histological evaluation. The free radical-neutralising role of the extract, as determined utilising FRAP and ABTS assays, revealed its capacity to attenuate oxidative stress by markedly increasing the activities of endogenous antioxidant enzymes ($p<0.05$) such as superoxide dismutase and catalase, while also reducing malondialdehyde levels. The histological architecture revealed that treatment with the aqueous leaf extract significantly fixed liver damage imposed by CCl_4 exposure. This was displayed in a notable lowering in serum levels of liver enzymes such as alanine transaminase, alkaline phosphatase, and aspartate transaminase. Histological examination further corroborated these findings, presenting reduced liver cell inflammation and degeneration in groups treated with standard drug (silymarin) relative to the group exposed to CCl_4 only. This research gives an insight into the potency of the leaf extract of *S.eriathum* for treating liver damage poses by environmental stressors.

BMDSWP-32

Adjunctive Strategy for Preventing Malarial-related Liver Damage and Dysfunction

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Malaria infection is associated with liver damage and malfunction leading to depressed immune systems. This study assessed the liver protective potential of metformin and artesumate-amodiaquin combination therapy in *Plasmodium berghei* infected mice. Thirty-six adult mice were randomly divided into six groups labelled I-VI (n=15). Group I was normal control that received water *ad libitum*. Groups II-VI were infected with *Plasmodium berghei*. Group II was negative control, not treated while group III was positive control treated with artesunate-amodiaquine. Groups IV and V received metformin for seven days before the parasitaemia induction, with group IV receiving no post-infection treatment while group V was treated with artesunate-amodiaquine. Group VI was treated with metformin and artesunate-amodiaquine concomitantly after parasitaemia induction. Initial parasitaemia was established 72 hours after parasite inoculation before commencing post-infection treatments. All curative treatments lasted for three days. Final parasitaemia was determined 24 hours after the last treatment, and animals euthanised. Harvested liver tissue were homogenised and the homogenates used for biochemical assays. Increased liver enzyme activities, depleted antioxidant systems and imbalanced inflammatory mediators were recorded in untreated malaria cases. These alterations were brought to near normal in all the treated groups, more prominently in-group V. Thus, metformin demonstrated high adjunctive potential with artesunate-amodiaquine in ameliorating hepatic damage and dysfunctions implicated in malaria infection. This study concludes that metformin could be a potential adjunct to be combined with ACTs in mitigating malaria-related hepatic malfunction probably by boosting host immune systems.

BMDSWP-33

Toxicological Investigation of Polyphenol-Rich *Sorghum Bicolor* Supplement in Wistar Rats

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Sorghum bicolor is a rich source of antioxidant polyphenols and is widely promoted for managing diseases associated with oxidative stress, inflammation, and neurodegeneration. However, despite extensive pharmacological claims, information on the toxicological safety and tolerability of polyphenol-rich *Sorghum bicolor* supplement (SBS) remains limited. This study evaluated the acute and sub-acute toxicological effects of SBS in male and female Wistar rats. Acute toxicity was assessed using modified Organisation for Economic Cooperation and Development (OECD) 423 guidelines by administering a single oral dose of SBS (2000 mg/kg) to male and female rats and observing them for 14 days. Sub-acute toxicity followed OECD 407 guidelines, with rats receiving distilled water (10 mL/kg) and SBS (125 or 250 mg/kg) orally for 28 days. Neurobehavioral assessments were conducted using open field, elevated plus maze, Y-maze, and forelimb hanging wire tests. Haematological, biochemical, antioxidant, and histomorphological evaluations of the brain, liver, and kidney were performed. No mortality or overt toxicity occurred following acute exposure. Sub-acute administration did not impair motor activity, muscle strength, or anxiety behaviour; however, high-dose SBS impaired memory in both sexes. The 125 mg/kg dose did not significantly alter lipid profiles or cardiovascular risk indices. Variable changes were observed in serum albumin, bilirubin, urea, and creatinine levels. High-dose SBS altered antioxidant status and induced histomorphological changes in the brain, liver, and kidneys, indicating potential organ toxicity. High-dose SBS exposure may produce deleterious effects on neurological and vital organ integrity, highlighting the need for careful dose optimisation and safety evaluation before therapeutic application.

BMDSWP-34

Unlocking Fonio's Potential: A Novel Source of Amylase for Industrial Applications

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Fonio, (*Digitaria exilis*, *Digitaria iburua*) a traditional West African cereal, has been found to be rich source of amylase, an enzyme widely used in various industrial applications. This study explores the potential of fonio as a sustainable and efficient source of amylase, comparing its properties and performance to traditional sources. Our results showed that fonio-induced amylase exhibits high enzymatic activity, stability and specificity, making it an attractive alternative for industrial uses. An optimum condition based on days of germination was achieved by steeping grains in water and water containing phosphate salts at pH 6.5. However, second day of germination produced the highest amount of amylases. The obtained amount was higher for grains steeped in buffer pH 6.5 compared to just water. *Digitaria iburua* produced higher amount of amylases compared to *Digitaria exilis*. *Digitaria exilis* gave 17498 U/mgprotein while *Digitaria iburua* gave 24332 U/mgprotein. Optimum condition in terms of pH and temperature were equally investigated and 30^{o}C was the best temperature for the induction of amylases. The use of fonio as a source of amylase offers advantages including reduced water requirements, lower production costs and increased sustainability This research highlights the potential of fonio to contribute to a more sustainable and efficient industrial enzyme production, with implications for the food, beverage and biofuel industries Therefore fonio, a locally grown cereal possesses amylases as a total replacement to imported barley for biological applications.

BMDSWP-36

Assessment of Dichlorvos and Aluminium Phosphide Binary Mixture Toxicity on Male Reproductive Parameters of Wistar Rats

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This study evaluated the reproductive toxicity of a binary mixture of dichlorvos and aluminium phosphide, locally formulated as an insecticide known as *Ekamabu*, on male Wistar albino rats. Thirty adult male rats were randomly assigned into five groups named A–E. Groups B–E were administered Ekamabu orally at graded doses of 0.26, 0.52, 0.78, and 1.30 mg/kg body weight respectively for 28 consecutive days, while the control group (A) received 0.1ml/animal of olive oil. At the end of the exposure period, the rats were sacrificed and reproductive indices: testicular weight, epididymal sperm count, sperm motility, serum testosterone, and total cholesterol concentrations was assessed using standard methods. Ekamabu exposure resulted in death of eight treated rats. The results showed no significant changes ($p > 0.05$) in the rat body weight across all groups. However, Ekamabu exposure caused a significant decrease ($p < 0.05$) in testicular weight and epididymal sperm count in treated groups compared to controls. Testicular weight for groups A–E were 1.42, 1.32, 1.30, 1.28, and 1.29 g, respectively, while corresponding sperm counts were 9.17×10^7, 6.20×10^7, 6.77×10^7, 6.14×10^7, and 5.12×10^7 cells/ml. Serum testosterone levels and sperm motility were also significantly decreased ($p < 0.05$) in Ekamabu-treated groups, with testosterone concentrations of 0.65, 0.51, 0.48, 0.47, and 0.43 ng/mL and sperm motility of 84%, 59%, 52.5%, 51.67%, and 50% for groups A–E, respectively. Further, serum total cholesterol concentration was significantly increased ($p < 0.05$) in Ekamabu-treated rats. These findings indicate that sub-chronic exposure to Ekamabu may induce significant reproductive toxicity, mediated through endocrine disruption and impairment of spermatogenesis. These findings highlight the need for regulatory oversight, public awareness, and safer pest-control alternatives to reduce environmental and human health risks.

BMDSWP-37

Perinatal exposure to Bisphenol A (BPA) Disrupts Leptin Signalling and Induces Metabolic Dysfunction in Pre-Adolescent Wistar Rats

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Bisphenol A (BPA) is a ubiquitous endocrine disruptor linked to metabolic syndrome. This study investigated the dose-dependent effects of perinatal BPA exposure on leptin levels and metabolic homeostasis in pre-adolescent Wistar rats. Pregnant rats received oral BPA at 0, 2.5, 25, or 2500 µg/kg from gestational day 0 to postnatal day (PND) 13. Pups were directly gavaged with the same doses from PND 14 to 28, then euthanised on PND 29. Serum leptin, insulin, glucose, GLP-1, lipids, and oxidative stress markers were analysed. BPA exposure significantly reduced serum leptin levels in a dose-dependent manner ($p \leqslant 0.05$), correlating with increased body weight, particularly at 2500 µg/kg. A non-monotonic response was observed for insulin—decreasing at lower doses but increasing at 2500 µg/kg—while fasting glucose remained elevated across all BPA groups. Lipid profiles were disrupted: triglycerides increased at 2.5 and 2500 µg/kg, while LDL rose at the highest dose. Early-life BPA exposure, even at human-relevant doses, suppresses leptin and impairs glucose and lipid metabolism. These findings suggest that BPA-induced leptin suppression may be a primary driver of metabolic dysfunction, potentially predisposing individuals to obesity and metabolic disorders later in life.

BMDSWP-38

Effects of Selected Secondary Metabolites in Leaf Extract of *Jatropha tanjorensis* on Some Gonadal Hormones in Male Wistar Rats

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The use of medicinal plants in societies for the development of many drugs has increased in recent times. Plant–based medicine with about 80% global population relying on it because of its cheap source and availability. *Jatropha tanjorensis* is one such plant used for treatment of reproductive problems such as infertility. Literature on isolation and characterisation of the secondary metabolites in this plant may not be common. This research work was carried out to isolate, characterise and determine the effects of *J. tanjorensis* on the gonadal hormones of male wistar rats. The secondary metabolites were isolated, characterised, and identified using nuclear magnetic resonance. Twenty-five male wistar rats weighing between 180-200 g randomised into 5 groups, 3 controls and 2 treatment groups of 5 rats each. The treatment groups received 25 mg/kg body weight of phytol and lupeol orally by gastric lavage for 14 days. The animals were anaesthetised and blood samples collected for hormonal assay. The experimental data was analysed using ANOVA with Statistical Package for Social Sciences (SPSS) version 17.0, while the post hoc test assessed using Duncan Multiple Range Test at $p \geqslant 0.05$. There was a significant decrease ($p < 0.05$) in the levels of FSH, LH and TST in the treatment groups when compared to the control groups. The motility and sperm count decrease significantly ($p < 0.05$) when treatment groups were compared to the control animals. Phytol and lupeol present in the leaf extract of *Jatropha tanjorensis* were responsible for the decrease in some of the gonadal hormones studied.

BMDSWP-39

Hesperidin Mitigates Inflammation and Autoimmune Markers in Complete Freund's Adjuvant (CFA)-Induced Rheumatoid Arthritis: Biochemical and Histopathological Insights in a Rat Model

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Rheumatoid arthritis (RA) is a debilitating autoimmune disorder marked by chronic inflammation, joint destruction, and limited treatment efficacy. This study investigates the therapeutic potential of hesperidin, a natural citrus flavonoid, in mitigating inflammation and autoimmune responses in a Complete Freund's Adjuvant (CFA)-induced RA rat model. A total of 48 female rats were divided into 6 groups of 8 each after acclimatisation for 7 days. Group 1 received normal saline, while group 2 was induced RA using 0.1 ml of CFA subcutaneously and left untreated. Group 3 was induced RA with CFA and treated with naproxen at 8 mg kg-1 body weight. Groups 4, 5, and 6 received HSP at 100, 200, and 400 mg kg-1 body weights after RA induction. Over 28 days, hesperidin administration significantly reduced erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and rheumatoid factor (RF) in a dose-dependent manner. Histopathological scoring of rat's joints revealed marked improvement in synovial inflammation, bone erosion, and cartilage degradation, particularly at the 400 mg/kg dose, which achieved effects comparable to or exceeding those of naproxen, the standard drug used for this study. These findings emphasise hesperidin's potent anti-inflammatory, immunomodulatory, and tissue-protective properties, highlighting its promise as a, natural candidate for adjunct or alternative RA therapy.

BMDSWP-40

Effect of Ethanolic Leaf Extract of *Anredera cordifolia* on Experimental Testosterone-Induced Benign Prostatic Hyperplasia (BPH) in Albino Rats

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This study evaluated the effects of ethanol extract of *Anredera cordifolia* leaves (EEACL) on testosterone-induced BPH in albino rats. Twenty-five rats were randomly divided into five groups (n = 5). Group 1 served as the normal control, while Group 2 was induced with BPH but left untreated. Group 3 received 1 mg/kg body weight (b.w.) finasteride as the standard control. Groups 4 and 5 were induced and treated with 100 and 200 mg/kg b.w. of EEACL, respectively. BPH was induced in Groups 2–5 via subcutaneous injection of testosterone (5 mg/kg b.w.) for 21 days. Treatment with EEACL resulted in a significant ($p < 0.05$) reduction in prostate weight, bladder weight, and prostate index compared to the untreated group. Prostate-specific antigen levels were significantly decreased ($p < 0.05$) in extract-treated groups (3.39 ± 0.36) compared to the untreated group (6.75 ± 0.32). Serum testosterone levels showed a significant ($p < 0.05$) reduction in the finasteride-treated and extract-treated groups, with a dose-dependent decline observed in the EEACL groups. Additionally, serum HDL levels were significantly ($p < 0.05$) elevated in the extract-treated animals (4.46 ± 0.28) relative to the untreated group (2.07 ± 0.23). Antioxidant parameters revealed significant ($p < 0.05$) increases in GSH and CAT activities in the treatment groups. Furthermore, liver enzyme markers were significantly ($p < 0.05$) decreased compared to the untreated control, suggesting improved hepatic function. In conclusion, EEACL demonstrated anti-BPH activity, evidenced by reduced prostate enlargement, improved biochemical parameters, enhanced antioxidant status, and favourable hormonal modulation.

BMDSWP-41

Gas Chromatography-Mass Spectrometry Characterisation and Toxicological Evaluation of Methanolic Leaf Extract of *Morinda lucida*

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Parts of *Morinda lucida* (*M. lucida*), commonly identified as the brimstone tree is used in herbal practice for treatment of malaise and ailments such as malaria, high blood pressure and diabetes mellitus. Despite documented research on its therapeutic relevance, there are concerns on its safety profile. The aim of this study is phytochemical profiling and *in vivo* toxicological evaluation of methanolic extract of *M. lucida*. Crude extract of *M. lucida* was obtained by cold maceration method, the phytoconstituents were analysed by standard phytochemical procedures and Gas-Chromatography Mass-Spectrometry (GC-MS) analysis. Lorke's method was employed in toxicity assessment (LD50). *In vivo* toxicological effect of the extract was conducted based on assessment of oxidative stress markers, lipid profile, parameters of liver and kidney function. The experimental animals were administered extract doses of 100, 250 and 500 mg/kg body weight. The GC-MS analysis identified thirty-five (35) bioactive compounds in the extract with phytol, n-hexadecanoic acid and 9, 12, 15-octadecatrien-1-ol being compounds of relative abundance. The LD50 of the extract was < 5000 mg/kg. There was significant decrease ($p < 0.05$) in the serum concentration of the free radical scavengers at the administered dose of 500 mg/kg with an enhanced malondialdehyde concentration. Furthermore, there was dose-dependent increase in the concentration of liver and some kidney function markers. The findings suggest that, despite the bioactive constituents and medicinal benefits of *M. lucida* leaf, caution should be used during its administration due to its potential toxicity at higher doses.

BMDSWP-42

Association of Angiotensin Converting Enzyme Gene Polymorphism Among Overweight Hypertensive Patients Attending Murtala Muhammad Specialist Hospital, Kano State, Nigeria

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One risk factor for high blood pressure is obesity. An enzyme called the angiotensin-converting enzyme (ACE) is responsible for vasoconstriction. It is possible that ACE gene insertion or deletion polymorphisms are linked to hypertension. The goal of this investigation is to identify a correlation between blood pressure and polymorphisms in the ACE gene in obese patients. This study employed a cross-sectional design and an analytical observational approach. To investigate ACE gene polymorphism, blood samples were collected from 40 overweight patients. The Kruskal-Wallis test was employed to examine the correlation hypothesis. The findings indicated that type II (62.5%), type ID (25%), and type DD (12.5%) ACE gene polymorphisms were the most prevalent; the mean systolic blood pressure values for type II were 129.5 mmHg, type ID was 142.3 mmHg, and DD was 64.9 mmHg. Diastolic pressure was 90.5 mmHg on average for ACE gene polymorphism type II, 101.4mmHg on average for type ID, and 113.9 mmHg on average for type DD. There was a correlation between the angiotensin ACE gene polymorphism and systolic pressure at p=0.002 and the diastolic pressure at p=0.004. There was a correlation between ACE gene polymorphism and BMI at p= 0.004, waist circumference at p= 0.001, body adiposity index at p= 0.003, and mid-upper-arm circumference at p= 0.006. Thus, we concluded that there is a relationship between blood pressure, degree of obesity, as measured by anthropometric indices, and polymorphism in obese, hypertensive patients.

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Biochemical Evaluation of the Therapeutic Use of Nigerian Bonny Light Crude Oil in the Testes and Brain of Male Albino Rats

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Crude oil therapy is a common practice in the Niger Delta area of Nigeria. The study investigates the biochemical evaluation of the testes and brain of male albino rats exposed to diluted Nigerian Bonny Light Crude Oil (NBLCO). A total of 25 male albino rats were used for the research, and their exposure to diluted crude oil was achieved through oral administration of increasing doses for 28 days. The animals were grouped into four: 0.5 ml/g body weight distilled water, 0.5 ml/g body weight olive oil, 1.0 ml (0.5 ml NBLCO + 0.5 ml olive oil)/g body weight, and 1.5 ml (1.0 ml NBLCO + 0.5 ml olive oil)/g body weight. The effects of the administration on the testes and brain homogenates were investigated, and histopathology analyses of both organs were carried out using standard techniques. Creatine kinase activity, lipid profile analyses, and total protein concentrations were assayed using research kits. Testosterone concentration was assayed using ELISA kits. Data from the study showed that diluted crude oil significantly ($P<0.05$) altered all the biochemical parameters evaluated in the testes and brain, which could result in impairment of the organs. The histopathological study reveals that damage was done to the testes and brain cells in a dose-dependent manner in the experimental groups compared with the normal control group. Conclusively, the therapeutic use of Nigerian Bonny Light crude oil should be discouraged since its toxicological risk outweighs the pharmacological potential.

BMDSWP-44

Response of Renal Specific Genes, Biochemical and Redox Indices to Embalming Fumes in Rat

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Occupational inhalation of cadaver preservative fumes represents a significant hazard in anatomy laboratories and mortuary environment. The kidney is particularly vulnerable to fume-induced toxicity. This study examined the nephrotoxic effects of three formulated cadaver preservative fumes in male Wistar rats. 28 adult male Wistar rats were randomly assigned to four groups(=7)Group I (control, exposed to humidified ambient air), Group II (chronic exposure, Formulation A:40mL formalin, 30mL ethanol, 5mL phenol, 15mL glycerol, 10mL methanol), Group III (sub-chronic,Formulation B: 25mL formalin, 17.5mL ethanol, 3.5mL phenol, 10mL glycerol, 7.5mL methanol,36.5mL distilled water), and Group IV (acute exposure, Formulation C: 10mL formalin,5mL ethanol, 2mL phenol, 5mL glycero1, 5mL methanol, 73mL distilled water), whole body exposure duration: 6hr/day for 120 days, within a controlled exposure chamber. Fume concentrations were verified using a calibrated photoionisation detector (ppbRAE 3000+). Kidney tissue homogenates were assayed for total thiol and non-protein thiol concentrations, TBARS,NTPDase and 5'-nucleotidase activities, and ALA-D activity. Renal function indices were determined by evaluating serum urea, creatinine, uric acid, total and conjugated bilirubin. The relative gene expression of KIM-1, cystatin C, IL-6, IL-1β, NGAL, TNF-α, IL-10, HO-1, ICAM-1, and paraoxonase was evaluated by RT-PCR. Results revealed significantly ($p<0.05$) reduced total thiol, non-protein thiol, and ALAD activity, and elevated TBARS, NTPDase and 5'-nucleotidase levels. Serum creatinine, urea, uric acid, total bilirubin, and conjugated bilirubin were elevated across all exposure groups, indicating progressive renal failure and disrupted purine and bilirubin metabolism, more significant in chronic exposure group

(Group II). Molecular analysis revealed significant upregulation of KIM-1, cystatin C, NGAL, IL-6, IL-1β, TNF-α, HO-1, and ICAM-1 expression, suggesting acute tubular injury, inflammatory activation, and endothelial recruitment, Downregulation of IL-10 and paraoxonase indicate loss of anti-inflammatory and antioxidant renal protection. These findings highlight the nephrotoxicity of cadaver fumes and the necessity for improves occupational safety measures in anatomy laboratories and mortuary environments.

BMDSWP-45

Nephroprotective Potential Of Ethanolic Extracts Of *Ipomoea asarifolia* Against Potassium Dichromate - Induced Acute Kidney Injury Paradigm In Wistar Rats

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Potassium dichromate is a widely known heavy metal for inducing severe acute kidney injury (AKI) primarily mediated by massive reactive oxygen species (ROS) generation via oxidative stress. *Ipomoea asarifolia;* is a natural plant traditionally used due to its potency in diseases management. This study aims to investigate the protective effect of *Ipomoea asarifolia* on the kidney of induced wistar rats by potassium dichromate. Materials and Methods: Thirty- five adult male albino rats were divided into five groups, Seven (7) rats in group I (control) and in each of group II, III, IV and V induced with 15 mg/kg potassium dichromate orally. Group II (untreated), while Groups III received livolin forte orally (30 mg /kg/bw), Group IV and V were administered with 250 and 500 mg/kg extract of *I. asarifolia* respectively daily for 2 weeks. Blood was taken, Kidney was harvested and homogenised, thereafter biochemical assays such as Glutathione peroxidase (GSH), Superoxide dismutase (SOD), catalase (CAT), total protein, KIM-1, were assessed. The results showed that administration of potassium dichromate caused a significant ($p< 0.05$) decline in renal compromise characterised by a severe reduction in tissue activity of the antioxidant enzymes GSH, SOD, CAT signifying intense intracellular lipid peroxidation. Concurrently, systemic inflammatory cascades were upregulated, marked by a massive surge in serum interleukins IL-6 and IL-1. Furthermore, an elevation in tissue level of KIM-1 was observed, indicating profound acute desquamation of the proximal convoluted tubule epithelium. Remarkably, treatment with *Ipomoea asarifolia* significantly mitigated these toxic alterations in a dose-dependent manner. The extract was able to preserved and replenished kidney total protein and boosted endogenous antioxidant enzymes. Furthermore, *Ipomoea asarifolia* administration profoundly suppressed the overproduction of pro-inflammatory cytokines in serum and significantly down-regulated the pathognomonic renal injury biomarker KIM-1. The findings clearly demonstrate that *Ipomoea asarifolia* exerts exceptional nephroprotective action against potassium dichromate-induced acute kidney injury. The therapeutic mechanism may be attributed to its potential to arrest heavy-metal-induced oxidative stress, inhibit systemic pro-inflammatory cytokine cascades, and guard proximal tubular structural integrity, validating its potential as a natural therapeutic countermeasure against heavy metal nephrotoxicity.

BMDSWP-46

Effect of Water Soluble Phyto-Extract of *Terminalia catappa* L. against Bacteria-Mediated Wilting and Stunting in Tomato Plants

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It is a common knowledge that bacteria species can initiate wilting and eventual stunting of the growth in tomato (*lycopersicon esculentum)* plant varieties. However, there is a dearth of information on effective control of bacterial-mediated wilting in tomato production and thus still open. In this report, microorganism were isolated from fruits, soil and stem of wilting tomato using the pour plate method; and the isolate were partially identified and characterised by standard microbiological techniques. The antimicrobial properties of Tropical almond *(Terminalia catappa L.)* against the isolates *w*ere determined using agar-well diffusion method. The results show that the microbial colony count are tomato fruits (42), top soil layer (38), soil second layer (21), soil 3rd layer (4) and tomato stem (21). Microbial isolate identified includes; *Bacillus licheniformis, Routella planticola* (*Klebsiella), Bacillus licheniformis and staphylococcus arlettae* in the soil sample. *Staphylococcus xylosus, Bacillus trypoxylicola, Klebsiella pneumoniae* in tomato stem, *Bacillus megaterium, citrobacter freundi and pantoea ananatis* in tomato fruit. In addition, aqueous extract of tropical almond effectively inhibited the growth of *Bacillus licheniformis, staphylococcus arlettae, citrobacter freundi, Staphylococcus xylosus, Routella planticola (Klebsiella*), and *Bacillus trypoxylicola* associated with tomato wilting. This suggest that aqueous extract of tropical almond, have potential as natural antimicrobial agents against tomato wilting. This finding may serve as a public awareness to tomato farmers.

BMDSWP-47

Phytochemical Characterisation, Antioxidant Profiling, and *in silico* Anti-Inflammatory Evaluation of *Peperomia pellucida* (Shiny Bush)

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Peperomia pellucida, a widely used medicinal plant, possesses diverse bioactive constituents with potential therapeutic benefits. This study aims to analyse the phytochemical constituents of the aqueous extract of *Peperomia pellucida* and investigate its antioxidant and anti-inflammatory activities through both *in vitro* and *in silico* methods. Phytochemical analysis revealed high concentrations of alkaloids (91.65 mg/g), phenols (56.16 mg/g), saponins (20.99 mg/g), and flavonoids (14.02 mg/g). Laboratory-based antioxidant assays revealed important radical neutralising potential with 2,2-diphenyl-1-picrylhydrazyl (DPPH) at 27.05%, 2,2'-azino-bis (3 ethylbenzothiazoline-6-sulfonic acid) (ABT) at 78.72%) hydroxyl (OH) at 55.35% and nitric oxide (NO) at 35. 66%. High-performance liquid chromatography (HPLC) profiling of the *Peperomia pellucida* extract revealed the presence of peperomin E (3.37 mg/g), β-caryophyllene (3.18 mg/g), and pellucidin A (1.09 mg/g). Molecular docking studies targeting the cyclooxygenase-2 using the Protein Data Bank structure 5KIR, indicates that Peperomin E showed a strong binding affinity (−9.702 kcal/mol), when compared to that of the standard inhibitor rofecoxib (−9.720 kcal/mol) and formed a hydrogen bond with ARG120 along with multiple hydrophobic interactions. β bisabolene also displayed favourable binding (−7.986 kcal/mol). MM-GBSA binding energy analysis supported these findings, with rofecoxib (−64.95 kcal/mol) and β-bisabolene (−43.42 kcal/mol) exhibiting favourable free energy profiles, outperforming ibuprofen, the standard drug. The pharmacokinetic and toxicity evaluations indicated that the lead bioactive compounds adhered to established pharmaceutical suitability criteria, demonstrating acceptable pharmacokinetic profiles. In summary, *Peperomia pellucida* contains bioactive compounds with potent antioxidant properties and promising COX-2 inhibitory potential. These findings suggest that the plant serves as a rich reservoir of bioactive anti-inflammatory agent, demanding further preclinical and pharmacological investigation.

BMDSWP-48

Effects of *Gladiolus psittacinus* Bulb Supplemented Diet on Brain Enzyme Activities in Streptozotocin-Induced Diabetic-neuropathy Rats

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Diabetic neuropathy is a common complication of diabetes mellitus, associated with neuroinflammation, cholinergic dysfunction, and impaired neuronal ion transport. This study evaluated the neuroprotective and antineuropathic effects of *Gladiolus psittacinus* bulb powder in streptozotocin (STZ)-induced diabetic rats. Seventy male rats were divided into seven groups each: normal control, STZ-induced diabetic control, acarbose-treated group, rats fed 5% and 10% *G. psittacinus* bulb powder-supplemented diets, and their respective combinations with acarbose. The activities of adenosine deaminase (ADA), acetylcholinesterase (AChE), Na^+/K^+-ATPase, and angiotensin-converting enzyme (ACE) were assayed in brain tissues using standard biochemical methods. STZ induction significantly ($P < 0.05$) increased ADA, AChE, and ACE activities while reducing Na^+/K^+-ATPase activity compared with the normal control, indicating neuroinflammation and altered neuronal function. Supplementation with *G. psittacinus* bulb powder significantly reversed these changes in a concentration-dependent manner. The 10% bulb powder diet markedly enhanced Na^+/K^+-ATPase activity and reduced ADA and ACE activities. Combined treatment with acarbose and *G. psittacinus* further improved AChE and ACE activities, suggesting synergistic neuroprotective effects. *Gladiolus psittacinus* bulb powder exhibits significant neuroprotective properties by modulating key neurotransmitter- and ion-regulating enzymes, supporting its potential use in the management of diabetic neuropathy.

BMDSWP-49

The Toxicological Profile of Lacatomtom: Implications for Oxidative Stress and Organ Damage: A Review

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Lacatomtom (LTT), a psychoactive mixture of Tomtom candies and Lacasera beverage, has gained popularity among Nigerian youth despite significant health risks. This review synthesises current experimental and computational data to provide a comprehensive toxicological profile of the mixture. The study specifically evaluates the multisystaemic impact of LTT and explores the hypothesis that oxidative stress serves as the fundamental mechanism for the observed organ damage. This review analyses findings from several *in vivo* Wistar rat models and *in silico* investigations conducted between 2020 and 2025. Data regarding hepatic and renal biomarkers, lipid profiles, reproductive indices, and neurotoxic effects were aggregated. Additionally, *in silico* ADMET analysis was reviewed to predict the pharmacokinetic and toxicological properties of 47 identified chemical constituents. The synthesised data consistently show that LTT induces significant elevations in liver enzymes (ALT, AST, ALP) and creatinine, alongside general cellular cytotoxicity marked by increased LDH levels. *In silico* results indicate that key constituents like 3-(hydroxyphenylmethyl)-3, 4-dimethyl-1-phenylpentan-2-one are potentially mutagenic and hepatotoxic. The review highlights that while direct oxidative stress markers were often unmeasured, the pattern of damage including cellular necrosis and sodium benzoate-linked reproductive impairment provides strong inferential evidence of oxidative stress as a primary driver of toxicity. This review confirms that LTT is a potent multi-systemic toxicant. It concludes that the widespread cellular disruption across the liver, kidneys, and brain is highly consistent with oxidative stress overwhelming antioxidant defences. The findings underscore an urgent need for targeted public health campaigns and the establishment of clinical guidelines for managing LTT-induced pathologies.

BMDSWP-50

Comparative Effects of Heavy Metal Exposure and Protective Role of Ginger (*Zingiber officinale*) Tea on Gut Microbiota and Systemic Oxidative Stress in Wistar Rats

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Heavy metal exposure remains a critical global health concern, with Cadmium, Lead, and Mercury being among the most toxic contaminants affecting humans through food, water, and air. These metals induce oxidative stress, haematological abnormalities, and gastrointestinal dysfunction. Ginger (*Zingiber officinale*) is traditionally consumed for its medicinal properties, yet its protective efficacy against heavy metal–induced toxicity requires further investigation. Rats were divided into control, metal-induced, and treatment groups, which received ginger tea. Blood, intestinal, and colonic samples were analysed for haematological indices, differential leucocyte profiles, antioxidant enzyme activities (CAT, SOD, etc), glutathione (GSH) levels, and lipid peroxidation (MDA). Results were compared across groups to determine the extent of toxicity and therapeutic recovery. All heavy metals induced significant oxidative stress, characterised by marked reductions in antioxidant activities and increases in MDA across intestinal and colonic tissues. Haematological disruptions included altered RBC and WBC counts, decreased haemoglobin, abnormal erythrocyte indices, and shifts in leucocyte differentials. Ginger tea significantly improved antioxidant enzyme activity, restored glutathione levels, reduced lipid peroxidation, and partially normalised haematological parameters. Mercury-exposed groups showed the strongest recovery following Ginger treatment. Cadmium, lead, and mercury cause pronounced haematological and gastrointestinal toxicity, driven by oxidative stress and depletion of antioxidants. Ginger tea offers substantial protective effects by enhancing antioxidant defences, reducing oxidative damage, and improving haematological stability. These findings highlight Ginger tea as a promising natural intervention for mitigating heavy metal–induced toxicity and underscore its potential public health relevance in chronically exposed populations.

BMDSWP-51

A Multi-Target Approach to Malaria: Toxicological and Polypharmacological Assessments of *Enantia chlorantha* Oliv. Stem Bark Extract

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Multistage antimalarial agents, targeting various developmental stages of the *Plasmodium* life cycle, offer promising strategy to enhance chemotherapeutic efficacy, reduce resistance and block transmission. This study investigates the antimalarial potential of *Enantia chlorantha* aqueous stem bark extract (EcASBE), a traditional remedy widely used by herbal practitioners in Nigeria. Its polypharmacological, transmission-blocking, and toxicological properties were explored, offering a multi-target approach to malaria management. Ethnobotanical insights guided investigations of *Enantia chlorantha* stem bark extract (EcASBE) for *in vivo* antimalarial activities in *Plasmodium berghei*-infected mice and *in vitro* efficacy against *P. falciparum*. Synergistic effects with antimalarials, haemolytic, cytotoxic, and transmission-blocking potentials were also assessed. GC-MS identified phytocompounds, with computational docking predicting protein interactions. EcASBE restored biochemical, haematological, and inflammatory parameters altered by malaria infection. *In vitro*, EcASBE demonstrated potent antiplasmodial activity against *P. falciparum* strains (3D7, R539T, and Dd2) with IC_{50} values of 13.77–18.27 µg/mL, achieving 100% inhibition at 500 µg/mL against Pf3D7 and PfR539T. Synergistic interactions with artemisinin against drug-resistant strains highlighted its potential as an ACT enhancer. GC-MS identified 32 bioactive compounds, with molecular docking revealing strong binding affinities of key phytochemicals, such as 1-(3,4-Dimethoxybenzyl)-6,7-dimethoxy-2-methyl-1,2,3,4-tetrahydroisoquinoline, to *P. falciparum* drug targets (ΔG = -57.66 kcal/mol). EcASBE also inhibited mosquito-stage *Plasmodium* development, demonstrating transmission-blocking efficacy. Toxicological evaluations showed no significant adverse effects on human erythrocytes, HepG2 cells, or biochemical and oxidative stress markers in animal models. This study underscores the therapeutic potential of EcASBE as a safe and effective natural antimalarial agent with multiple modes of action.

BMDSWP-53

Effects of Synergistic Activities of Different Ethanol Plant Extracts Co-Administered With Magnesium on Some Biochemical Parameters in NaCl–Induced Wistar Rats

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In hypertension, volume and pressure loads on the kidneys lead to the dysfunction and damage to the renal tissues; serum urea, and uric acid are considered as a marker of the renal. This study aimed at determining the effects of synergistic activity of different plants (*S. meongena*, *H. crinite* and *C. papaya*) co –administered with magnesium on some biochemical parameters in sodium chloride – induced hypertensive Wistar rats. A total of 28 Wistar rats were used for this study and randomly grouped into 7 (n = 4). All but of group 1 was hypertension-induced using 8 % salt solution. Group 1 served as the normal control (fed only normal feed and water), while groups 2 and 3 served as negative (untreated hypertension group). Groups 4 and 6 were hypertension-induced and treated with 200 mg/kg (*H. critina*) + 200 mg/kg (*S. melongena*), and 200 mg/kg (*H. critina*) + 200 mg/kg (*C. papaya*), respectively; while groups 5 and 7 received same extract administration as 4 and 6 hut with mg-supplements. The administration lasted for a period of 28 days after which the animals were sacrificed and blood was drawn by cardiac puncture for laboratory analysis. The parameters were assayed for using standard methods. Results were analysed statistically using ANOVA, SPSS v21 and significance was accepted at $p<0.05$. From the results of urea, it was observed that there was a significant ($p<0.05$) increase in the positive control (47.00 ± 7.42) when compared with the group administered *H.crinita* + *C. papaya* (40.00 ± 1.15), and a non-significant ($p>0.05$) when compared with other treated groups; while results of uric acid shows a marked significant ($p<0.05$) increase when positive control group (12.15 ± 0.11) is compared with the normal control (8.70 ± 0.18), and all the extract - treated groups. Furthermore, there was a significant ($P>0.05$), in total protein when the groups 5 (4.48 ± 0.18), 6(4.75 ± 0.15), and 7(4.63 ± 0.15), and 7(4.63 ± 0.21) are compared with the positive control (4.95 ± 0.50). Using the activities of the plant extracts and co-administration of magnesium, the result confirmed the role of these magnesium in delaying and treatment of hypertension and underscores the role of magnesium in delaying and treatment of cardiovascular complications of hypertension.

BMDSWP-54

Evaluation of Antihyperglycaemic and Hepatoprotective Effects of *Delonix regia* and *Azadirachta indica* in Experimental Animal Models Unveiling Therapeutic Potentials in Metabolic and Hepatic Disorders

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Delonix regia and Azadirachta indica, two Nigerian medicinal plants, have been traditionally used to manage various ailments. This study aimed to evaluate the phytochemical composition, nutritional profile, safety, and therapeutic potential of these plants. Fresh leaves were processed into aqueous extracts via maceration and rotary evaporation. Proximate analysis (AOAC methods) and GC-MS analysis (Shimadzu QP2010 PLUS) were conducted. Wistar albino rats were used for acute oral toxicity testing and biochemical studies. Serum samples were analysed for glucose, liver enzymes, and proteins using standard enzymatic assays. The plants exhibited notable nutritional value, with appreciable levels of carbohydrates, crude fibre, ash, crude protein, and energy. GC-MS profiling identified 13-19 bioactive compounds, including myristic acid vinyl ester, methyl oleate, and squalene, known for their antioxidant and anti-inflammatory properties. In experimental rat models, *Delonix regia and Azadirachta indica* extracts demonstrated potent therapeutic effects against hyperglycaemia, metabolic disturbance, and CCl4-induced toxicity. Treatment with the extracts nearly restored glucose and HbA1c levels, improved liver enzyme profiles, and significantly restored hepatic protein synthesis. Histopathological observations supported the biochemical results, showing substantial restoration of hepatic architecture. Notably, *Azadirachta indica* stem bark extract exhibited strong hepatoprotective activity, but in the CCl4 toxicity model, *Delonix regia* leaf extract showed the strongest hepatoprotective activity. Overall therapeutic efficacy followed the order: < *Delonix regia* leaf < *Azadirachta indica* stem bark extract. These findings demonstrate that *Delonix regia and Azadirachta indica* contain bioactive phytochemicals capable of modulating metabolic disorders, protecting hepatic tissue, and improving systemic biochemical homeostasis.

BMDSWP-55

Assessment of Hepatoprotective and Antioxidant Potential of Hydro-Ethanolic Leaf Extract of *Piper guineense* (Uziza) on Thioacetamide-induced Liver Toxicity in Male Wistar Rats

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Thioacetamide (TAA) is a well-known hepatotoxin commonly used in experimental models of liver injury. *Piper guineense* (uziza), also known as black pepper, is a native African plant renowned for its medicinal properties in treating various ailments. This study assessed the hepatoprotective and antioxidant effects of the hydro-ethanolic leaf extract of *Piper guineense* on thioacetamide-induced liver toxicity in male Wistar rats. *In vivo* antioxidant analysis and biochemical assays were conducted following standard methods and manufacturer's instructions. Thioacetamide induction in rats resulted in a significant increase ($p<0.05$) in serum ALT (48.31 ± 2.87), AST (80.42 ± 4.43), ALP (139.86 ± 4.93), and GGT (114.45 ± 6.69) activities compared to the control group (18.81 ± 1.79, 24.35 ± 1.53, 52.75 ± 3.70, and 57.13 ± 5.37), but treatment with silymarin and the extract significantly reduced these enzyme activities. Thioacetamide treatment also elevated bilirubin levels (4.37 ± 0.23) compared to the normal control (0.75 ± 0.09) and treated animals (1.87 ± 0.35 and 2.02 ± 0.42). *In vivo* antioxidant analysis revealed increased MDA levels (13.42 ± 1.55) and decreased SOD (0.91 ± 0.18), CAT (0.013 ± 0.00), and GPx (1.09 ± 0.01) in TAA-treated animals compared to the control (4.45 ± 0.44, 1.86 ± 0.56, 0.033 ± 0.00, and 1.09 ± 0.01), with the extract administration bringing the levels closer to normal. In conclusion, the study showed that the hydro-ethanolic leaf extract of *P. guineense* has antioxidant and hepatoprotective properties comparable to silymarin, supporting its traditional and therapeutic use in human health care management.

BMDSWP-56

Investigation of Inflammatory Marker Genes Associated with Hypertension in Adolescents and Young Adults in Ekiti State: A Case-Control StudyArulogun Ayobami Sunday*[1], Ibikunle Akinlua[2], Asaolu Modupe Fisayo[1]

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Hypertension is an emerging public health concern among adolescents and young adults, with inflammatory mechanisms increasingly implicated in its early onset and progression. This study investigated the expression of selected inflammatory marker genes namely; vascular endothelial growth factor (VEGF), leptin (LEP), interleukin-10 (IL-10), and interleukin-1 alpha (IL-1α) in hypertensive adolescents and young adults in Ekiti State, Nigeria. A total of 160 participants were recruited from Ekiti State University Teaching Hospital, Ado-Ekiti, and Federal Teaching Hospital, Ido-Ekiti, and classified into normotensive and hypertensive adolescents (13–18 years) and normotensive and hypertensive young adults (19–25 years). Blood pressure was measured using standard protocols, and venous blood samples were collected for gene expression analysis using appropriate molecular techniques. Among adolescents, hypertensive participants demonstrated significantly increased expression of VEGF and IL-10 and decreased expression of LEP and IL-1α when compared to normotensive controls. In contrast, hypertensive young adults exhibited significantly increased expression of LEP, VEGF, and IL-1α, and significantly reduced expression of IL-10 when compared with the control subjects. These findings indicate that hypertension in adolescents and young adults is characterised by distinct, age-specific variations in inflammatory gene expression patterns, with hypertensive adolescents exhibiting a potential regulatory or compensatory response and young adults showing a predominant pro-inflammatory profile, which is pointing to the need for early, screening and potential prevention strategies to reduce future cardiovascular risk.

BMDSWP-57

Assessment of Liver, Kidney, and Electrolyte Levels among Agrochemicals Exposed Individuals in Bade LGA, Yobe State, Nigeria

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The global use of agrochemicals has increased substantially due to rapid population growth, food insecurity, and the need for intensified agricultural production, particularly in developing countries. This study evaluated the biochemical effects of prolonged occupational exposure to agrochemicals on hepatic and renal function and electrolyte levels among agrochemical sellers in the Bade Local Government Area, Yobe State, Nigeria. A comparative cross-sectional study design was employed, involving sixty (60) adult male participants comprising thirty (30) agrochemical-exposed individuals and thirty (30) age-matched non-exposed individuals. Venous blood samples were collected under standard conditions and analysed for liver function, kidney function, and serum electrolyte levels. Data were presented as mean ± standard deviation and statistically analysed using one-way analysis of variance (ANOVA), with significance differences at $p < 0.05$. The findings demonstrated statistically significant differences in liver, kidney, and electrolyte levels between agrochemical-exposed and non-exposed participants. These increases were more pronounced among individuals with longer durations of agrochemical exposure, indicating a clear duration- dependent toxic effect. In conclusion, long-term occupational exposure to agrochemicals is associated with hepatic and renal impairment as well as electrolyte imbalance. The study underscores the need for routine biochemical monitoring of agrochemical handlers, strict enforcement of occupational safety measures, and increased public health awareness to mitigate exposure-related health risks.

BMDSWP-58

Effects of Zinc oxide Nanopriming on the Growth and Development of Cowpea Plants under Combined Heavy Metal and Salinity Stress

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This study investigated the effects of seed priming with zinc oxide nanoparticle (ZnO-NP) on the growth and development of cowpea (*Vigna unguiculata*) under combined salinity and heavy metal stress. Cowpea seeds were primed with ZnO-NPs at concentrations of 0.25, 0.5, and 1.0 ppm and compared with untreated controls under combined 0.1 mM chromium and 150 mM NaCl stress. The 0.5 ppm ZnO-NP treatment increase the chlorophyll content of the plants by 42 %, root and shoot lengths by 28%, and biomass by over 30 % relative to the stressed control. Furthermore, hydrogen peroxide and malondialdehyde contents decreased by up to 45 %, while proline contents and ascorbate peroxidase activity increased by 60% and 45%, respectively in seeds primed with 0.25 ppm, indicating enhanced antioxidant capacity. These findings reveal that seed priming with ZnO-NP improves physiological stability, photosynthetic efficiency, and growth performance in cowpea under combined heavy metal and salinity stress.

BMDSWP-59

Effect of *Rosmarinus officinalis* L on Neuronal Biomarkers in the Hippocampus of Calcium-Carbide Intoxicated Male Wistar Rats

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The central nervous system, particularly, the hippocampus is responsible for the crucial brain functions such as memory, learning, cognition and emotional regulation. Damage to this region can result in permanent neurological damages. Calcium-carbide (CAC), an industrial compound commonly used in the production of metals and illegal ripening of fruits, releases acetylene and several reactive intermediates upon degradation, this results in free radical generation. This study examines the effects of *Rosmarinus officinalis* L. on neuronal biomarkers in the hippocampus of calcium carbide-intoxicated male Wistar rats. Twenty-eight rats (180 g ± 20 g) were divided into seven groups (A-G): A- normal control, B- CAC (100 mg/kg) only, C- ascorbic acid + CAC (100 mg/kg), D- *Rosmarinus officinalis* extract 200 mg/kg alone and three treatment groups (E-G) receiving *Rosmarinus officinalis* extract 200, 400, and 800 mg/kg and CAC (100 mg/kg), respectively daily for 28 days. Biomarkers assessed included adenosine deaminase, acetylcholine esterase, sodium-potassium ATPase, and monoamine oxidase activities. Moreso, behavioural parameters such as memory index, number of crossed boxes, time spent at the central square, and escape latency were also evaluated. Results indicate that calcium carbide intoxication significantly altered neuronal enzyme activities and behavioural performance, while *Rosmarinus officinalis L* extract, particularly at higher doses, demonstrated potential neuroprotective effects, restoring enzyme activities and improving memory and locomotor functions compared to controls. These findings suggest the extract's potential in reducing calcium carbide-induced neurotoxic effects by preserving the integrity of the neuronal function and structure.

BMDSWP-60

Production and Optimisation of Parameters for Cycloamylase from *Alkalihalobacillus lehensis* JO-26

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Cycloamylase is an industrial enzyme that transforms starch and similar polysaccharides into cycloamylose. Soil samples were collected from cassava processing sites and abattoir dumpsites located in the Mobil and Bosso areas of Minna, Niger State. The samples were cultured on Horikoshi agar plates to screen for cycloamylase-producing bacteria. The isolate with the highest cycloamylase-producing potential was identified as *Alkalihalobacillus lehensis* JO-26. The enzyme was purified using 80% ammonium sulphate precipitation followed by starch adsorption chromatography on DEAE-Sepharose 6B. The effects of pH, temperature, and thermal stability on the enzyme were evaluated. Optimisation of cycloamylase production was conducted by varying sweet potato concentration (1–3%), nitrogen concentration (0.5–1%), incubation time (24–72 h), and agitation speed (150–250 rpm). A total of twenty experimental runs were designed using Central Composite Design (CCD) in STATISTICA version 10.0. The fitness of the statistical and mathematical models was evaluated using ANOVA. Optimisation and production of cycloamylose were performed via CCD, with sweet potato starch concentration, cycloamylase concentration, and temperature as independent variables. Sweet potato starch concentration, nitrogen concentration, and agitation were found to be significant factors, as indicated by p-values < 0.05. The enzyme exhibited optimum activity at pH 9.0 and a temperature of 55 °C. The highest cycloamylose yield of 88.40 g/L was obtained using sweet potato starch at 3 hours. The study demonstrated that sweet potato starch can be used as a viable alternative to soluble starch for cycloamylose production.

BMDSWP-61

Ameliorative Effect of Crude Ethanolic Extract of *Allium cepa* on Sodium Benzoate-induced Neurotoxicity in Male Albino Wistar Rats

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Sodium benzoate (SB), a prevalent food preservative, has been linked to oxidative stress and neurobehavioral problems following significant exposure. This study investigated the protective

effects of crude ethanolic extract of *Allium cepa* against sodium benzoate-induced neurotoxicity

in male albino Wistar rats. Thirty (30) male Wistar rats (120-180 g) were randomly divided into

six groups of five animals each: Group I (Normal Control, distilled water), Group II (SB only, 200 mg/kg), Group III (*A. cepa* only, 200 mg/kg), Group IV (SB+*A. cepa* 100 mg/kg), Group V (SB + *A. cepa* 200 mg/kg), and Group VI (SB + *A. cepa* 300 mg/kg). All treatments were given orally once daily for 28 days. Neurobehavioral tests included the Open Field Test, Hanging Wire Test, Forced Swim Test, and Negative Geotaxis Test. Brain tissue homogenates were harvested to perform biochemical assays. The findings indicated that chronic exposure to SB resulted in a significant reduction in body weight, alongside impairments in locomotor and exploratory behaviours, as evidenced by the open field test and line crossings. Furthermore, negative geotaxis latency was shortened, immobility latency in the forced swim test was decreased, motor coordination was diminished, depressive-like behaviours were exacerbated, and antioxidant enzyme activities were reduced when compared to the control groups. Conversely, the co-administration of *A. cepa* extract yielded dose-dependent enhancements across all assessed parameters. The highest dose yielded the most notable recovery, nearly normalising FST immobility latency and significantly restoring GPx activity. These findings indicate that *Allium cepa* has strong neuroprotective, anxiolytic, and antidepressant effects.

BMDSWP-62

Modelling Chronic Arsenic Toxicity in *Drosophila melanogaster*: Insights into Oxidative Stress, Neurotoxicity, and Carcinogenesis

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Arsenic is a ubiquitous environmental toxicant strongly associated with oxidative stress, neurotoxicity, and carcinogenesis. Despite extensive evidence in mammalian systems, cost-effective *in vivo* models that recapitulate chronic arsenic toxicity and disease progression remain limited. This study investigated the effects of chronic sodium arsenite exposure in *Drosophila melanogaster* to model oxidative stress–mediated neurotoxicity and carcinogenic processes. Adult Canton-S flies were exposed to graded concentrations of sodium arsenite (0.03, 0.06, 0.12 and 0.14 mM) for up to 21 days. Survival analysis was conducted using Kaplan–Meier estimation. Biochemical assays evaluated oxidative stress markers including hydrogen peroxide, total thiols, glutathione, nitric oxide, protein carbonyls, glutathione-S-transferase, and acetylcholinesterase activity. Histological and morphological analyses of the brain, gut, and fat body were performed, alongside quantitative gene expression profiling of *p53, Ras, SOD1,* and *CncC*. Arsenite exposure induced a dose-dependent reduction in survival, with significant mortality at higher concentrations. Oxidative stress was evident by increased hydrogen peroxide and protein carbonyl levels, alongside depletion of thiols and glutathione. Enzymatic antioxidant defences and acetylcholinesterase activity were significantly impaired. Histological examination revealed intestinal dysplasia, neuronal degeneration, and fat body atrophy, while morphological assessment identified tumour-like growths and ovarian damage. Gene expression analysis showed *Ras* and *CncC* upregulation with concurrent downregulation of *p53* and *SOD1*, indicating oncogenic activation and compromised antioxidant defence. Chronic arsenite exposure in *Drosophila melanogaster* effectively models key features of oxidative stress–driven neurotoxicity and carcinogenesis. This system provides a robust, translational platform for elucidating molecular mechanisms of arsenic toxicity and for screening therapeutic interventions.

BMDSWP-63

Bryophyllum pinnatum and *Vernonia amygdalina* Ethanolic Extracts Modulate L-Name-Induced Neurotoxicity in Wistar RatsJuliana Bunmi Adetunji[1,*], Abdul-Raheem Folorunsho Ahmad[2], Olufemi Ayodade Ajibade[3], Aminat Bukola Olalekan[4]

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Neurotoxicity, driven by agents like Nω-Nitro-L-arginine methyl ester (LNAME), induces oxidative stress, inflammation, and neuronal damage, leading to neurodegenerative disorders. *Bryophyllum pinnatum* (BryP) and *Vernonia amygdalina* (VerA) were investigated for their neuroprotective potential in an L-NAME-induced Wistar rat model. The leaf extracts of BryP and VerA were characterised by GC-MS, identifying 20 compounds, including 9-octadecenamide. 36 male Wistar rats (100–160 g) were divided into six groups (n=6): Control, LNAME (40mg/kg), Captopril (100mg/kg), LNAME+BryP200 (200mg/kg of BryP), LNAME+VerA200 (200mg/kg of VerA) and LNAME+ (BryP + VerA) 200 (200mg/kg of BryP and VerA). LNAME was administered for 28 days with 14 days of treatment; brain homogenates were assessed for oxidative stress markers (malondialdehyde (MDA), superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH)), nitric oxide (NO), inducible NO synthase (iNOS), inflammatory biomarkers (NF-κB, C-reactive protein [CRP]), neurotransmitters (GABA, dopamine, serotonin), acetylcholinesterase (AChE) activities, and histopathological evaluations. LNAME significantly increased MDA ($p<0.05$) and NO, reduced SOD, CAT, GSH, GABA, dopamine, serotonin, and AChE ($p<0.05$), and caused severe neuronal degeneration (histopathology score: 2.7 ± 0.3). BryP and VerA extracts significantly lowered MDA ($p<0.05$), with VerA achieving the greatest SOD enhancement ($p<0.05$), and restored CAT, GSH, and neurotransmitters. The combined extract group exhibited the most robust neuroprotection, with near-normal histopathology (score: 0.8±0.2), normalised NO, NF-κB, and CRP, and neurotransmitter levels comparable to captopril (1.5±0.2). BryP and VerA, particularly in combination, demonstrate potent neuroprotective effects against LNAME-induced neurotoxicity, reducing oxidative stress and inflammation while preserving neuronal integrity, supporting their potential as cost-effective therapeutics for neurodegenerative diseases.

BMDSWP-64

Hepatocellular Pattern and It Association with Demography Factors in *Hepatitis B* Virus Infection

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Hepatitis B virus (HBV) infection is a leading cause of liver disease globally, with significant implications for public health in low and middle-income countries. This study investigated demographic associated factors on liver function biomarkers of HBV-positive individuals. A active survey design method was used, to assess the status of HBV status and liver biomarker through by serological screening. Data analysis involved test of associations. A prevalence of 4% HBV was recorded among the 544 screened participants. There is increase in mean values aspartate aminotransferase (AST) levels in HBV-positive participants (74.73±28.59 U/L) compared to negatives (32.80±3.72 U/L; p< 0.001). Alkaline phosphatase (ALP) and gamma-glutamyl transferase (GGT) were significantly lower in HBV-positive individuals (57.08±31.89 U/L and 19.07±15.62 U/L) than in negatives (83.76 ± 6.19 U/L and 29.90±2.29 U/L; p = 0.003 and p = 0.009, respectively). Total protein (TP) and albumin (ALB) were significantly higher in the HBV-positive group (71.95±5.07 g/L and 34.30±2.07 g/L; p= 0.037 and p= 0.001, respectively). Based on age group alkaline phosphatase (ALP), value rage from 23.57 U/L in the 30–39 years group to 77.50 U/L in the 40–49 years group, indicating higher ALP activity with advancing age, Aspartate aminotransferase (AST) levels were highest in the age less than 20 years group (72.09 U/L). Overall, gender-based differences was observed, LIT, ALP, GGT and ALT were higher in male. The BMI 5(25%) were shows underweight while 20% and 5% were overweight and obese respectively. BMI did not have a significant association with any of the liver function test parameters, as the correlation coefficients ranged from -0.23 to 0.12 and all p-values were greater than 0.05. These findings suggest hepatocellular injury as the primary biochemical effect of HBV infection. Screening, vaccination, and routine liver monitoring are recommended, particularly in urban populations.

BMDSWP-65

Correlation Analysis, Age, Number of Wives and Biochemical Indices of Prostate Cancer Patients Attending Abubakar Imam Urology Centre Kano Nigeria

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Prostate cancer, a known leading malignancy among men worldwide, may be influenced by lifestyle and some biochemical indices. This study evaluated and correlates; Age, number of wives, and selected biochemical indices of the prostate cancer patients. A cross-sectional design involving 60 male patients aged ⩾41 years was employed. The biochemical indices (lipid profile, glucose, total protein, PSA, acid phosphatase, and oxidative-stress markers) were evaluated using standard methods. Data were analysed using ANOVA and correlation statistics. The findings reveals that prostate cancer patients between the age group 41 - 60years had lower mean PSA level (7.21 ± 1.21ng/ml). Age has strong positive correlation with serum PSA serum level, based on the Cohen's scale; with exception of catalase and reduced glutathione with negative small effects, while; SOD, MDA, acid phosphatase (AP) and percentage life style score shows small positive correlation with serum PSA. Oxidative stress played critical roles in prostate cancer progression. It may be conclude that antioxidants may be recommended to improve prognosis and overall wellbeing of affected men.

BMDSWP-66

Evaluation of Anti-Cancer Potentials of *Carica papaya* Leaf Extracts in 7,12-Dimethylbenz[A]Anthracene-Induced Breast Cancer in Female Wistar Rats

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Breast cancer remains a pressing global health challenge, driving the need for effective therapeutic approaches, particularly by utilising natural products. *Carica papaya* leaf (CPL), traditionally used in ethnomedicine for management of inflammatory conditions and as an adjuvant therapy against certain cancers have been reported. This study investigated the anti-breast cancer potentials of aqueous crude extract (*AqCE*) and flavonoid-rich extract (*FRE*) of *CPL* extracts in 7,12-dimethylbenz[a]anthracene (DMBA)-induced breast cancer in rats. Thirty-five female Wistar rats were grouped into seven: group 1 (1% tween 80), groups 2 – 7 were exposed to DMBA (80 mg/kg b.w, administered intraperitoneally); then group 3 received cyclophosphamide (20 mg/kg), groups 4 and 5 received AqCE 250 and 500 mg/kg respectively, while groups 6 and 7 received FRE 150 and 300 mg/kg respectively. Treatments were administered by oral gavage, twice per week for 17 weeks. Breast tissue/tumour lysate were assessed for oxidative stress biomarkers, inflammatory cytokines, tumour biomarkers, and histopathology. DMBA significantly ($p < 0.05$) induced oxidative stress, as evidenced by elevated antioxidant parameters. Both AqCE and FRE modulated oxidative stress, with FRE exhibiting super depletion of GSH. DMBA-elevated inflammatory cytokines and tumour biomarkers were significantly ($p < 0.05$) reduced by both extracts relative to control. Pleomorphic and hyperchromic invasive ductal carcinoma (Scarff-Bloom-Richardson score 9 grade 3) revealed in group 2 was ameliorated by extract treatments, particularly FRE which showed marked clearance of malignant cells, preserving the mammary architecture. Overall, these findings demonstrate that *CPL* extracts exhibited anti-breast cancer potentials against DMBA-induced breast cancer in Wistar rats.

BMDSWP-67

Comparative Toxicological Evaluation of Smoke from Two Brands of Allethrin Based Mosquito Coils on Blood, Liver and Kidney Function in Wistar RatsChikezie Precious Chieze[1,*] and Onuoha Chibuzor Peter[2]

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Malaria is a prevalent disease in Nigeria that has claimed a lot of lives and counting.The study aimed to evaluate the toxicological effects of smoke from two brands of Allethrin based mosquito coils on blood, liver and kidney function of wister rats. Haematological analysis of the blood samples were performed in an automated haematology analyser (BC-2300 model, Mindray Medical Co., China) with the procedure carried as specified by the producer. Standard procedures were used to determine liver and kidney function makers. At days 0, 7, 14 and 21, the result showed no significant increase at $p>0.05$ on the red blood cell, lymphocyte, monocyte, eosinophil and haemoglobin concentrations of rats when compared to their respective control groups. A significant ($p<0.05$) increase was observed in the aspartate aminotransferase, aminotransferase, total protein, globulin, total bilirubin concentrations of the test groups in all other days (7, 14, 21 and 28) when compared with the control group, with the exception of group 2 which did not differ significantly ($p>0.05$) from the control group. Urea concentration and creatinine concentration significantly ($p<0.05$) increased in the rats exposed to both sample A and sample B when compared with the control group on day 28. The study indicated that the group of animals exposed to sample A (SWAN) seemed to demonstrate the most toxic effects on biochemical and liver function test. In conclusion, the continuous inhalation of mosquito coil smoke containing pyrethroid, including one of its forms called allethrin, may harm vital body organs.

BMDSWP-69

Identification of *Euphorbia kamerunica* Lead Compounds (EKDF20 and EK2B8) as Potent Tyrosine Hydroxylase Activators and Monoamine Oxidase Inhibitors with Potential for Parkinson's Disease Management

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Parkinson's disease (PD) is a progressive neurodegenerative disorder characterised by the loss of dopaminergic neurons. This study employed bioassay-guided fractionation to isolate and characterise bioactive constituents from *Euphorbia kamerunica* with modulatory effects on Monoamine oxidase (MAO) and tyrosine hydroxylase (TH) activities, two pivotal enzymes regulating dopamine metabolism in the dopaminergic neurons whose dysregulation is implicated in the pathogenesis of Parkinson's disease. The crude extract was partitioned into five solvent fractions: n-hexane, ethyl acetate, dichloromethane, butanol, and aqueous. Each fraction was evaluated for MAO inhibitory and TH activatory potentials using *in vitro* biochemical assays, with dose-response curves fitted via non-linear regression to determine IC_{50} and EC_{50} values. The ethyl acetate fraction demonstrated the most potent MAO inhibition (IC_{50} = 0.539 mg/mL; 97% inhibition), surpassing butanol (0.887 mg/mL), aqueous (0.826 mg/mL), n-hexane (0.90 mg/mL), and dichloromethane (1.023 mg/mL) fractions. Sequential column chromatography and thin-layer chromatography (TLC) of the ethyl acetate fraction yielded subfraction EK2B8 as the most potent MAO inhibitor (IC_{50} = 0.2224 mg/mL). For TH activation, the ethyl acetate fraction consistently elevated TH activity 110–140% above control across all concentrations, while n-hexane and butanol fractions exhibited non-linear inhibitory profiles. Further fractionation identified EKDF20 as the most potent TH activator (EC_{50} = 0.9351 mg/mL), achieving a maximum activating activity approximately twofold higher than control. These findings demonstrate that *Euphorbia kamerunica* harbors structurally diverse bioactive constituents with complementary neuroprotective mechanisms. Subfractions EK2B8 and EKDF20 represent compelling lead compounds for subsequent phytochemical characterisation and *in vivo* validation in a rotenone-induced PD model.

BMDSWP-70

Haematological Evaluation of Haemoparasite in Relation to Sex of Cattle and Goats Slaughtered in Ado Ekiti Central AbattoirFeyisetan Olalekan Tayo[1,*], Olofintoye Lawrence Kayode[2,] Ogunmoroti Oluwole[3], Itakorede Babamotemi[4] and Onileowo Sefunmi[5]

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Haemoparasitic infections are a significant threat to livestock health and productivity in tropical regions such as Nigeria. These infections often lead to anaemia and reduced performance in ruminants. This study was therefore conducted to determine their prevalence and associated haematological changes in cattle and goats in relation to sex in Ado Ekiti central Abattoir. A total of 100 blood samples (65 cattle and 35 goats) were randomly collected from both sexes. Giemsa stained blood smears were examined microscopically for haemoparasites. Packed cell volume (PCV), haemoglobin concentration (Hb), and red and white blood cell counts were determined using standard haematological techniques. Data were analysed using Chi-square version 23 while the student T-test was used to determine the difference. The overall prevalence of infection of 15.0% was encountered out of 100 ruminants examined while the cattle had higher prevalence of infection (16.9%) than goats (11.4%). In cattle, *Anaplasma spp* was the only haemoparasite genus observed with 16.9%, while two genera of haemoparasites, *Anaplasmaspp* (11.4%) and *Trypanosomaspp* (2.9%) co-infection were observed in goats. Among sexes, female cattle and goats had a significantly higher prevalence of infection of 22.7% and 13.8% than males 4.7% and 0.0% respectively. PCV, RBC, HB values were higher in *Anaplasma spp* uninfected ruminants while WBC values were higher in the infected ruminants. In conclusion, *Anaplasma spp* is predominant in cattle and goat's population and therefore, a routine check is hereby recommended to put the haemoparasite under control in Ado Ekiti central Abattoir.

BMDSWP-71

Effects of Soymeal-Based Diet on Hepatic Oxidative Stress, Nrf2 Gene Expression, and Inflammatory Responses in Male Wistar Rats under Simulated Microgravity

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Microgravity is linked to immunological dysfunction and oxidative damage, particularly in the liver. This study used the hindlimb suspension model to evaluate the effects of soymeal-based diets (10% and 50%) on antioxidant defence and inflammatory responses in male Wistar rats exposed to simulated microgravity for 7, 14, and 21 days. Male Wistar rats were randomly assigned to control and treatment groups and fed with normal (without, 10%, and 50% soymeal-based diets. Oxidative stress markers, antioxidant enzyme activities, and inflammatory cytokines were assessed using standard biochemical and molecular techniques. Malondialdehyde (MDA) levels were elevated in rats fed with normal and 10% soymeal-based diets. Activities of antioxidant enzymes like superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) as well as glutathione (GSH) levels were significantly reduced ($p<0.05$), indicating impaired antioxidant defence. However, rats fed with 50% soymeal-based diet showed reduced oxidative stress and preserved antioxidant enzyme activity. No significant difference in Nrf2 gene expression was observed at 7, 14, and 21 days in the group fed with 50% soymeal-based diet compared to the normal diet under simulated microgravity, indicating maintained antioxidant regulation. Under simulated microgravity, inflammatory markers (TNF-α and IL-1β) were elevated in rats fed normal and 10% soymeal-based diets, whereas the 50% soymeal-based diet mitigated these effects in a time-dependent manner. These findings highlight the potential of a high soymeal-based diet as a nutritional countermeasure against oxidative stress and inflammation during spaceflight.

BMDSWP-72

Ethyl Acetate Fraction of *Platycerium bifurcatum* Leaf Attenuates Isoprenaline Induced Cardiac Oxidative Stress in Rats

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Myocardial infarction is strongly associated with oxidative stress and inflammation, which contribute to cardiac tissue damage and functional impairment. This study investigated the cardioprotective potential of the ethyl acetate fraction of *Platycerium bifurcatum* leaves (EAFPBL) against isoprenaline (ISO)-induced oxidative stress in rats. Thirty six albino rats randomly assigned to six groups were used and given different treatments: Group 1, normal control; Group 2, ISO control; Groups 3 carvedilol control; and Group 4 through 6 were ISO induced rats treated with 50 mg/kg b.w., 100 mg/kg b.w. and 200 mg/kg b.w. of EAFPBL respectively for 21 days. The results showed that ISO administration caused significant elevation of creatine kinase-MB, lactate dehydrogenase, and cardiac troponin, alongside marked increases in malondialdehyde levels, indicating lipid peroxidation. The superoxide dismutase, catalase, and reduced glutathione, were significantly ($P< 0.05$) depleted in untreated rats. Treatment with the EAFPBL significantly ($P< 0.05$) attenuated the alterations in a dose-dependent manner. EAFPBL reduced lipid peroxidation, restored endogenous antioxidant enzyme activities, and improved cardiac biomarker profiles. Histopathological examination revealed reduced myocardial necrosis, inflammatory infiltration, and structural disruption in treated groups compared with the ISO control. The findings suggest that the EAFPBL possesses significant antioxidant and cardioprotective potential and may serve as a promising natural therapeutic agent for the prevention or management of oxidative stress-related cardiac disorders.

BMDSWP-73

Physicochemical Properties of a Thermostable Laccase from *Penicillium citrinum* LHB3 with Enhanced Lignin Degradation Capability

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Agricultural residues such as cassava peels pose significant environmental challenges when improperly disposed of, yet they also represent low-cost substrates for producing value-added biocatalysts. In this study, crude laccase was produced by *Penicilium citrinium* LHB3, isolated from the gut of a longhorn beetle, using cassava peel in solid-state fermentation (SSF). The enzyme was characterised for its physicochemical properties, including the effects of temperature and pH on activity and stability, kinetics, and the influence of metal ions, surfactants, inhibitors, chelators, and organic solvents. The delignification capacity of the crude enzyme was also examined. The laccase exhibited optimal activity at pH 6 and 90 °C, while retaining over 90% relative activity at pH 7–8. Stability studies showed residual activities of 67–97% across pH 2–12 and 72–94% over 30–90 °C after 20 min incubation, with notable retention of 53% at 50 °C and 37% at pH 8. Enzyme activity was enhanced by mono- and divalent metal ions at 5 mM but inhibited at higher concentrations. EDTA, Tween-20, cysteine, and β-mercaptoethanol strongly inhibited activity, whereas SDS and Triton X-100 enhanced it. DMSO and ethanol were inhibitory, while isopropanol, glycerol, and acetone significantly enhanced activity. Kinetic analysis revealed a low Km (4×10^{-4} mM) and a Vmax of 5.56 mg mL^{-1} min^{-1}. The enzyme achieved 87% lignin removal from cassava biomass, demonstrating strong biodelignification potential. These findings highlight a thermostable, efficient laccase suitable for sustainable bioprocessing, waste valorisation, and industrial applications.

BMDSWP-74

Antihyperglycaemic Effect, Antioxidant nad Dipeptidyl Peptidase 4 Inhibitory Potential of *Pteridium Acquilinum* Flavonoids Rich Extract

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The current therapeutic agents for diabetes provide glycaemic control but not without adverse effects, necessitating the investigation of safe and effective alternatives. This research investigated the potential of a flavonoid-rich extract of *Pteridium aquilinum* (PAFRE) in the treatment of diabetes, employing an integrated *in silico*, *in vitro*, and *in vivo* approach. The DPP4 inhibitory potential of PAFRE was studied using an *in vitro* and *in silico* model, while the antihyperglycaemic effect of PAFRE was studied in an alloxan-induced diabetic rat model. Thirty albino rats randomly assigned to five groups were used and given different treatments: Group 1, normal control; Group 2, diabetes control; Groups 3 and 4, diabetic rats treated with 100 mg/kg b.w. and 200 mg/kg b.w. of PAFRE, respectively; Group 5, diabetic rats treated with glibenclamide (5 mg/kg b.w.) for 14 days. The compounds of PAFRE identified by GC-MS were docked for inhibitory potential against DPP-4 using AutoDock in PyRx and Discovery Studio. *In vitro* assays revealed that PAFRE possesses potent inhibitory activity against DPPH and DPP-4. The *in silico* molecular docking supported these findings, showing high binding affinity of identified phytocompounds to the active site of DPP-4, comparable to that of a standard inhibitor (Alogliptin). An *in vivo* study showed that PAFRE administration significantly ($p < 0.05$) reduced fasting blood glucose, modulated antioxidant enzyme activities (SOD, CAT, GPx), and suppressed lipid peroxidation (MDA), thereby mitigating oxidative stress while attenuating dyslipidaemia, liver enzyme dysfunction, and renal damage. These findings suggest that PAFRE exhibits antidiabetic effects by attenuating oxidative stress and inhibiting DPP-4 activity, highlighting *P. aquilinum* flavonoids as promising candidates for the development of natural therapeutics for managing diabetes mellitus.

BMDSWP-75

Anticlastogenic and Protective Influence of *Justicia secunda* on Procarbazine-Induced Haematological Alteration and Hepatotoxicity

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Procarbazine (PCZ) is an effective chemotherapeutic drug used in the treatment of lymphoma; however, its clinical utility is limited due its toxicity especially its implication in oxidative stress–mediated hepatic injury. *Justicia secunda* (JS) belongs to *Acanthaceae* family that is traditionally used in West Africa for ailments such as anaemia and as a blood tonic due to its biological activity like antioxidant and anti-inflammatory potential. This study was designed to investigate the ameliorative effect of JS against PCZ-induced liver damage in rats. Twenty-four male Wistar rats were randomised into four treatment groups: (A) control, (B) PCZ, 2 mg/kg body weight (b.w.), (C) co-treatment with JS (400 mg/kg b.w) and PCZ (2 mg/kg b.w.) and (D) *Justicia secunda* alone (400 mg/kg b.w.). The result showed that simultaneous-treatment with *Justicia secunda* restored altered haematology and significantly reduces alanine aminotransferase, aspartate aminotransferase and alkaline phosphatases activities compared to the PCZ group. Moreover, *Justicia secunda* abated PCZ-induced decreases in catalase, superoxide dismutase and glutathione transferase enzymes in the liver homogenate. JS alleviated PCZ-facilitated surges of hepatic concentration of lipid peroxidation in rats. Additionally, JS muted the pathological lesions in the liver of co-treated rats and exhibited anti-genotoxic effect by abrogated PCZ-mediated increases of frequency of formation of polychromatic erythrocyte in the bone marrow in PCZ -exposed rats. In conclusion, *Justicia secunda* possesses the capacity that improved liver injury occasioned by PCZ -mediated toxicities in rats by mitigating oxidative stress and suppressing genotoxic responses.

BMDSWP-76

Effects of *Curcuma longa* and *Zingiber officinale* on Oxidative Stress, Immunological Parameters and Organ Weights in Msg-Treated Experimental Models

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Monosodium glutamate (MSG) consumption has been linked to oxidative stress, haematological alterations, immune dysregulation, and changes in organ morphology. This study investigated the protective effects of *Curcuma longa* extract (CLE) and *Zingiber officinale* extract (ZOE), individually and combined, on oxidative stress markers, haematological and immunological parameters, body weight, and relative organ weights in MSG-exposed experimental models. Animals were assigned to six groups: normal control, MSG-only, MSG + CLE (200 mg/kg), MSG + ZOE (200 mg/kg), MSG + CLE (20 mg/kg) + ZOE (200 mg/kg), and MSG + ascorbic acid (100 mg/kg). Key oxidative stress markers, including superoxide dismutase (SOD), malondialdehyde (MDA), catalase, and glutathione levels were evaluated alongside haematological indices such as haemoglobin, packed cell volume, red and white blood cell counts, and differential leucocyte counts. Body weight and relative organ weights of liver, heart, kidney, and spleen were also assessed. MSG administration induced oxidative imbalance, haematological and immunological disruptions, and organ weight alterations compared to controls. Treatment with *Curcuma longa* extract and *Zingiber officinale* significantly ameliorated oxidative stress, improved haematological and immunological profiles, normalised organ weights, and stabilised body weight changes. Combination therapy demonstrated superior efficacy relative to individual treatments. These findings suggest that *Curcuma longa* extract and *Zingiber officinale* possess potent antioxidant, haematoprotective, and immunomodulatory properties against MSG-induced toxicity, highlighting their therapeutic potential. Further research is needed to elucidate the molecular mechanisms underlying these protective effects.

BMDSWP-77

Comparative Genomic Analysis of Selected Probiotic Bacteria present in Fermented African Locust Beans

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The use of comparative genomics for the elucidation of the functional and safety profiles of beneficial microbes present in locally fermented foods is gaining traction. This study comparatively analysed the genomes of two bacteria associated with fermented African locust beans (*Parkia biglobosa*): *Bacillus subtilis* and *Bacillus licheniformis*. Their genomes were analysed for genome assembly and annotation quality, resistome profiling, functional characteristics, fermentation capacity and nutritional & probiotic potential. Both organisms exhibited high genome quality and completeness with very comparable annotation profiles. Results from resistome profiling revealed the genomes had low prevalence of acquired antimicrobial resistance, although *B. licheniformis* exhibited a single high-confidence β-lactamase gene. Both organisms also displayed features corresponding to intrinsic cellular targets which support overall safety of both organisms for use as probiotics in functional foods. The results for functional genomics analysis revealed that *B. subtilis* functions as the primary fermentative microbe while *B. licheniformis* demonstrated high capacity for amino acid release. Furthermore, both organisms utilise metabolic pathways related to Vitamin B-complex and amino acid biosynthesis, which are key requirements for nutritional enhancement. Conclusively, the findings from this study suggest that *B. subtilis* and *B. licheniformis* function as fermentation-associated probiotics and may provide a genomic basis for the optimisation of starter culture selection for locally fermented African foods.

BMDSWP-78

Effect of Breadfruit (*Artocarpus altilis*) Leaf Powder–Supplemented Diet on Serum Lipid Profile of Alloxan-Induced Diabetic Albino Rats

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Cardiovascular Diseases (CVDs) remain major global causes of mortality, often linked to dyslipidaemia resulting from unhealthy diets. Leaves of the breadfruit tree (*Artocarpus altilis*) contain bioactive compounds such as flavonoids, saponins, and tannins known for lipid-lowering and antioxidant properties. This study investigated the hypolipidaemic potential of *A. altilis* leaf powder by evaluating its effect on the lipid profile of diabetic albino rats. Forty adult male Wistar rats were distributed among five groups of eight rats each. Group 1 is the positive control (basal diet), group 2 were alloxan-induced diabetic rats (untreated), group 3 diabetic rats were treated with 5% *A. altilis* leaf powder diet, group 4 were pretreated with the supplemented diet for four weeks before alloxan induction, while group 5 diabetic rats received the standard drug. The experiment lasted four weeks. Blood glucose was measured using an Accu-Chek glucometer, while serum total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL-C), and high-density lipoprotein (HDL-C) were analysed using enzymatic colorimetric assays. Data were statistically analysed using ANOVA. Results showed a significant increase in blood glucose in groups 2, 3, and 5 compared to the control, whereas the pretreated group (4) showed no marked difference. Groups 3 and 5 exhibited reduced TC, TG, and LDL-C with elevated HDL-C compared to the diabetic control. The pretreated group compared favourably with the normal control. These findings indicate that *A. altilis* leaf powder possesses hypolipidaemic potential and may serve as a functional dietary supplement for managing hyperlipidaemia and reducing cardiovascular risk.

BMDSWP-79

Comparative Investigation of the Haematological and Bilirubin-Modulating Effects of *Spondias mombin* and *Detarium microcarpum* Extract Fractions in Experimental Mice

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This study comparatively evaluated the effects of fractions derived from *Spondias mombin* and *Detarium microcarpum* on haematological parameters and total bilirubin levels in Swiss albino mice. Haematological indices, including red blood cell (RBC) count, haemoglobin concentration, platelet count, and white blood cell (WBC) count, were assessed as indicators of physiological and immune status, while total bilirubin levels were evaluated to determine hepatic function and possible hepatoprotective activity. Twenty-five Swiss albino mice were randomly assigned into five groups (n = 5). Group I served as the control, while Groups II and III received 250 mg/kg and 500 mg/kg body weight of *Spondias mombin* fractions, respectively. Groups IV and V were administered 250 mg/kg and 500 mg/kg body weight of *Detarium microcarpum* fractions, respectively. Oral administration was carried out daily for 14 days, after which blood samples were collected for haematological and biochemical analyses. The study provides comparative insight into the haematological and hepatic effects of the plant fractions and their potential therapeutic relevance.

BMDSWP-80

Ameliorative Effects of *Polyalthia longifolia* Leaf Fractions in Cadmium Chloride–induced Testicular Perturbations in Male Wistar Rats

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Polyalthia longifolia has been substantiated against toxicant-induced testicular perturbations in rats without information on the solvent partitioned fraction; a required step for bioactivity guided fractions. Therefore, this study assessed the effects of *P. longifolia* leaf fractions in cadmium chloride (CdCl2)–induced testicular perturbations in male Wistar rats. Seventy male rats were assigned into seven groups (n=10/group), A-G. Rats in Groups B-G received CdCl2 (7.5 mg/kg body weight (bw), daily for 14 days for induction of testicular perturbations. Afterwards the animals were administered orally for 60 days as: A (distilled water, DW), B (CdCl2 + DW), C (CdCl2 + Addyzoa, 3 mg/kg bw, reference drug), D, E, F and G (CdCl2 each + 100 mg/kg bw each of fractions of n-hexane fraction {nHF}, n-butanol {nBF}, ethylacetate {EAF} and aqueous residual {ARF} respectively). The results revealed that CdCl2-treatment related reductions in total sperm cell concentration, normal sperm cells concentration, testes-body weight ratios, testicular λ-glutamyl transferase, lactate dehydrogenase, sorbitol dehydrogenase, glucose-6-phosphate dehydrogenase, sialic acid, cholesterol, protein, glycogen, superoxide dismutase, glutathione peroxidase, catalase, testosterone, follicle stimulating hormone, lutenising hormone, dihydrotestosterone, zinc, copper and iron, and significantly increased number of tangled, dead sperm cells, malondialdehyde as well as large luminal size and its dispersed content, reduced cellular density-testicular histoarchitectural changes were reversed/ameliorated by the nHF, nBF, EAF and ARF in manner similar to the Addyzoa-treated rats. The nBF and ARF produced the most pronounced effects. The study concluded that nBF and ARF of *Polyalthia longifolia* leaves effectively ameliorated Cd-induced testicular perturbations in Wistar rats.

BMDSWP-81

Influences of *Parquetina nigrescens* Leaf Inclusive Diets on Hepatic Antioxidant Enzyme Activities in Phenylhydrazine Induced Anaemia in Experimental Rats

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Anaemia, a consequence of low levels of red blood cells, is characterised by accumulation of reactive oxygen species. We evaluated the effect of *Parquetina nigrescens (PN*) leaf inclusive diets on hepatic antioxidant enzyme activities in phenylhydrazine (PHZ) induced anaemic rats. Thirty-five male albino rats weighing between 140–200 g were randomly divided into seven (7) groups of five (5) rats each. Group I received standard diet while Groups II-V were induced with PHZ (60mg/kg b/w). Group II rats were untreated, Group III was treated with ferric sulphate standard drug, Groups IV and V were fed with diets containing 10% and 20% PN *leaf* powder respectively while Groups VI and VII were uninduced but fed 10% and 20% *PN* inclusive diets, respectively. Animals were fasted overnight and sacrificed. Excised livers were homogenised in phosphate buffer (pH 7.4). Homogenates were centrifuged and analysed. There was significant reduction in Glutathione, Glutathione peroxidase and superoxide dismutase activities in the PHZ-induced untreated group compared with the control. Supplementation of *PN* leaf diet enhanced antioxidant status in both induced and uninduced rats. Rats fed with 20% *PN* diet (Group VII) exhibited the highest catalase, GSH, GPx and SOD levels compared with other groups, suggesting improved hepatic antioxidant defence. Malondialdehyde (MDA), decreased significantly in *PN* diet-inclusive groups. Supplementation with *PN* leaf diet enhanced hepatic antioxidant enzyme activities and reduced lipid peroxidation, demonstrating its potential hepatoprotective and antioxidant properties against oxidative stress induced anaemia.

BMDSWP-82

Comparative Assessment of Antioxidant, Anti-Inflammatory and Anti-Diabetic Potential of Aqueous Extracts of Floret and Stem of *Helianthus annuus*

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The floret and stem of *Helianthus annuus* constitute agricultural waste but are rich in phytochemicals that have not received robust scientific study for biomedical applications. This study aims to compare the potential biomedical importance of the two major parts of the plant. The free radical-scavenging potential of the aqueous extracts of the stem and flower was evaluated *in vitro* by measuring inhibition of 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2-Azino-Bis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) and hydroxyl (OH-) radicals. Furthermore, anti-inflammatory activity was assessed by inhibition of protein denaturation and trypsin-induced proteinase in egg albumen. The α-amylase inhibitory potential, as a measure of anti-diabetic potential, was evaluated in the two aqueous extracts. The percentage scavenging of DPPH by the aqueous flower extract was 76.11, while the stem extract showed 53.68 at 6.25 µg/ml. The flower exhibited ABTS percentage inhibition of 60.94 compared with 47.93 for the stem at 1.6 µg/ml. The hydroxyl radical-scavenging ability of the flower was 77.11%, and the stem exhibited 84.52%. The maximal percentage inhibition of protein denaturation by the flower and stem was 93.00 and 88.93, respectively, at a concentration of 800 µg/ml. The flower reached 64.27% inhibition of proteinase at 300 µg/ml. compared with 99.91% of the stem at 100 µg/ml. The inhibition of α-amylase by the flower peaked at 800 µg/ml, showing 76.57% compared with the stem of 99.99% at 200 µg/ml. This finding suggests that both extracts have strong antioxidant, anti-inflammatory and antidiabetic potential, providing a scientific basis for their scalability and potential biomedical applications.

BMDSWP-83

Differential Anti-Inflammatory and Antioxidant Potentials of *Lawsonia inermis* and *Curcuma longa*: Evidence from a Carrageenan-Induced *in vivo* Model

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Inflammation and oxidative stress are interconnected drivers of numerous chronic diseases, necessitating the search for safer and more effective therapeutic agents. This study comparatively evaluated the phytochemical composition, anti-inflammatory, and antioxidant potentials of *Lawsonia inermis* and *Curcuma longa* using validated *in vitro* and *in vivo* models. Methanolic extracts of *Curcuma longa* rhizomes (9.45% yield) and *Lawsonia inermis* leaves (11.40% yield) were subjected to phytochemical and biochemical analyses. Both plants were rich in bioactive constituents, including flavonoids, tannins, phenolics, and alkaloids. Quantitatively, *Curcuma longa* exhibited higher phenolic content (28.49 ± 0.04 mg/100 g), whereas *Lawsonia inermis* showed significantly elevated flavonoids (131.11 ± 2.66 mg/100 g) and tannins (140.49 ± 2.94 mg/100 g). Anti-inflammatory activity, assessed using the carrageenan-induced paw oedema model, revealed a superior inhibitory effect of *Lawsonia inermis* (71.5% inhibition at 4 h) compared to *Curcuma longa* (64.5%). In contrast, antioxidant profiling demonstrated stronger activity in *Curcuma longa*, evidenced by higher catalase (16.15 ± 0.75 U/mL) and glutathione levels (294.20 ± 1.54 mg/dL), alongside enhanced ferric reducing power (87.66 ± 0.06%). Notably, *Lawsonia inermis* showed higher levels of antioxidant vitamins, including vitamin A and vitamin E. These findings reveal a functional divergence between the two plants, with *Lawsonia inermis* acting as a potent anti-inflammatory agent and *Curcuma longa* as a superior antioxidant. This differential activity highlights the potential for targeted phytotherapeutic applications and provides a scientific basis for their traditional use. Further mechanistic and pharmacokinetic studies are warranted to optimise their clinical translation.

BMDSWP-85

Chitosan Nanoparticle-Encapsulated *Acanthospermum hispidum* for Enhanced Antioxidant, Antimicrobial, and Anticancer Activities Against Hepatocellular Carcinoma

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Hepatocellular carcinoma (HCC) remains a major global health challenge driven by oxidative stress, chronic inflammation, and limited therapeutic options. Medicinal plants rich in bioactive compounds offer promising alternatives; however, their clinical application is often restricted by poor solubility, instability, and low bioavailability. This study evaluates the therapeutic effectiveness of *Acanthospermum hispidum* extract encapsulated in chitosan nanoparticles (AH-CNP) to enhance its biological activities. The extract (10 mg/mL) was incorporated into a 0.5% (w/v) chitosan solution, achieving an encapsulation efficiency of 90 ± 0.33%. *In vitro* antioxidant activity assessed using DPPH assay showed improved radical scavenging with a lower IC_{50} value (4.10 µg/mL) compared to free extract (4.40 µg/mL) and blank nanoparticles (5.50 µg/mL). Antimicrobial activity demonstrated that AH-CNP produced the highest zone of inhibition (20.50 ± 1.20 mm against *Escherichia coli* at 8000 µg/mL). *In vivo* evaluation in an HCC-induced rat model revealed that AH-CNP (300 mg/kg) significantly reduced liver enzyme levels (ALT, AST, ALP), improved liver function, and restored hepatic architecture. Furthermore, pro-inflammatory markers (TNF-α, IL-6, CRP, IL-1β) were significantly suppressed, confirming strong anti-inflammatory effects. These findings indicate that AH-CNP is a promising nanomedicine for managing HCC and oxidative stress-related diseases, although further studies are required to establish long-term safety and clinical applicability.

BMDSWP-86

GC-MS Characterisation of Bioactive Phytochemicals in Methanol Extract of *Garcina kola* Leaf

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Medicinal plants remain central to primary healthcare, particularly in developing countries, because they supply nutrients and bioactive phytochemicals with antioxidant and therapeutic potential, although some constituents may exert antinutritional or cytotoxic effects depending on dose. *Garcinia kola* (bitter kola; Clusiaceae) is widely used in West and Central African ethnomedicine, yet research has disproportionately emphasised seeds despite the leaves offering a more sustainable source of bioactives. This study aimed to characterise bioactive phytochemicals in the methanol extract of *G. kola* leaves using Gas Chromatography–Mass Spectrometry (GC–MS) and to relate identified compounds to known pharmacological activities within the broader context of reported leaf antimicrobial activity and *Garcinia kola* derived neuroprotective/antidiabetic fractions. Fresh leaves collected from Umuokpara-Umuosiku (Obingwa L.G.A., Nigeria) were washed, air-dried, pulverised, and extracted by cold maceration/sonication (10 g powder in 10 mL methanol; 2 h sonication, 24 h standing), filtered, and concentrated to 1 mL. GC–MS analysis (Agilent 6890N/5973; HP-5 column; helium 1 mL/min; splitless 3 µL; 80–300 °C program; 18 min runtime) with NIST 2024 library matching identified 40 volatile/semi-volatile constituents spanning fatty acids/esters, terpenoid-like compounds, phenolic derivatives, and heterocycles. The most abundant components were 2(1H)-naphthalenone derivative (13.62%), 1-methylene-2β-hydroxymethyl-3,3-dimethyl-4β-(3-methylbut-2-enyl)-cyclohexane (12.30%), and a curan-17-oic acid derivative (11.44%), terpene-like cyclohexane (9.40%), methyl 8,11,14-heptadecatrienoate (6.98%), vitamin E (6.36%), and n-hexadecanoic acid (4.70%). The detected tocopherols, fatty acids, phenolics, and nitrogen/sulfur heterocycles are consistent with reported antioxidant, anti-inflammatory, antimicrobial, enzyme-inhibitory, and potential anticancer/neuroprotective activities, aligning with prior observations of narrow-spectrum antibacterial effects of leaf extracts and bioactive fractions that improved glycaemic and motor outcomes in streptozotocin-diabetic mice. Overall, *G. kola* leaves contain diverse bioactive candidates that support ethnomedicinal use and sustainable harvesting, but targeted isolation, mechanistic validation, and rigorous toxicity/safety studies including hepatic and renal function are required for translational drug discovery.

BMDSWP-87

Haematological Indices of Ethanol Extract of *Carica papaya* Seed on Paracetamol Induced Toxicity in Albino Rats

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Paracetamol is widely used as an over-the-counter analgesic and antipyretic, yet excessive exposure can generate the reactive metabolite N-acetyl-p-benzoquinone imine (NAPQI), provoking oxidative stress and systemic disturbances that extend beyond hepatic injury to measurable alterations in haematological indices. This study aimed to evaluate the effects of an ethanol *Carica papaya* seed extract on body weight, liver and kidney relative organ weights, and complete blood count parameters in albino Wistar rats with paracetamol-induced toxicity, using silymarin as a reference protective agent. Mature *C. papaya* seeds were authenticated, air-dried, powdered, and extracted by soaking 500 g in 70% ethanol for 72 h, followed by filtration and concentration at 60°C. Fifteen rats (6–8 weeks) were acclimatised for 14 days and grouped into paracetamol (1500 mg/kg), paracetamol+silymarin (50 mg/kg), paracetamol+extract (300 mg/kg), paracetamol+extract (600 mg/kg). After 14 days of oral administration, animals were fasted, euthanised, and blood collected into EDTA for automated haematology liver and kidneys were weighed to compute relative organ weight. The result showed that Paracetamol markedly suppressed growth (weight gain 3.09±8.93 vs 39.90±18.30 in controls) and increased relative liver and kidney weights (6.26±0.23% and 1.10±0.08%, respectively). It also reduced RBC (6.88±0.29×10^6/mm^3), PCV (46.33±1.16%), and Hb (14.90±0.36 g/dl) while elevating WBC (11.48±1.14×10^3/mm^3) and platelets (479.33±2.52×10^3/mm^3). *C. papaya* extract at 300 mg/kg and silymarin improved weight gain, normalised organ weights, and restored RBC/PCV/Hb with reduction of elevated WBC and platelet counts toward control values; the 600 mg/kg dose improved haematology and organ weights but did not enhance weight gain. MCV, MCH, and MCHC remained stable across groups, consistent with a predominantly normocytic, normochromic pattern. Overall, ethanol *C. papaya* seed extract mitigated paracetamol-associated haematological and organ weight disturbances, supporting its antioxidant-based protective potential while indicating dose-dependent effects that warrant further safety and mechanistic studies.

BMDSWP-88

Impact of Diethylstilbesterol on Experimentally Induced Uterine Leiomyomas in Female Rat Model

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Uterine leiomyomas are oestrogen-dependent benign tumours that significantly affect female reproductive health. In order to evaluate the impact of diethylstilbestrol (DES) on experimentally induced uterine leiomyomas in female rat model, 32 Wistar rats were grouped into 4 (n=8). Group 1=control, group 2=1.5 mg/kg body weight (bwt) of DES induction, group 3=2.0 mg/kg bwt of DES induction, and group 4=2.5 mg/kg bwt of DES induction. The animals were scanned after 8 weeks of induction and sacrificed. The blood and organs (uterine, kidney, brain, heart, and liver) were collected for haematology, histology, and biochemical assay. Ultrasonography evaluation demonstrated a progression in severity of pathologic lesions as dose of DES increases, with the 2.5 mg/kg group showing the most pronounced fibroid-like lesions. Histological analysis of the uterine confirmed abnormal uterine proliferation, glandular dilation, vascular congestion, and myometrial hypertrophy following DES exposure compared to the control, indicating strong oestrogenic stimulation and disruption of normal uterine architecture. DES administration also induced hepatotoxicity characterised by fatty degeneration and inflammatory infiltration, alongside haematological alterations marked by elevated white blood cell and platelet counts. Induction with DES resulted in elevated oestrogenic stimulation; increased circulating levels of progesterone and prolactin; suppressed luteinising hormone (LH) and follicle-stimulating hormone (FSH); a modest reduction in testosterone; and mild thyroid-stimulating hormone (TSH) suppression. Furthermore, DES disrupted endogenous antioxidant defence systems, causing tissue-specific oxidative stress in the liver, kidney, brain, and heart. In conclusion, the findings of this study indicate that diethylstilbestrol (DES) promotes fibroid-like uterine growth and induces oxidative stress in female rats. Furthermore, these effects collectively contribute to significant imbalances in systemic metabolic function. Specifically, DES exposure appears to disrupt normal metabolic homeostasis, potentially through pathways involving reactive oxygen species and altered hormonal regulation. These observations suggest that DES not only acts as a uterotrophic agent but also exerts broader metabolic consequences that may exacerbate the pathophysiology of uterine fibroids. Further studies are warranted to elucidate the molecular mechanisms linking DES-induced oxidative stress to metabolic dysregulation and to explore potential therapeutic interventions targeting these pathways.

BMDSWP-89

In vivo Antidiabetic Effect of Hydroethanolic Extract of *Ficus asperifolia* Stem Bark

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Diabetes mellitus (DM), a chronic metabolic disorder characterised by hyperglycaemia, resulting from inadequate insulin secretion or action, has become a public health concern due to its high prevalence. This high prevalence has therefore necessitated the need to screen for alternative and complementary management options in medicinal plants. *Ficus asperifolia* (family: Moraceae), a plant widely used in traditional African medicine for various ailments including diabetes, was investigated to provide scientific support for its anti-diabetic use. This study was designed to screen the antidiabetic activity of the hydroethanolic extract of *Ficus asperifolia* stem bark (HEFASB). Secondary metabolite constituents of *Ficus asperifolia* stem bark were determined using standard methods. Thirty male Wistar rats weighing 212.50±12.10 g were randomly divided into five groups A-E. Animals in group A (non-diabetic) received 0.5 mL of distilled water (DW) orally, once daily for 14 days, while those in groups B, C, D, and E, which were made diabetic (by intraperitoneal injection of 150 mg/kg body weight of alloxan monohydrate), also received 0.5 mL of DW, 100 mg/kg body weight of metformin, 78.28 mg/kg body weight, and 156.56 mg/kg body weight of HEFASB, respectively. The results revealed that HEFASB contained phenolics (164.19± 1.29 mg/g), flavonoids (92.42 ± 0.82mg/g), alkaloids (105.70 ± 5.97 mg/g), saponins (80.40 ± 1.54 mg/g) and tannins (72.87 ± 0.68 mg/g). Alloxan significantly ($p < 0.05$) increased the fasting blood glucose (FBG), total cholesterol, triglycerides, low-density lipoprotein-cholesterol, atherogenic index, whereas the pancreas/body weight ratio were significantly reduced. In contrast, the 78.28 mg/kg and 156.56 mg/kg body weight of HEFASB significantly reversed and/or ameliorated the alloxan treatment-related changes in the levels of these parameters in a manner similar to that of metformin-treated diabetic rats. The study concluded that HEFASB has antidiabetic activity and holds promising potential as a natural resource for developing complementary therapies against diabetes.

BMDSWP-90

Hepatoprotective Effects of *Ocimum gratissimum* Essential Oil in Thioacetamide-induced Liver Injury in Wistar Rats

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Liver disease poses a persistent global health challenge, causing approximately two million deaths annually. This study investigated the hepatoprotective effects of *Ocimum gratissimum* essential oil (OGEO) in a thioacetamide (TAA)-induced liver injury model in Wistar rats, combining chemical profiling, *in vitro* bioassays, and *in vivo* biochemical, inflammatory, apoptotic, and histopathological evaluations. Forty-eight male rats were assigned to seven groups: distilled water, coconut oil, TAA (200 mg/kg), TAA with silymarin (50 mg/kg), and TAA with OGEO at 50, 100, and 200 mg/kg for eight weeks. GC-MS analysis identified thymol (23.28%), γ-terpinene (19.16%), and p-cymene (11.28%) as major constituents. OGEO demonstrated potent *in vitro* antioxidant (IC50: 17.19–31.24 µg/mL) and anti-inflammatory activities. In TAA-treated rats, OGEO significantly improved liver function by normalising serum biomarkers (ALT, AST, ALP, GGT, and bilirubin), restoring albumin and renal parameters, reducing lipid peroxidation, and enhancing antioxidant enzymes, including superoxide dismutase, catalase, glutathione, and glutathione S-transferase. OGEO also suppressed pro-inflammatory cytokines (TNF-α and IL-6), restored IL-10 levels, and reduced caspase-3 and caspase-9 activities. Histopathological analysis showed dose-dependent restoration of hepatic architecture with minimal necrosis, while no haematological toxicity was observed. At 200 mg/kg, OGEO demonstrated hepatoprotective efficacy comparable to silymarin. The findings suggest that OGEO exerts hepatoprotective effects through antioxidant, anti-inflammatory, and anti-apoptotic mechanisms.

BMDSWP-91

Transgenerational Suppression of Antioxidant Genes Following Chronic Lead (Pb) Exposure in *Drosophila melanogaster*

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Lead (Pb) is a pervasive heavy metal toxicant with strong oxidative properties capable of disrupting epigenetic regulation, leading to persistent and heritable alterations in gene expression. Such disruptions have been linked to a range of complex diseases. However, transgenerational evidence on how chronic Pb exposure affects key antioxidant genes remains limited. This study, therefore, examined the transgenerational effects of chronic Pb exposure on the expression of antioxidant markers specifically catalase (CAT) and superoxide dismutase 1 (SOD1) mRNA, using *Drosophila melanogaster* as a model organism, while also evaluating paternal, maternal, and combined exposure pathways. Wild-type *Drosophila melanogaster* (W^{1118}) were maintained on a standard cornmeal diet under controlled laboratory conditions. In a randomised design, F0 flies were divided into control and Pb-exposed groups, with exposed flies receiving 500 ppm lead acetate for 20 days. After exposure, F0 flies were crossed to generate F1 lineages representing paternal (Pb-exposed males vs control females), maternal (Pb-exposed females vs control males), and combined exposure (both parents exposed). F1 progeny were maintained on a Pb-free diet and bred to produce F2 and F3 generations, which were also unexposed. Across all exposure paradigms, significant down-regulation ($p < 0.05$) of *SOD1* and *CAT* mRNA was observed, not only in F0 but persisting through F1–F3 generations. The combined exposure lineage exhibited the most pronounced suppression of antioxidant gene expression. Conclusively, chronic Pb exposure induces sustained transgenerational suppression of key antioxidant defence genes, indicating heritable impairment of oxidative stress response pathways that may increase long-term susceptibility to disease.

BMDSWP-92

Mechanistic Insights into *Conoclinium coelestinum*'s Antimalarial Activity: Correlative Analysis of Antioxidant Restoration and Molecular Target Engagement

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Malaria remains a global health challenge that necessitates the exploration of novel plant-based therapeutics. This study investigated the antimalarial potential of *Conoclinium coelestinum* through antioxidant mechanisms and molecular target interactions. Experimental studies evaluated antioxidant responses in *P. berghei*-infected mice treated with plant extract (250, 500, and 1000 mg/kg). This measures catalase, superoxide dismutase, reduced glutathione, glutathione peroxidase, and malondialdehyde levels. Computational analysis involved molecular docking of 20 bioactive compounds against 19 Plasmodium protein targets using AutoDock Vina. The extract demonstrated dose-dependent enhancement of antioxidant enzymes. 500 and 1000 mg/kg doses showing superior activity compared to artemisinin standard. Molecular docking revealed significant binding affinities. Chlorogenic acid with glutathione S-transferase (-8.30 kcal/mol), quercetin with Apical Membrane Antigen 1 (AMA1)-antibody complex (-7.20 kcal/mol), rutin with Hypoxanthine-Guanine-Xanthine Phosphoribosyltransferase (HGXPRT) (-9.70 kcal/mol), and eupatolin with protein kinase (PKG) (-8.70 kcal/mol). These interactions correlated with experimental antioxidant enhancements. The integrated analysis reveals *C. coelestinum*'s multi-target antimalarial mechanism. This emphasises the combining antioxidant restoration with specific protein interactions. The correlation between computational and experimental findings suggests promising therapeutic potential, that warrants further development as an antimalarial agent.

BMDSWP-93

Effect of *Persea americana* Leaf Extract on Glycerol-induced Acute Kidney Injury in Rats

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Acute kidney injury (AKI) remains a major clinical challenge, with oxidative stress and lipid dysregulation contributing to its pathogenesis. *Persea americana* (avocado) has been suggested as a potential renoprotective agent due to its high content of polyphenolic compounds. This study investigated the effects of aqueous avocado leaf extract on renal function and lipid metabolism in a glycerol-induced AKI rat model. Twenty-five male Wistar rats were randomised into five groups: Positive control, Negative Control, and three treatment groups receiving 50, 100, or 200 mg/kg of *P. americana* leaf extract. Serum biochemical parameters (Creatinine, Cholesterol, Triglycerides, Albumin, HDL, LDL and Urea) were measured using standard kits. Statistical analysis was performed using one-way ANOVA followed by Tukey's post hoc test. Significant differences were observed in Creatinine ($p=0.026$) and Triglycerides ($p = 0.021$). Creatinine levels were significantly reduced in the 100 mg/kg and 200 mg/kg groups compared to the negative control, suggesting improved renal clearance. In contrast, triglycerides were significantly elevated in the 50 mg/kg and 200 mg/kg groups relative to controls. No significant changes were detected in cholesterol, albumin, HDL, LDL or urea. Avocado leaf extract exerted dose-dependent effects on renal and lipid metabolism. At higher doses, the extract showed nephroprotective potential by lowering Creatinine levels. These findings point to *P. americana* as a promising natural product for renoprotective therapy. Further studies are needed to establish the active compounds and mechanism of action.

BMDSWP-95

Hormone Profile and Serum Lipid Levels in androgen Induced Prostate Hyperplastic Rats Treated with *Achatina Achatina* Haemolymph

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Haemolymph is a fluid analogous to blood in vertebrates and contains haemocyte suspended in fluid plasma and many other chemicals dissolved in it. Its use in traditional management of hypertension, atherosclerosis, obesity and Diabetes Mellitus is well documented. The purpose of this study was to investigate haemolymph potential effect on androgen induced prostate hyperplasia with specific interest on some sex hormones and serum lipid profiles. The apex shell of the *Achatina Achatina* was opened and haemolymph drained freely into a clean sterile bottle. Different volumes of the haemolymph were used in the treatment. The experiment was for 28 days and analysis performed using standard methods. Benign prostate hyperplasia (BPH) induction significantly reduced ($P<0.05$) Follicle stimulating hormone (FSH), luteinising hormone (LH) and testosterone hormone levels (3.69±12, 2.02±0.14 and 6.58±0.21) respectively and significantly increased ($P<0.05$) prostate specific antigen (PSA) level (1.94±0.02) compared with the normal control group. Serum cholesterol, triglyceride (TAG), low density lipoprotein-cholesterol (LDL-C) and very low density lipoprotein-cholesterol (VLDL-C) were significantly increased ($P\leqslant0.05$) in BPH group (118.32±0.08, 169.89±0.12, and 30.54±0.13) respectively compared with the normal control, whereas high density lipoprotein-cholesterol (HDL-C) decreased significantly ($P\leqslant0.05$) in BPH group. The high serum cholesterol, TAG, LDL-C and VLDL-C observed in our study together with concurrent decrease in HDL-C values in BPH group may explicate the relationship between BPH and cardiovascular disorders but these values were significantly reversed by our treatment. Our study showed that haemolymph could improve biochemical and hormonal changes caused by BPH in experimental rats.

BMDSWP-96

Toxicological Assessment of Potentially Harmful Elements in Selected Fish Species from Lagos and Ogun States, and Their Impact on Oxidative Stress Biomarkers in Wistar Rats

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Fish remains a key source of dietary protein in coastal communities of Nigeria, but growing environmental pollution has raised concerns about contamination with potentially toxic elements (PTEs). This study assessed the toxicological load of commonly consumed fish from major markets in Lagos and Ogun State and examined their effects on oxidative stress biomarkers in Wistar rats. Eight groups of fish samples, representing different species and markets, were analysed. Potentially toxic elements (PTEs) including Cu, As, Zn, Fe, Pb, Hg, and Cd, were quantified using atomic absorption spectrophotometry. Female Wistar rats (180–200 g) were assigned to nine groups and fed diets containing 0%, 50%, and 75% oven-dried fish over 10 days. Oxidative stress biomarkers were subsequently evaluated in serum and selected tissues. PTE levels across all sampled markets were consistently above recommended limits set by regulatory bodies, with the highest accumulation observed in liver and kidney tissues, especially from Makoko and Ebute Ero Fish Markets. Exposed rats showed variable weight changes alongside marked disruptions in oxidative stress markers. Elevated lipid peroxidation and increased 8-OHdG levels confirmed heightened oxidative damage. Antioxidant enzymes displayed tissue-specific responses, with some showing adaptive increases and others, particularly in reproductive organs, showing depletion. The findings demonstrate that fish from these markets contain unsafe levels of contaminants capable of inducing oxidative stress and biochemical dysfunction, posing potential public health risks and emphasising the need for stricter monitoring and regulation.

BMDSWP-98

Influences of *Parkia biglobosa* Seed coat Supplemented diets on Haematological Parameters in Streptozotocin Induced Diabetic Rats

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Parkia biglobosa, a lesser-known legume is used locally as a food condiment. The seed processing leads to generation of a massive lignocellulosic waste in form of the seed coat which is underutilised. This study evaluated and compared the effects of *Parkia biglobosa* seed and seed coat supplemented diets (PBSD and PBSCD) on haematological parameters in streptozotocin (STZ)-induced diabetic rats. Forty-five male Wistar rats divided into nine groups (n=5) were fed PBSD and PBSCD at different dietary inclusion for 21 days, after which haematological parameters were determined using standard methods. STZ induction significantly ($p<0.05$) reduced Red Blood Count, Haemoglobin, and Packed Cell volume while increasing Leucocyte counts in untreated rats compared to the normal control. Treatment with PBSD and PBSCD significantly ($p<0.05$) ameliorated these alterations in a dose-dependent manner. *Parkia biglobosa* seed and seed coat supplemented diets exhibited haematological potentials in STZ-induced diabetic rats.

BMDSWP-99

Anogeissus leiocarpus Confers Neuroprotection through Coordination Modulation of Excitatory, Oxidative, Apoptotic, and Neuroinflammatory Signalling

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Neurodegenerative disorders are characterised by progressive neuronal damage associated with oxidative stress, neuro-inflammation, mitochondrial dysfunction, and neurotransmitter imbalance. This study investigated the neuroprotective potential of ethanol leaf extract from *Anogeissus leiocarpus* (ALE) against aluminium chloride (AlCl3)-induced neurotoxicity in Wistar rats. Thirty-five adult male wistar rats were randomly divided into seven groups: normal control, negative control, standard drug, and ALE-treated groups. Neurotoxicity was induced using aluminium chloride, and treatment was administered orally for the duration of the experiment. Biochemical analyses were conducted to evaluate antioxidant enzymes, inflammatory markers, neurotransmitter levels, mitochondrial function, apoptotic indices, and behavioural performance. Aluminium chloride administration significantly reduced the activity of oxidative stress markers such as glutathione (GSH), superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione-S-transferase (GST), catalase, and other brain enzymes, such as dopamine concentration, tyrosine hydroxylase activity, Na^+/K^+-ATPase activity, and mitochondrial complex I activity, but significantly increased the activity of malondialdehyde (MDA), acetylcholinesterase (AChE), glutamate, xanthine oxidase, myeloperoxidase, tumour necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and caspase-3 compared with those in the normal control group ($p < 0.05$). Aluminium exposure also impaired spatial working memory in the Y-maze test. The leaf extract of *Anogeissus leiocarpus* significantly protected against aluminium chloride-induced neurotoxicity through antioxidative, anti-inflammatory, antiapoptotic, and neuromodulatory mechanisms. These findings suggest that *Anogeissus leiocarpus* is a promising therapeutic candidate for the management of neurodegenerative disorders.

BMDSWP-100

Assessing the Bioaccumulation of Essential and Heavy Metals in Free-Ranging Chickens Raised Around Ilesha Gold Mining Areas

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Artisanal and small-scale gold mining (ASGM) continues to be a major source of local environmental contamination in developing countries, especially across sub-Saharan Africa, including the mineral-rich tropical lowland forest areas of Osun State, Nigeria. This study assessed the bioaccumulation of toxic heavy metals (Pb, Hg, Cd, As) and essential macro- and micro-elements (Mg, Al, Ca, Cr, Mn, Fe, Ni, Co, Cu, Zn, Se, Mo) in environmental matrices (soil, water) and biological samples (blood of free-ranging chickens) across artisanal gold mining areas (Ifewara, Iperindo, Itagunmodu and Store) in Osun State, Nigeria, against Ilesa, a non-gold mining area as a baseline control. The metals were detected and quantified using Inductively Coupled Plasma Optical Emission Spectroscopy. Mining-impacted zones revealed massive environmental loading compared to the baseline control. Toxic heavy metals severely breached regulatory health thresholds, driven by aquatic Mercury peaking at 0.25 µg/mL (250-fold above WHO limits) in Itagunmodu. Concurrently, essential element profiles showed profound environmental and biological elevations. Magnesium and Calcium concentrations in soil spiked up to 40.42 µg/mL and 21.57 µg/mL, respectively. This dual environmental enrichment directly drove systemic biological uptake in the free-ranging chickens, with avian blood displaying critical Lead (0.16 µg/mL), Chromium (0.23 µg/mL), and Zinc (3.24 µg/mL) burdens. The findings confirm an active, non-biodegradable food-chain bioaccumulation loop. The synergistic combination of heavy metal toxicity and highly altered essential element homeostasis poses severe ecotoxicological risks, underscoring an urgent need for targeted environmental remediation and dietary public health interventions.

BMDSWP-101

Citrullus colocynthis L. Seed Kernel Extract Mitigates Monosodium Glutamate–Induced Uterine Leiomyoma through Antioxidant, Hormonal, and NF-κB Pathway Modulation in Wistar Rats

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Uterine leiomyoma (fibroids) represents one of the most common benign gynaecological tumours among women of reproductive age worldwide. This study investigated the protective effects of *Citrullus colocynthis* L. seed kernel extract against monosodium glutamate (MSG)-induced uterine leiomyoma in Wistar rats, focusing on antioxidant, hormonal, lipid, hepatic, and NF-κB-related mechanisms. HPLC analysis identified a range of bioactive phytochemicals in the extract, including β-carotene, phenol, anthocyanin, lycopene, citrulline, catechin, epicatechin, quercetin, rutin, and kaempferol, each detected at distinct retention times. *In vitro* antioxidant assays revealed potent iron-chelating activity (IC_{50} = 0.085 ± 0.015 mg/mL), surpassing the standard quercetin (0.140 ± 0.010 mg/mL), alongside notable reducing power (FRAP IC_{50} = 0.180 ± 0.015 mg/mL) comparable to ascorbic acid (0.150 ± 0.010 mg/mL), with moderate radical-scavenging capacity. *In vivo*, MSG administration significantly depleted catalase, superoxide dismutase (SOD), and glutathione (GSH) levels; however, supplementation with *C. colocynthis* extract restored these antioxidant markers, with the most pronounced recovery observed at the higher dose of 250 mg/kg body weight (GSH = 81.05 ± 6.01 µmol/mL). The extract also improved lipid profiles, lowering total cholesterol and LDL while raising HDL levels, and moderated liver function by reducing ALT activity and increasing total protein concentration. Hormonal analysis indicated partial normalisation of testosterone and oestradiol levels, while inflammatory markers showed favourable modulation, with reduced TNF-α and elevated IL-10 concentrations. Taken together, these findings demonstrate that aqueous *Citrullus colocynthis* seed kernel extract exerts antioxidant, hypolipidaemic, hepatoprotective, reproductive-hormone-modulating, and anti-inflammatory effects, underscoring its therapeutic potential in mitigating MSG-induced uterine leiomyoma.

BMDSWP-102

Exposure to Cadaver Preservative Fume Triggers Molecular and Biochemical Dysfunctions in Rat Brain

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Cadaver preservative fumes constitute a major occupational hazard to mortuary workers, pathologists, and anatomy laboratory personnel, posing neurotoxicological effects which areincompletely characterised. We investigated the effects of three formulated cadaver preservative fumes on the brain of male Wistar rats. 28 adult male Wistar rats were randomly assigned to four groups (n=7): Group I (control, exposed to humidified ambient air), Group II (chronic exposure, Formulation A: 40 mL formalin, 30 mL ethanol, 5 mL phenol, 15 mL glycerol, 10 mL methanol), Group III (sub-chronic, Formulation B: 25 mL formalin, 17.5 mL ethanol, 3.5 mL phenol, 10 mL glycerol, 7.5 mL methanol, 36.5 mL distilled water), and Group IV (acute exposure, Formulation C: 10 mL formalin, 5 mL ethanol, 2 mL phenol, 5 mL glycerol, 5 mL methanol, 73 mL distilled water), whole body exposure duration: 6hr/day for 120 days, within a controlled exposure chamber. Fume concentrations were verified using a calibrated photoionisation detector (ppbRAE 3000+). Brain tissue homogenates were collected and biochemical and molecular analysis were carried out. The results showed significant ($p < 0.05$) reduction of total thiol and non-protein thiol levels,elevation of TBARS and activities of purinergic enzymes, NTPDase and 5'-nucleotidase. At the molecular level, upregulation of tau protein, APP, BACE1, TNF-α, MPO, NF-κB, Nrf2, and IL-6 gene expression was observed. These findings provide biochemical and molecular evidence that chronic cadaver preservative fume exposure induces progressive neurotoxicity in ratsby oxidative stress, purinergic dysregulation, neuroinflammation, and activation of Alzheimer's disease-associated genes, hence the need for occupational safety standards in anatomy and mortuary settings.

BMDSWP-103

Neuroprotective Effects of Protocatechuic Acid and Vanillic Acid on Manganese-Induced Striatal Neurotoxicity in Rats

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High concentration of manganese in the brain is a neurotoxic condition that causes symptoms similar to Parkinson's disease through various mechanism. This study investigated the effects of protocatechuic acid and vanillic acid in male Wistar rats with manganese-induced neurotoxicity. Biochemical assessments were carried out on the striatal brain region of rats administered with manganese chloride (MnCl2) (25 mg/kg) to induce manganese toxicity, as well as on rats co-treated with 50 mg/kg protocatechuic acid (PA) and 50 mg/kg vanillic acid (VA) for 15 consecutive days. Results indicated that MnCl2 induced a state of oxidative stress in the striatum tissue, as evidenced by a significantly decreased reduced glutathione level and activity of superoxide dismutase, coupled with increased lipid peroxidation. These imbalances were significantly (p<0.0001) attenuated by PA and VA administration. MnCl2 also induced impairment in dopamine metabolism and acetylcholine metabolism in the straitum. These impairments were ameliorated upon treatment with PA and VA. MnCl2 caused a decrease in dopamine level (3.58 ± 0.26 mmol/mg protein), which was ameliorated after treatment with PA (7.14 ± 0.43 mmol/mg protein) and VA (7.52 ± 0.38 mmol/mg protein). Also, the acetylcholinesterase activity of the MnCl2 group was also decreased (3.18 ± 0.00 µmol of t.p./min/mg protein), and PA ameliorated this (5.64 ± 1.25) and VA (6.23 ± 1.54). Furthermore, MnCl2 occasioned an increase in the levels of nitric oxide in the straitum (12.70 ± 2.86 µmol nitrite/mg protein) which was mitigated after treatment with PA (7.42 ± 1.66) and VA (3.71 ± 0.89). The results obtained suggest that protocatechuic acid and vanillic acid could be promising neuroprotective agents due to their potent neuromodulatory activities and could be considered in developing effective therapies for the management of manganese-induced neurotoxicity and other related neurological disorders like manganism & Parkinsonism.

BMDSWP-104

Evaluation of the Thrombolytic Potential of *Allium cepa* Extracts in an *in vitro* Human Blood Model

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Thrombotic disorders are major contributors to cardiovascular and cerebrovascular diseases. Although thrombolytic agents such as streptokinase are widely used for clot dissolution, their clinical application is often limited by bleeding complications and cost. These limitations has increased the interest in the search for alternative sources of safer thrombolytic. *Allium cepa* is rich in bioactive phytochemicals with reported cardioprotective and antioxidant potential. This study evaluated the thrombolytic and antioxidant activities of *Allium cepa* extract and fractions. Ethanolic crude extract of *Allium cepa* (AC) was prepared and partitioned into aqueous (ACA) and ethyl acetate (ACE) fractions. Thrombolytic activity of AC, ACE, and ACA was assessed using an *in vitro* human blood clot lysis model, with streptokinase as the reference standard. The phytochemical profile of the ethanolic extract was characterised using high-performance liquid chromatography (HPLC). Antioxidant activity was evaluated by determining total phenolic content (TPC), total flavonoid content (TFC), and free radical scavenging activity. HPLC profiling identified quercetin-3-O-rhamnoside and other polyphenols, which may contribute to the observed thrombolytic and antioxidant activities. All samples exhibited thrombolytic activity, with AC showing the highest clot lysis (58.99 ± 2.80%), followed by ACE (43.69 ± 0.90%) and ACA (39.30 ± 0.13%), compared with streptokinase (75.20 ± 1.31%). AC also demonstrated significant antioxidant-related phytochemical contents, with TPC of 190.34 ± 1.48 mg GAE/g extract and TFC of 539.926 ± 6.54 mg QE/g extract. In the DPPH assay, AC showed the strongest radical scavenging activity (IC_{50} = 48.41 ± 1.26 µg/mL), followed by ACE (62.16 ± 2.44 µg/mL) and ACA (78.43 ± 5.86 µg/mL), and was more potent than quercetin (55.66 ± 3.10 µg/mL). *Allium cepa*, particularly its ethanolic crude extract, possesses promising thrombolytic and antioxidant activities and may serve as a potential source of bioactive compounds for adjunct management of thrombotic disorders.

BMDSWP-105

Effect of Cinnamic Acid on Lipid Profile Level of Female Rats Exposed to Manganese Chloride

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Manganese chloride ($MnCl_2$) toxicity is associated with oxidative stress, which disrupts lipid metabolism and increases the risk of cardiovascular complications. This study evaluated the protective effect of cinnamic acid (CA) on lipid profile alterations in female Wistar rats exposed to $MnCl_2$. Thirty adult female rats were randomly assigned into six groups (n = 5): normal control, $MnCl_2$ (10 mg/kg), CA (50 mg/kg), CA (100 mg/kg), $MnCl_2$ + CA (50 mg/kg), and $MnCl_2$ + CA (100 mg/kg). Treatments were administered orally once daily for 90 days, after which blood samples were collected for lipid profile analysis. Exposure to $MnCl_2$ produced significant ($p < 0.05$) dyslipidaemia, characterised by elevated total cholesterol, low-density lipoprotein (LDL), and triglyceride levels, with a concomitant reduction in high-density lipoprotein (HDL) compared with the normal control. Co-administration of cinnamic acid attenuated these lipid abnormalities in a dose-dependent manner. Rats treated with the higher dose of CA (100 mg/kg) showed the greatest improvement, with lipid parameters approaching normal values, while the lower dose (50 mg/kg) produced partial but significant restoration. In contrast, rats treated with cinnamic acid alone exhibited lipid profiles comparable to those of the normal control, indicating that CA did not adversely affect lipid metabolism. The observed hypolipidaemic effect of cinnamic acid is likely attributable to its antioxidant activity, which mitigates $MnCl_2$-induced oxidative damage and preserves normal lipid homeostasis. These findings demonstrate that cinnamic acid effectively protects against manganese chloride-induced dyslipidaemia and may have therapeutic potential as a natural agent for preventing lipid metabolic disorders associated with heavy metal toxicity.

BMDSWP-106

Biochemical and Toxicological Investigation of Two Salt Substitutes on the Cardiac Function of Rats

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Cardiovascular diseases have remained the leading cause of mortality worldwide for over two decades. Numerous substances consumed as food additives, dietary supplements, and salt substitutes have been implicated in adverse cardiovascular outcomes. This study investigated the biochemical and toxicological effects of two unrefined salt substitutes, collectively known as Obu-Otoyo, which are traditionally consumed in a Nigerian community to manage hypertension and diabetes mellitus. Previous studies have reported the presence of heavy metals in these salt substitutes, raising concerns about their potential health risks. Following the determination of the median lethal dose (LD_{50}), male Wistar rats were randomly assigned to four groups for each salt substitute. The first group served as the control, while the remaining groups received graded doses of the salt substitutes orally for 28 days. At the end of the treatment period, biochemical assessments were conducted to evaluate the effects of the treatment on cardiac function. Biochemical evaluation of lipid profiles demonstrated elevated levels of total cholesterol, triglycerides, low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), and high-density lipoprotein (HDL). Assessment of oxidative stress markers showed significant increases in lipid peroxidation, nitric oxide production, and glutathione peroxidase activity across all treatment groups. Furthermore, the concentrations of pro-inflammatory biomarkers, including interleukin-6 (IL-6), C-reactive protein (CRP), tumour necrosis factor-alpha (TNF-α), and inducible nitric oxide synthase (iNOS), were markedly elevated in animals administered varying doses of the salt substitutes. Collectively, these findings indicate that the investigated salt substitutes possess significant cardiotoxic potential and may adversely affect cardiac health through mechanisms involving oxidative stress, inflammation, dyslipidaemia, and myocardial tissue damage. Their prolonged consumption may therefore constitute a significant risk factor for cardiovascular dysfunction.

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Neuropharmacological Effect of a Polyherbal Formulation on Electrolyte and Glutamate Homeostasis in Rats with Cerebral Ischaemia and Reperfusion Injury

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Cerebral ischaemia and reperfusion injury is a major cause of neurological disability and death, largely driven by electrolyte imbalance, glutamate excitotoxicity, and neuronal damage. This study investigated the neuroprotective effects of a polyherbal formulation on electrolyte homeostasis and glutamate metabolism in a rat model of cerebral ischaemia/reperfusion injury. Global cerebral ischaemia was induced in adult Wistar rats using bilateral common carotid artery occlusion (BCCAO). Animals were divided into normal control, ischaemic control, nimodipine-treated, and polyherbal-treated groups at varying doses. Following treatment, biochemical and neurobehavioral assessments were performed. Electrolyte levels (Na^+, K^+, Ca^{2+}, and Mg^{2+}), Na^+/K^+-ATPase activity, glutamate-metabolising enzymes, glutamate transporter-1 (GLT-1) expression, and lactate dehydrogenase (LDH) activity were evaluated. Ischaemic rats showed significant disruption of electrolyte balance, reduced Na^+/K^+-ATPase activity, impaired glutamate metabolism, increased LDH activity, and poor neurobehavioral performance. Treatment with the polyherbal formulation significantly restored electrolyte homeostasis, improved Na^+/K^+-ATPase activity, enhanced glutamate clearance through modulation of glutamate-metabolising enzymes and GLT-1 expression, reduced neuronal damage, and improved functional outcomes in a dose-dependent manner. These findings demonstrate that the polyherbal formulation possesses significant neuroprotective potential by simultaneously targeting ionic imbalance and glutamate excitotoxicity, two key mechanisms underlying ischaemic brain injury. The study provides experimental evidence supporting the development of this polyherbal formulation as a promising complementary therapeutic strategy for the management of cerebral ischaemia and reperfusion injury, warranting further pharmacological and clinical investigation.

BMDSWP-108

In vitro Thrombolytic Activity of Crude Ethanolic Extract and Solvent Fractions of *Spondias mombin*

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Thrombosis is a leading cause of cardiovascular disease worldwide. Conventional thrombolytic agents such as streptokinase and tissue plasminogen activator are effective but are limited by high cost, short half-life, and bleeding risk. *Spondias mombin* is traditionally used to treat hypertension and circulatory disorders and contains bioactive compounds with potential cardiovascular benefits. This study evaluated the thrombolytic and antioxidant potential of *Spondias mombin* as an affordable plant-based thrombolytic agent. Crude ethanolic extract of *Spondias mombin* was partitioned into aqueous (SMA), dichloromethane (SMD), and ethyl acetate (SME) fractions. Antioxidant activity was assessed by determining total phenolic content (TPC), total flavonoid content (TFC), and DPPH free radical scavenging activity. Thrombolytic activity was evaluated using an *in vitro* clot lysis assay with streptokinase as the reference standard, while phytochemical profiling of the crude extract was performed using high-performance liquid chromatography (HPLC). HPLC identified ellagic acid and other polyphenolic compounds that may contribute to the observed activities. SMA exhibited the highest antioxidant related phytochemical contents, with TPC (217.39 ± 7.07 mg GAE/g extract) and TFC (185.98 ± 4.72 mg QE/g extract). SME showed the strongest DPPH radical scavenging activity (IC_{50} = 47.85 ± 0.606 µg/mL), followed by SMA (59.15 ± 0.594 µg/mL), SMD (50.01 ± 0.651 µg/mL), and the crude extract (65.14 ± 2.28 µg/mL), and was more potent than quercetin (55.34 ± 0.00) The crude extract produced the highest clot lysis (32.59 ± 1.65%), followed by SME (29.99 ± 0.37%), SMD (27.71 ± 2.22%), and SMA (26.33 ± 1.14%), compared with streptokinase (75.20 ± 1.31%). These findings demonstrate that *S. mombin* possesses promising thrombolytic and antioxidant properties and warrants further investigation as a cost-effective source of plant-derived agents for thrombotic disorders.

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In vitro Antioxidant and Antiaging Activities of Fruit Extract and Total Alkaloids of *Solanum torvum* (Swartz)

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The study obtained the extract and total alkaloidal constituents of *S. torvum* fruits, investigated anti-oxidant potentials and evaluated the anti-aging properties of the total alkaloid using *in silico* approach. These were with a view to providing information on the culinary and therapeutic potentials of *S. torvum* fruits. Anti-oxidant activities were analysed using DPPH (2, 2 – Diphenyl -2- picryl hydrazyl hydrate), free radical scavenging activity, total antioxidant capacity, ferric reducing antioxidant power, hydrogen peroxide radical scavenging assays and estimation of vitamin C and vitamin E concentrations according to standard procedures. GraphPad Prism 5 was used to analyse data. The percentage yields of ethanol extract and alkaloid fraction obtained were 10.01% and 2.71% respectively. The concentrations of phenolics, flavonoids, tannins, saponins, vitamin C and vitamin E in *S. torvum* ethanol extract varied from 17.77 ± 0.88 µg/g to 611.00 ± 10.71 mgQSE/g extract. Moreover, the ethanol extract exhibited higher DPPH radical scavenging activity, while alkaloid fraction demonstrated higher hydrogen peroxide radical scavenging activities, ferric reducing anti-oxidant and total anti-oxidant capacity. Molecular docking was applied to explore the mechanisms of action of fourteen bioactive compounds identified through LC-MS analysis in the alkaloid fraction of *Solanum torvum*. Solasonine demonstrated the highest binding affinity with collagenase, with a binding energy of -9.7 kcal/mol. Highest binding affinity for elastase was recorded for solasodine with a binding energy of -8.0 kcal/mol. The study concluded that the radical scavenging activities of both ethanol extract and alkaloid fraction demonstrated antioxidant potency and good antiaging potentials.

BMDSWP-110

Reproductive Hormones and Cardiovascular Risk Biomarkers among Women Using Hormonal Contraceptives in Southwest Nigeria

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Hormonal contraceptives are extensively used for family planning, but their effects on reproductive hormone regulation and cardiovascular health remain a subject of concern. This study investigated reproductive hormone profiles and cardiovascular risk biomarkers among women using hormonal contraceptives at the University of Medical Sciences Teaching Hospital (UNIMEDTH), Akure, Nigeria. A cross-sectional comparative study was conducted among 250 women, including 150 hormonal contraceptive users and 100 age-matched non-users. Serum levels of progesterone, follicle-stimulating hormone (FSH), luteinising hormone (LH), and testosterone were measured using enzyme-linked immunosorbent assay (ELISA). Cardiovascular biomarkers, including troponin I, troponin T, creatine kinase-MB (CK-MB), lactate dehydrogenase (LDH), and myoglobin, were also assessed. Hormonal contraceptive users exhibited significantly higher serum oestradiol (15.9 ± 4.53 nmol/L), progesterone (4.9 ± 1.09 nmol/L), and prolactin (31.9 ± 5.55 mIU/L) compared with controls (5.5 ± 1.37 pmol/L, 1.0 ± 0.31 nmol/L, and 26.8 ± 4.86 mIU/L, respectively; $p < 0.05$). Alterations in cardiovascular biomarkers, particularly CK-MB, LDH, and troponin I, were observed among contraceptive users ($p < 0.05$). Significant associations were identified between reproductive hormone alterations and lipid profile parameters, especially total cholesterol. Furthermore, women who had used contraceptives for more than five years demonstrated are at greater disadvantage when compared with those using contraceptives for one year or less. Hormonal contraceptive use is associated with significant alterations in reproductive hormone profiles and cardiovascular risk biomarkers, with the magnitude of these changes influenced by duration of use. Periodic medical assessment of users may support early identification of potential cardiovascular risks.

BMDSWP-111

Antiplasmodial, Cytotoxic and Membrane Stabilitising Activities of Methanolic Extract and Fractions of *Tithonia diversifolia* Leaf

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In African traditional medicine, the leaves of *Tithonia diversifolia* (Hemsl.) are widely utilised for the management of malaria and related conditions. While the ethnomedical use and general antiplasmodial activity of *Tithonia diversifolia* have been scientifically established, there remains a critical need to determine the polarity profile of its bioactive constituents. Therefore, this study aims to evaluate the comparative efficacy of non-polar dichloromethane (DCM) and polar aqueous fractions to identify the solvent matrix that best concentrates the plant's active antiplasmodial principles. The crude extract was obtained using 85% methanol and sequentially fractionated into aqueous and dichloromethane (DCM) phases to obtain both aqueous and DCM fractions. Antiplasmodial potential was evaluated using an *in vitro* β-haematin inhibitory assay to mimic heme detoxification. Anti-inflammatory activity was assessed via stressed erythrocyte membrane stability assay, while cytotoxicity was determined using a brine shrimp lethality assay (BSLA). All assays were performed in triplicate across a range of concentrations to determine active values. The dichloromethane (DCM) fraction exhibited the highest activity in the β-haematin, cytotoxicity, and hypotonic stress membrane stability assays, while the aqueous (AQ) fraction led in heat-induced stress inhibition. For β-haematin inhibition, the efficacy order compared to chloroquine (CQ) was CQ > DCM > AQ > crude extract (CrE). Brine shrimp lethality was concentration-dependent, following the trend DCM > AQ > CrE. In the membrane stability assay using diclofenac (DF) as the reference, percentage stability under heat-induced stress followed the sequence AQ > CrE > DCM > DF, whereas hypotonic stress protection followed DF > CrE > AQ > DCM. This study reveals a polarity-dependent split in *Tithonia diversifolia* leaf bioactivity. The non-polar dichloromethane (DCM) fraction concentrated the antiplasmodial and cytotoxic agents, showing superior β-haematin inhibition and the highest brine shrimp lethality. Conversely, anti-inflammatory membrane protection was driven by polar constituents, with the aqueous (AQ) fraction exceptionally outperforming the standard drug under heat stress. Consequently, future antimalarial isolation efforts should target the DCM fraction, while anti-inflammatory studies should prioritise the polar aqueous matrix.

BMDSWP-114

The Effects of N-Acetylcysteine on Reproductive Toxicity Induced By Zinc Oxide Nanoparticle in Male Wistar Rats

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The increasing industrial and biomedical use of zinc oxide nanoparticles (ZnO NPs) has raised concern over their potential impact on male reproductive health. Owing to their nanoscale size and high reactivity, ZnO NPs can cross the blood–testis barrier, disrupt testicular function, and impair spermatogenesis, primarily through oxidative and inflammatory mechanisms. N-acetylcysteine (NAC), a thiol-containing antioxidant and glutathione precursor, has shown promise in counteracting oxidative damage. To assess whether NAC can attenuate ZnO NP-induced reproductive injury in male Wistar rats. Fifteen adult rats were randomly assigned into three experimental groups (n = 5 per group): control (distilled water), ZnO NP-treated (200 mg/kg), and ZnO NP + NAC-treated (200 mg/kg ZnO NP + 100 mg/kg NAC). Oral administrations were conducted daily for four weeks. After treatment, blood and testicular tissues were analysed for oxidative stress indicators (MDA, NO, SOD, CAT, GPx, GSH, TAC), reproductive hormones (FSH, LH, testosterone), sperm quality indices (count, motility, viability, morphology), inflammatory markers (TNF-α, IL-1β), and apoptosis-related proteins (BCL-2, Caspase-3). Exposure to ZnO NPs caused a significant rise in lipid peroxidation and nitrosative stress, depletion of antioxidant defences, suppression of testosterone, deterioration of sperm quality, and increased testicular inflammation and apoptosis. Co-administration of NAC markedly attenuated these effects, reducing MDA, restoring SOD/CAT activity, normalising testosterone, improving sperm quality, and suppressing TNF-α, IL-1β, BCL-2 and Caspase-3. The findings suggest that NAC confers notable protection against ZnO NP-induced reproductive injury, primarily via redox restoration and modulation of inflammatory and apoptotic pathways. While NAC did not fully reverse nitrosative stress or nanoparticle accumulation, this work highlights its therapeutic potential and provides a mechanistic basis for antioxidant intervention strategies in nanoparticle-associated male infertility.

BMDSWP-115

Hepatotoxic Effects of Cadaver Preservative Fume Exposure on the Liver: Biochemical, Functional, and Molecular Evidence in Rat Models

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Cadaver preservative fumes constitute a major occupational hazard to mortuary workers, pathologists, and anatomy laboratory personnel. This study examined the hepatotoxic effects of three formulated cadaver preservative fumes in male Wistar rats. 28 adult male Wistar rats were randomly assigned to four groups (n=7): Group I (control, exposed to humidified ambient air), Group II (chronic exposure, Formulation A: 40mL formalin, 30mL ethanol, 5mL phenol, 15mL glycerol, 10mL methanol), Group III (sub-chronic, Formulation B: 25mL formalin, 17.5mL ethanol, 3.5mL phenol, 10mL glycerol, 7.5mL methanol, 36.5mL distilled water), and Group IV (acute exposure, Formulation C: 10mL formalin, 5mL ethanol, 2mL phenol, 5mL glycerol, 5mL methanol, 73mL distilled water), whole body exposure duration: 6hr/day for 120 days. Fume concentrations were verified using a calibrated photoionisation detector (ppbRAE 3000+). Animals were sacrificed and the liver collected for biochemical and molecular evaluation. The results showed that cadaver preservative fumes significantly ($p < 0.05$) reduced total thiol, non-protein thiol, and ALAD activity in liver homogenates while significantly elevating TBARS, NTPDase, and 5'-nucleotidase levels, confirming disturbed redox homeostasis and damage, and impaired haem biosynthesis with increasing duration of exposure. Serum ALT, AST, and ALP were significantly elevated in all exposed groups, providing multi-faceted biochemical evidence of hepatocellular injury and cholestatic dysfunction. In Group 4 (chronic), total protein and albumin were significantly increased. Lipid profile analysis revealed a significantly atherogenic pattern in all exposed groups, with elevated VLDL, LDL, total cholesterol, and triglycerides and reduced HDL, consistent with disrupted hepatic lipid metabolism. Molecular analysis confirmed coordinated upregulation of the glutathione synthesis pathway (GCLC, GCLM, GSS, GPx), Nrf2, NF-κB, VCAM-1, alpha-foetoprotein, SREBP, and FAS gene expression, demonstrating simultaneous adaptive antioxidant activation, inflammatory signalling, vascular endothelial activation, and enhanced de novo lipogenesis. These findings highlight the hepatotoxicity of cadaver fumes and the necessity for improves occupational safety measures in anatomy laboratories and mortuary environments.

BMDSWP-116

Attenuating Potential of Ethanol Leaf Extract of *Boerhavia coccinea* Against Ethanol-Induced Ulcers Exploring Oxidative Stress, the Interleukins/Bcl-2/ ICAM-1 Pathway

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The objective of the study was to assess the Attenuating potential of *Boerhavia coccinea* in ethanol-induced gastric ulcers in rats. Male Wistar rats (150±10 g) were used in the study (n=5). The rats were randomly divided into different groups, i.e., the normal group, ethanol control, Omeprazole 20mg/kg and *Boerhavia coccinea* 250 and 400 mg/kg group. The degree of ulceration was determine, and Various biochemical parameters were assessed, including total acidity and pH values, oxidative stress biomarkers such as superoxide dismutase (SOD), glutathione (GSH), malondialdehyde (MDA), and catalase (CAT) along with markers, i.e., tumour necrosis factor-α (TNF-α), interleukin-6 (IL-6), IL-1β, intercellular adhesion molecule-1 (ICAM-1) and expression of B-Cell Leukaemia/Lymphoma 2 (Bcl 2). Also, histopathology was performed. Rats pretreated with *Boerhavia coccinea* showed a substantial dose-dependent drop in their mean ulcer score when compared to controls ($P<0.05$), indicating that 500 mg/kg of the extract would be the most beneficial in preventing or treating ulcers. Treatment with *Boerhavia coccinea* in the ethanol-induced-ulcer rats restored the levels of biochemical parameters such as SOD, GSH, MDA, CAT, MDA, MPO, NO and marker expression, including TNF-α, IL 6, IL-1β, PGE-1, ICAM-1, and Bcl-2 with protected against cellular necrosis. *Boerhavia coccinea* aqueous extract has been shown to have preventive properties against ethanol-induced ulcers in rats by reducing inflammation and oxidative stress and promoting gastroprotection.

BMDSWP-117

Characterisation and Anti-Malarial Properties of *Entada africana* Stem Bark Fractions in Mice

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Malaria remains a significant public health burden in sub-Saharan Africa, which is exacerbated by the rising resistance of *Plasmodium* species to conventional antimalarial drugs. In response to the urgent need for novel therapeutic alternatives, *Entada africana* (EA) was evaluated for its antimalarial properties in this study. A total of 240 mice were allocated into prophylactic, curative, and suppressive models, with 5 mice per group. The animals were orally treated with varying doses (100, 200, or 400 mg/kg body weight) of EA stem bark fractions, including flavonoid, alkaloid, saponin, and crude extracts. Standard antimalarial drugs - chloroquine (CQ) and artemether-lumefantrine (AL) at a dose of 5 mg/kg body weight served as positive controls, while untreated infected mice represented the negative control. Parasitaemia status was determined microscopically after 7 days of treatment. Haematological indices, liver cum renal function markers, oxidative stress biomarkers and *in vitro* antioxidant activities were assessed. Results showed that malarial infection significantly disrupted haematological and biochemical homeostasis. However, treatment with EA fractions significantly reversed these alterations. The flavonoid-rich fraction consistently demonstrated the most potent therapeutic effects across all models. The flavonoid fraction also demonstrated the highest antioxidant capacity. *Entada africana*, particularly its flavonoid-rich fraction, exhibited significant antimalarial and antioxidant activities, effectively blocking the haematological and biochemical disruptions caused by *Plasmodial* infection. Thus, the flavonoid-rich stem bark fraction of the plant offers a promising candidate for potent and effective antimalarial drug.

BMDSWP-119

Development and Validation of a Monosodium Glutamate-Induced Hyperlipidaemia Model for Studying Atherosclerosis in Rats: A Comparative Evaluation with Poloxamer 407

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Cardiovascular diseases continue to be a major cause of death around the world; Hyperlipidaemia is a major risk factor. Experimental models that mimic lipid disturbances and early atherosclerotic changes are critical for investigating the underlying pathological mechanisms and facilitating the development of therapeutic strategies. This study developed a rat model that develops hyperlipidaemia and atherosclerosis that is induced by monosodium glutamate (MSG). This is administered through feed and drinking water, and compared its effects with poloxamer 407 (P-407). Twenty-five male albino rats, 135–200 grams in weight, were randomly divided into five groups. MSG was given as 2% (w/w) in feed and 2 g/kg/day in water. Hyperlipidaemia was also induced using P-407 for comparison. Blood samples were collected through cardiac puncture. Serum lipid profile, atherogenic indices, oxidative stress markers, liver and renal function parameters, and changes in blood vessels were assessed using established biochemical methods followed by statistical analysis. Control rats showed normal lipid levels, whereas Low-dose MSG increased total cholesterol (125.21 ± 8.16 mg/dL) and triglycerides (97.51 ± 4.51 mg/dL), while high-dose MSG group had severe lipid issues, with very high (total cholesterol 220.53 ± 40.91 mg/dL; LDL-C 85.17 ± 4.13 mg/dL). The group that received both MSG and P-407 had the worst lipid level (total cholesterol 251.26 ± 21.43 mg/dL) and Cardiac Risk Ratio I (6.41 ± 0.07), with elevated liver and renal markers. MSG consistently caused abnormal lipid levels and changes in blood vessels, providing a useful and affordable model for investigating lipid metabolism and ways to prevent atherosclerosis.

BMDSWP-120

Anti-Diabetic, Antioxidant and Hypolipidaemic Activities of *Dichrostachys cinerea* Leaf Extract on Alloxan-Induced Diabetic Rats

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Dichrostachys cinerea, is widely consumed medicinal plant that grows in the Savannah or rain forests of Africa to treat diabetes with reported antioxidant properties. This work investigate the anti-diabetic, antioxidant and hypolipidaemic activities of methanol leaf extract of *Dichrostachys cinerea* in alloxan induced diabetic rats. The rats were randomly divided into 6 groups: positive and negative control, diabetic untreated, and three treatment groups receiving 100, 200, and 400 mg/kg body weight of extract respectively for 21 days. Blood glucose level, oxidative stress markers and lipid profile were determine using standard biochemical techniques. Results showed significant (P<0.05) reduction in blood glucose and MDA levels in extract treated groups compared to diabetic controls. While SOD and catalase activities were signicantly increased, suggesting a dose-dependant antioxidant effect. Serum total cholesterol, TG, and HDL showed significant difference (P<0.05) between treated groups when compared to untreated control. However serum low density lipoprotein revealed a non-significant differences in all the treatment groups when compared to normal, and untreated groups. The present study revealed that *D. cinerea* leaf methanol extract contain numerous phytochemicals and the extract is practically not toxic at acute dose, showed strong antioxidant potentials, average hypolipedaemic effect and revealed strong glucose lowering potential.

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1,863 names, indexed by surname and cross-referenced to abstract page numbers, with the abstract identifier in brackets. Names are listed as the authors wrote them, so an author who spelled or abbreviated a name differently on two submissions appears twice. The index draws on 510 of the 522 abstracts; the remainder carry no separable author line.

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Alilonu, Doris Olachi **154** (NMBCW-125)
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Alugbuo, Stanley Udochukwu **304** (MTDDI-116)
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Anyiam, Paul Ndubuisi **490** (BMDSWP-74)
Anyim, Godwin **428** (BMDSWP-01)
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Apeh, Keleojo Anthony **373** (EIBSD-49)
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Araga, Peace Ahuoyiza **198** (MTDDI-06)
Aramide, Ganiyu Islamiat **400** (EIBSD-76)
Aremu, Kolawole Harun **82** (NMBCW-51)
Arise, Rotimi Olusanya **310** (MTDDI-123)
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Ashogbon, A. G. **232** (MTDDI-42)
Asinmi, Muhammed Robiu **114** (NMBCW-83), **253** (MTDDI-63), **305** (MTDDI-117)
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Atasie, Okechukwu **501** (BMDSWP-86), **502** (BMDSWP-87)
Atere, Tope G. **82** (NMBCW-51)
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Austin-Asomeji, Iyingiala **165** (NMBCW-136)
Auta, Ishaya Kato **265** (MTDDI-75)
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Awhin, Erutere Blessing **527** (BMDSWP-116)
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Awonowo, Olamide David **320** (MTDDI-136), **321** (MTDDI-137)
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Ayodeji, Folashade Oluwatobiloba **202** (MTDDI-10)
Ayodeji, Ifedayo David Akerele Folasade Oluwatobiloba **296** (MTDDI-108)
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Ayodeji, Oka Samson **308** (MTDDI-121)
Ayodeji, Victor Mister **388** (EIBSD-65)
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Ayokunle, Sunday Michael **133** (NMBCW-104)
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Ayomide, Marvelous **151** (NMBCW-122)
Ayomiposi, Ibrahim Wasilat **400** (EIBSD-76)
Ayotunde, Ogunsina Faith **138** (NMBCW-109), **228** (MTDDI-38)
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Babatunde, Moyinoluwa Elizabeth **448** (BMDSWP-28)
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Bashir, Ibrahim **11** (AIGCB-10)
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Benjamin, Joshua Omojo **216** (MTDDI-24)
Benjamin, Yisa Nma **239** (MTDDI-49)
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Chinedu, Peter **476** (BMDSWP-59)
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Diala, Ibe Daberechi **509** (BMDSWP-95)
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Ekpo, Ndifreke Daniel **267** (MTDDI-77)
Ekun, O. E. **232** (MTDDI-42)
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Evuenb, Uduenevwo F. **234** (MTDDI-44)
Ewhre, Oberhiri Lawrence **527** (BMDSWP-116)
Ewhre-Oberhiri, Joy A. **527** (BMDSWP-116)
Ezaka, Vitalis **111** (NMBCW-80)
Eze, Tochukwu Rex **197** (MTDDI-05)
Ezeigwe, Obiajulu Christian **424** (EIBSD-106)
Ezeji-Chigbu **319** (MTDDI-135)
Ezema **476** (BMDSWP-59)
Ezema, Mathew David **210** (MTDDI-18)
Ezeogo, James Item **418** (EIBSD-100)
Ezeonwumelu, Ebubechukwu C. **90** (NMBCW-59)
Ezima, E. N **398** (EIBSD-74)

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Fabunmi, Oluwatosin Esther **407** (EIBSD-84)
Fagbomedo, Olayemi F **37** (NMBCW-06)
Faith **439** (BMDSWP-18)
Faith, Airiohuodion **318** (MTDDI-133)
Faith, Egbedeyi **271** (MTDDI-81)
Faith, Ogbonaya **2** (AIGCB-01)
Fakai, Isah Musa **506** (BMDSWP-91)
Fakoya, Akindele **528** (BMDSWP-117)
Falana, Mansurat Bolanle **114** (NMBCW-83), **253** (MTDDI-63), **305** (MTDDI-117)
Falese, Babatunde A. **332** (EIBSD-04), **354** (EIBSD-30), **415** (EIBSD-94)
Faleyimu, Mercy Bisola **5** (AIGCB-04)
Falowo, Pelumi Helen **142** (NMBCW-113)
Faloye, Kolade Olatubosun **324** (MTDDI-140)

Famutimi **453** (BMDSWP-34)
Famutimi, Mayokun Ebunolu **186** (NMBCW-157)
Faoziyat, Sulaiman Adenike **7** (AIGCB-06)
Fapetu, Aanuoluwapo Patricia **56** (NMBCW-25)
Fapetu, Anuoluwapo P. **137** (NMBCW-108)
Faruk, Shehu Umar **260** (MTDDI-70)
Fasakin, Olamide W. **182** (NMBCW-153)
Fasakin, Olamide Wilson **33** (NMBCW-02)
Fasan, Damilola **22** (BMPMS-09)
Fasehun, Oluwatoyin I. **51** (NMBCW-20), **116** (NMBCW-85)
Fasogbon, Ilemobayo Victor **457** (BMDSWP-39)
Fasooto, Tolulope **83** (NMBCW-52)
Fatima, Sule Ajuma **459** (BMDSWP-41)
Fatoki, Toluwase Hezekiah **245** (MTDDI-55)
Fatokun, Cornelius Oluwafemi **336** (EIBSD-09)
F.E, Fanoro **311** (MTDDI-124)
Felicia, Ezennaya Chidinma **88** (NMBCW-57), **307** (MTDDI-120)
Felicia.N **10** (AIGCB-09)
Femi-Olabisi, Fehintolu. J. **179** (NMBCW-150)
Fetoh, Mohammed E. Abo-El **300** (MTDDI-112)
Feyisayo, Olaitan Aanuoluwa **270** (MTDDI-80), **314** (MTDDI-127)
Finbarrs-Bello **111** (NMBCW-80)
Forcados, Gilead Ebiegberi **407** (EIBSD-84)
Francis, Atanu Onakpa **459** (BMDSWP-41)
Friday, Titus **272** (MTDDI-82)
Funmilayo, Adisa Mofoluwaso **294** (MTDDI-106)
Funmilayo, Bello **322** (MTDDI-138)
Funmilola, Akomolafe Seun **125** (NMBCW-95)

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Gaiya, Daniel Danladi **404** (EIBSD-81)
Galadima, Yabani **380** (EIBSD-56)
Gambo, Muhammad Ali **460** (BMDSWP-42)
Ganiyu, Barakat Abiola **139** (NMBCW-110)
Ganiyu, Mariam Oluwabukola **462** (BMDSWP-44)
Gara, Theresa Yebo **392** (EIBSD-69), **475** (BMDSWP-58)
Garba **225** (MTDDI-35)
Garba, Maryam Atiku **266** (MTDDI-76)
Garba, Muhammad Haruna **124** (NMBCW-94)
Gassmann, Walter **392** (EIBSD-69)
Gaya, Jocthan Markus **164** (NMBCW-135)
Gbenenee, Jack **279** (MTDDI-90)
Gbenga, Akerele **35** (NMBCW-04)
George **29** (ERIBM-02)
George-Ojo, Adeola Esther **273** (MTDDI-84), **296** (MTDDI-108)
Ghali, Rukayya **323** (MTDDI-139)
Gideon, Ayeni **459** (BMDSWP-41), **467** (BMDSWP-49)
Gimba, Muhammed Yahuza **345** (EIBSD-19)
Gloria, Ibiama Boma **29** (ERIBM-02)
Gloria, Omite James **449** (BMDSWP-30)
G.M, Saibu **243** (MTDDI-53)
Godly, Chessed **171** (NMBCW-142)
Godwin, Anyim **110** (NMBCW-79)
Godwin, Ewu **467** (BMDSWP-49)
Goni, Chamba **152** (NMBCW-123)
Grace, Akindolire Tosin **515** (BMDSWP-102)
Grace, Alagbe **497** (BMDSWP-81)
Grace, Ojo Oluwaseun **355** (EIBSD-31)
Grace, Oladoyin **453** (BMDSWP-34)
Grace, Oluwafemi Adekemi **494** (BMDSWP-78)
Granica, Sebastian **71** (NMBCW-40)
Gupta, Kashish **92** (NMBCW-61)
Gurumenaso, Absalom **278** (MTDDI-89)
Gushit, John **379** (EIBSD-54)
Gwadabe, Salisu **361** (EIBSD-37)
Gwani, Helina Fodeke **323** (MTDDI-139)
Gwaram, Amina Ado **340** (EIBSD-14)

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Hammari, Abubakar **206** (MTDDI-14)
Hammed, Sheriffdeen Oladimeji **3** (AIGCB-02)
Hamza, A.B. **59** (NMBCW-28)
Hamza, Hajjagana **229** (MTDDI-39)
Hamzah, Aishat Adekunbi **325** (MTDDI-141)
Hamzah, Rabiat Unekwu **344** (EIBSD-18)
Hardy, Dehcontee M. **32** (NMBCW-01)
Harun, Fatima Abdullahi **135** (NMBCW-106)
Haruna, Abdullahi **65** (NMBCW-34)
Haruna, Yushau **94** (NMBCW-63)
Hashimu, Kabiru **104** (NMBCW-73), **112** (NMBCW-81)
Hassan, Abdullahi Musa **460** (BMDSWP-42)
Hassan, Fatima **387** (EIBSD-64)
Hassan, Maryam Abubakar **530** (BMDSWP-120)
Hassan, Temitayo Abidat **425** (EIBSD-108)
H.B, Muhammad **184** (NMBCW-155)
Helen, Oyeniran Olubukola **282** (MTDDI-93)
Henry, Chidubem **281** (MTDDI-92)
Higashitani, Atsushi **24** (BMCCA-01)
Hogan, Ako Itam **85** (NMBCW-54)
Horablaga, Marinel **393** (EIBSD-70)
Hulea, Anca **393** (EIBSD-70)
Hulea, Calin **393** (EIBSD-70)
Humi **505** (BMDSWP-90)

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Ibekwe, Chimmezirim **388** (EIBSD-65)
Ibezim, Harmony Uchenna **108** (NMBCW-77)
Ibidun, Oloyede Omotade **209** (MTDDI-17)
Ibitola, Samuel Oluwalonimi **36** (NMBCW-05)
Ibrahim, Abubakar **173** (NMBCW-144)
Ibrahim, A.M. **293** (MTDDI-105)
Ibrahim, Bashiru **252** (MTDDI-62)
Ibrahim, Hussaini D. **455** (BMDSWP-37)
Ibrahim, Kasimu Ghandi **115** (NMBCW-84)
Ibrahim, Lubabatu **421** (EIBSD-103)
Ibrahim, Makinde Akindeji **4** (AIGCB-03)
Ibrahim, Maryam Babakura **152** (NMBCW-123)
Ibrahim, Mohammed Auwal **326** (MTDDI-142)
Ibrahim, Omeyiza Micheal **450** (BMDSWP-31)
Ibrahim, Salihu **345** (EIBSD-19)

Ibrahim, Sani **65** (NMBCW-34), **236** (MTDDI-46), **343** (EIBSD-17)
Ibrahim, T. A **227** (MTDDI-37)
Ibrahim, Yahaya **260** (MTDDI-70)
Ibrahim, Yunusa Olatunji **292** (MTDDI-104)
Ibukun, Emmanuel Oluwafemi **180** (NMBCW-151)
Idoko, Alexander **217** (MTDDI-25)
Idomu, Omotuyi Olaposi. **10** (AIGCB-09)
Idowu, Olanipekun Oladele **107** (NMBCW-76)
Idris, Ibrahim **94** (NMBCW-63)
Idris, Olawale Temitope **370** (EIBSD-46)
Idris, Umma A. **442** (BMDSWP-21)
Idu, Macdonald **211** (MTDDI-19)
Ifeanyi, Ekwunife Kelvin **221** (MTDDI-30)
Ifedolapo, Famoroti Oluwatoyin **481** (BMDSWP-64)
Ifenkwe, Daniel Chidi **429** (BMDSWP-03)
Ifeoma, Veronica **289** (MTDDI-100)
Igben, Eguono Godwin **169** (NMBCW-140)
Ige, Oluwadamilola C. **517** (BMDSWP-104)
Ighodaro, Osasenaga Macdonald **42** (NMBCW-11)
Igue, Udoka B. **90** (NMBCW-59)
Igue, Udoka Bessie **120** (NMBCW-90)
Igunnu, Adedoyin **367** (EIBSD-43)
Igwe **10** (AIGCB-09)
Igwenyi **88** (NMBCW-57), **111** (NMBCW-80)
Igwenyi, Ikechuku Okorie **146** (NMBCW-117)
Iheanacho **28** (ERIBM-01)
Iheanyichukwu **10** (AIGCB-09)
Iheduru, Olivia **143** (NMBCW-114)
Ihinmikaye, Busayo Christiana **251** (MTDDI-61), **273** (MTDDI-84), **324** (MTDDI-140)
Ijeh, Ifeoma Irene **150** (NMBCW-121), **417** (EIBSD-99)
Ijeh Ifeoma Irene, Okechukwu Jane Ngozi **429** (BMDSWP-03)
Ikanone, C. E. O. **461** (BMDSWP-43)
Ikeade, Adedeji **285** (MTDDI-96)
Ikeakanam, Precious Ebere **64** (NMBCW-33)
Ikewuchi, Catherine Chidinma **75** (NMBCW-44)
Ikewuchi, Jude Chigozie **75** (NMBCW-44)
Ikulala, Oluwatosin Olamiposi **159** (NMBCW-130)
Ikwuazom **73** (NMBCW-42)
Ikwuazom, Onyekachi **111** (NMBCW-80)
Ilawagbon, Godstime Odeh **224** (MTDDI-34)
Ilesanmi, Omotayo B. **226** (MTDDI-36)
Iloanya, Ebele Lauretta **424** (EIBSD-106)
Ilobekemen, Ekakitie Lisa **191** (NMBCW-162)
Ilori, Desiire Adedoyin **100** (NMBCW-69)
Imah-Harry, Joan Uchukwu **362** (EIBSD-38)
Imaledo, David S. **51** (NMBCW-20)
Imam, Mustapha Umar **115** (NMBCW-84), **506** (BMDSWP-91)
Imbrea, Florin **393** (EIBSD-70)
Imbrea, Ilinca Merima **393** (EIBSD-70)
Immaculata, Olekanma I **411** (EIBSD-88)
Inedu, Simon Oodo **529** (BMDSWP-119)
Innocent, Henshaw Uchechi Okoroiwu Madubogwu Chimezie **317** (MTDDI-132)
Inwang, Uduak Anthony **451** (BMDSWP-32)
Inyang, Aniekemendisa **267** (MTDDI-77)
Inyima, Benard Uka **429** (BMDSWP-03)
Iorember, Swande Peter **72** (NMBCW-41)
Iretioluwa, Obatusin Esther **276** (MTDDI-87)
Irondi, Emmanuel Anyachukwu **412** (EIBSD-90)
I.S, Oyeleye **172** (NMBCW-143)
Isa, Mustapha **45** (NMBCW-14)
Isaac, Shaibu Eleojo **459** (BMDSWP-41)
Ishaku, Nengak **407** (EIBSD-84)
Ishaya, Japheth A. **478** (BMDSWP-61)
Ishiekwene, George **507** (BMDSWP-92)
Ismail, Ida Shazrina **316** (MTDDI-129)
Ismail, Muhammad **171** (NMBCW-142)
Isoje, Endurance Fegor **120** (NMBCW-90)
Isojea, Endurance F. **234** (MTDDI-44)
Issa **505** (BMDSWP-90)
Itakorode, Babamotemi **365** (EIBSD-41)
Itakorode, Babamotemi Oluwasola **363** (EIBSD-39), **481** (BMDSWP-64)
Itodo, Matthew Ocheleka **529** (BMDSWP-119)
Itongte, Enemugwem Racheal **319** (MTDDI-135)
Iya, Idris Ramatu **403** (EIBSD-79)
Iyanuoluwa, Adesipe Temitayo **20** (BMPMS-07)
Iyapo, Oluwadamilare **212** (MTDDI-20)
Iyare, Godfrey Innocent **448** (BMDSWP-28)
Iyoha, Aisuhuehien Imas. **39** (NMBCW-08)
Iyya, Zayyanu **223** (MTDDI-32), **375** (EIBSD-51)

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J.A, Saliu **172** (NMBCW-143)
Jabar, Jamiu Mosebolatan **391** (EIBSD-68)
Jacinta, Eboh Obioma **287** (MTDDI-98)
Jaiyeoba-Ojigho **254** (MTDDI-64)
Jaiyeola, T. O. **461** (BMDSWP-43)
Jaji, Saheedolatunde **199** (MTDDI-07)
Jalil, Idi **206** (MTDDI-14)
James, Dorcas Bolanle **81** (NMBCW-50)
James, Jalil Idi **390** (EIBSD-67)
Janet, Ogunsola **285** (MTDDI-96)
Jasiel, Joe-Ukairo **44** (NMBCW-13)
Jeje, Sikirullahi **4** (AIGCB-03)
Jeje, Temitope Olawale **275** (MTDDI-86)
Jekayinoluwa, Adenike G. **415** (EIBSD-94)
Jesusanmi, Deborah Odunayo **12** (AIGCB-11)
Jesutofunmi, Alawode Adekunle **491** (BMDSWP-75)
Jibril, Abdurrahman Hassan **421** (EIBSD-103)
Jibrin, Abdullahi **144** (NMBCW-115)
Jiyil, Markus Kirwe **43** (NMBCW-12), **333** (EIBSD-06)
Joan **254** (MTDDI-64)
Job, Amole Olamilekan **498** (BMDSWP-82)
Joel, Enoch Banbilbwa **367** (EIBSD-43), **379** (EIBSD-54)
Joel, Okpoghono **90** (NMBCW-59)
John, Agbi Ayodeji **358** (EIBSD-34)
John, Akighir **456** (BMDSWP-38)
John, Alheri Cyndrillar **107** (NMBCW-76)

John, Anyam **456** (BMDSWP-38)
John, Ekene **374** (EIBSD-50)
John, Oladipo Olutayo **6** (AIGCB-05)
John, Uche Louis **30** (ERIBM-03)
Johnson, Chinonyerem Anamemena Grace **250** (MTDDI-60)
Johnson, Titilayo Omolara **479** (BMDSWP-62)
Joseph, Akaninyene Paul **267** (MTDDI-77)
Joseph, Elvis Douglas **170** (NMBCW-141)
Joseph, Kade Ige **526** (BMDSWP-115)
Josephine, Iruoghene **254** (MTDDI-64)
Josephine, Kolawole Covenant **76** (NMBCW-45), **128** (NMBCW-99)
Joshua, Elijah **272** (MTDDI-82)
Joshua, Parker Elijah **157** (NMBCW-128), **197** (MTDDI-05), **308** (MTDDI-121)
Josiah, Sunday **94** (NMBCW-63)
Joy, Okonkwo Chioma **208** (MTDDI-16)
Joyce, Awoniyi Aderinola **133** (NMBCW-104)
Jude **476** (BMDSWP-59)
Juliana, Owanta I. **17** (BMPMS-04)
Junaidu **272** (MTDDI-82)
Justina, Okoro Nkechinyere **289** (MTDDI-100)
Justine, Mercy Odu **66** (NMBCW-35)

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Kabir, Nafisatu **124** (NMBCW-94)
Kabiru, Adamu Yusuf **477** (BMDSWP-60)
Kade, Ige Joseph **200** (MTDDI-08), **462** (BMDSWP-44), **464** (BMDSWP-46), **515** (BMDSWP-102)
Kalu, Ngozi Achi **150** (NMBCW-121)
Kanai, Thomas Emmanuel **317** (MTDDI-132)
Kankara, Aliyu Idris **54** (NMBCW-23), **104** (NMBCW-73), **112** (NMBCW-81), **255** (MTDDI-65)
Kankia, Ibrahim Hamza **215** (MTDDI-23), **335** (EIBSD-08)
Kanu, Shedrach Chidiebere **141** (NMBCW-112)
Kappo, Abidemi Paul **277** (MTDDI-88)
Kareem, Fatai A. **409** (EIBSD-86)
Kareem Quam Olalekan, Ogunleye Juliana Adefunke **48** (NMBCW-17)
Karigidi, Kayode O. **137** (NMBCW-108)
Karigidi, Kayode Olayele **283** (MTDDI-94)
Karigidi, Mojisola Esther **283** (MTDDI-94)
Kasarachi, Vitalis Comfort **403** (EIBSD-79)
Kasim, Habiba **343** (EIBSD-17)
Kayode, Abdullateef **505** (BMDSWP-90)
Kayode, Abolanle Abideen Azeez **149** (NMBCW-120), **295** (MTDDI-107)
Kayode, Esther Iyanuoluwa **64** (NMBCW-33)
Kayode, Olofintoye Lawrence **447** (BMDSWP-27)
Kayode, Omowumi Titilayo **303** (MTDDI-115)
Kayode, Rofiat B. **517** (BMDSWP-104), **521** (BMDSWP-108)
Kayode, Salau Amadu **428** (BMDSWP-01)
Kazeem, Mutiu Idowu **235** (MTDDI-45)
Kehinde, Akintunde Jacob **382** (EIBSD-58)
Kehinde, Dorcas Adeleke **247** (MTDDI-57)
Kehinde, Idayat Oyinkansola **425** (EIBSD-108)
Kelechi, Augustus **313** (MTDDI-126)
Kenou, Orace Mathieu **5** (AIGCB-04)
Keyster, Marshall **392** (EIBSD-69)
Kisara, Masato **24** (BMCCA-01)
Klein, Ashwil **392** (EIBSD-69)
Kolade, Mohammed Nurudeen **363** (EIBSD-39)
Kolawole, Adejoke N. **332** (EIBSD-04), **354** (EIBSD-30), **415** (EIBSD-94), **397** (EIBSD-110)
Kolawole, Adejoke Naomi **371** (EIBSD-47)
Kolawole, Ayodele Oluseyi **372** (EIBSD-48), **377** (EIBSD-53)
Kolawole, Covenant Josephine **38** (NMBCW-07)
Kolawole, Elijah **15** (BMPMS-01)
Kolawole, Ikeoluwapo Olanike **271** (MTDDI-81)
Kolawole, Oluwadamilola M. **148** (NMBCW-119)
Komolafe, Idowu Julius Olawuni Ige Joseph **522** (BMDSWP-109)
Kudirat, Shittu Oluwatosin **299** (MTDDI-111)
Kura, Aminu Umar **474** (BMDSWP-57)
Kurason, Blessing **265** (MTDDI-75)
Kutshik, Richard J. **205** (MTDDI-13)
Kutshik, Richard Joseph **367** (EIBSD-43), **379** (EIBSD-54)
kyari, Salamatu Mai **152** (NMBCW-123)

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La'ah, Philemon Joshua **252** (MTDDI-62)
Lagasi, Christopher Caleb **385** (EIBSD-62)
Langdon, Simon **215** (MTDDI-23)
Laoye, O. G. **232** (MTDDI-42)
Lawal, Abdulrazak **164** (NMBCW-135)
Lawal, Aishat Adebola **5** (AIGCB-04)
Lawal, Akeem O. **312** (MTDDI-125)
Lawal, Akeem Olalekan **159** (NMBCW-130), **324** (MTDDI-140)
Lawal, Almustapha **53** (NMBCW-22)
Lawal, andakeem Olalekan **251** (MTDDI-61)
Lawal, Ifemi Samuel **48** (NMBCW-17)
Lawal, Iyya Abubakar Mansur **223** (MTDDI-32)
Lawal, Mahmud **3** (AIGCB-02), **139** (NMBCW-110)
Lawal, Michael Ayodeji **121** (NMBCW-91), **142** (NMBCW-113)
Lawal, Misbahu Koramar Boko **500** (BMDSWP-85)
Lawal, Olusola Tosin **22** (BMPMS-09), **357** (EIBSD-33)
Lawal, Shuaibu **176** (NMBCW-147)
Lawan, Aliyu Ibrahim **229** (MTDDI-39)
Lawan, Zulaihat **340** (EIBSD-14)
Lebelo, Sogolo Lucky **166** (NMBCW-137)
Liman, Ibrahim Salihu **269** (MTDDI-79)
Longdet, Ishaya Y. **205** (MTDDI-13)
Longdet, Ishaya Yohanna **367** (EIBSD-43)
Lucy, Folake **497** (BMDSWP-81)
Lucy, Oyetayo Folake **125** (NMBCW-95), **494** (BMDSWP-78)
Luka, Carrol Domkat **43** (NMBCW-12), **333** (EIBSD-06)

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Mabel, Dorcas **458** (BMDSWP-40)
Mada, Sanusi Bello **13** (AIGCB-12), **130** (NMBCW-101)
Madaki, Fatima Mohammad **98** (NMBCW-67)
Madu, Judith Chizoba **274** (MTDDI-85)

Maduabuchi, Patrick **476** (BMDSWP-59)
Madugu, Zakari Fatima **19** (BMPMS-06)
Maduka, Godswill **475** (BMDSWP-58)
Mafulul, Simon Gabriel **367** (EIBSD-43), **379** (EIBSD-54)
Magaret-Rose, Usen Kesiena **314** (MTDDI-127)
Maharaj, Vinesh **258** (MTDDI-68)
Maikarfi, Muhammed **294** (MTDDI-106)
Mailafiya, Simon Chidawa **276** (MTDDI-87)
Makinde, Akinleye Peter **56** (NMBCW-25)
Makinde, Peter a. **137** (NMBCW-108)
Malibi, David Esla **43** (NMBCW-12)
Malik, Rowland Mayowa **366** (EIBSD-42)
Malomo, Rotimi Oluyemi **221** (MTDDI-30)
Malomo, Sylva Omonirume **367** (EIBSD-43)
Malut, Hamsatu Mohammed **136** (NMBCW-107)
Mankilik, Mary M. **205** (MTDDI-13)
Mansur, Lawan **260** (MTDDI-70)
Marcus-Bello, Oluwatosin A. **37** (NMBCW-06)
Markus, Dearsly Emmanuel **395** (EIBSD-72)
Marshall-Enudi, Yvonne EN **191** (NMBCW-162)
Martin, Darius Riziki **5** (AIGCB-04)
Mary, Adewale Adenike **231** (MTDDI-41)
Mary, Omolola **413** (EIBSD-91)
Maryam, Damilare **261** (MTDDI-71)
Matazu, Nasiruddeen Umar **61** (NMBCW-30)
Mattew, Oguntuase O. **175** (NMBCW-146)
Matthew, Olajumoke Josephine **55** (NMBCW-24)
Matthew, Taiwo Adewale **382** (EIBSD-58)
Matthew, Ugochinyere **87** (NMBCW-56)
Mba, Rosemary Kalu **141** (NMBCW-112)
Mbakwe, Ikechukwu Edmund **96** (NMBCW-65)
Mercy, Afolayan **271** (MTDDI-81)
Mercy, Oguche **459** (BMDSWP-41)
Mercy, Oloruntegbe Oluwadunni **520** (BMDSWP-107)
Merit **431** (BMDSWP-05)
Meyer, Mervin **277** (MTDDI-88)
Mgbeje, Bob Agboje **66** (NMBCW-35)
Mgbeje, Bob Agboje Ignatius **85** (NMBCW-54)
Michael, Anyekema **266** (MTDDI-76)
Micheal, Fawale **285** (MTDDI-96)
Mijinyawa, Farida Muhammad **103** (NMBCW-72)
Mikail, Tasiu Abdulmumin **135** (NMBCW-106)
Mikailu, Bashir Musa **94** (NMBCW-63)
Miller-Nzenwata, Roqeebat Olayinka ; **413** (EIBSD-91)
Minaopunye **208** (MTDDI-16)
Mode **254** (MTDDI-64)
Mode, Abduljalil Muhammad **53** (NMBCW-22), **506** (BMDSWP-91)
Modupe, Adetayo **2** (AIGCB-01)
Mohamed, Rafeezul **316** (MTDDI-129)
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Usifo, Osehmengbe R. **148** (NMBCW-119)
Usman, Akilu Salim **529** (BMDSWP-119)
Usman, Alhassan Gabi **260** (MTDDI-70)
Usman, Aminu **335** (EIBSD-08)
Usman, Hafsat Ik **93** (NMBCW-62)
Usman, Hauwau Salisu **326** (MTDDI-142)
Usman, Ibrahim Adamu **294** (MTDDI-106)
Usman, J. **59** (NMBCW-28)
Usman, Kabiru **130** (NMBCW-101)
Usman, Okeme **46** (NMBCW-15)
Usunobun, Usunomena **222** (MTDDI-31), **389** (EIBSD-66)
Usunomena, Usunobun **318** (MTDDI-133)
Uti, Daniel Eji **457** (BMDSWP-39)
Uti, Daniel Ejim **288** (MTDDI-99)
Uzoagba, Christiana Ebere **472** (BMDSWP-55)
Uzuegbu, Ugochukwu E. **507** (BMDSWP-92)
Uzunuigbe, Edwina.O. **277** (MTDDI-88)

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Vernumbe, Haruna Tsoho Bala Ushahemba Samuel **74** (NMBCW-43)
Victor, Helen Gerson **390** (EIBSD-67)

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Wandoo, Gbawuan Angela **217** (MTDDI-25)
Wanen, Iko **72** (NMBCW-41)
Wasagu, Rabiu'u Sa'idu Umar **53** (NMBCW-22)
Wilson, Harry Chiemeka **78** (NMBCW-47), **96** (NMBCW-65), **178** (NMBCW-149), **454** (BMDSWP-36)
Winning, Ehoro **208** (MTDDI-16)
Wisdom, Oniwon **459** (BMDSWP-41)
Wopara **10** (AIGCB-09)
Woroma, Nda-Wonodi **87** (NMBCW-56)

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Yaduma, Wandiahyel Gauison **278** (MTDDI-89)
Yahaya **272** (MTDDI-82)
Yahaya, Junaidu **308** (MTDDI-121)
Yakasai, Hafeez M. **345** (EIBSD-19)
Yakubu **225** (MTDDI-35)
Yakubu, Bilyameen **252** (MTDDI-62)
Yakubu, Dahiru Muhammad **94** (NMBCW-63)
Yakubu, Musa Toyin **405** (EIBSD-82), **496** (BMDSWP-80)
Yakubu, Ndatsu **184** (NMBCW-155)
Yakubu, Ojochenemi Eje **456** (BMDSWP-38)
Yang, Yili **300** (MTDDI-112)

Yaradua, Aliyu Ibrahim **61** (NMBCW-30)
Yashim, Williams D. **52** (NMBCW-21)
Ya'u, Auwal **220** (MTDDI-29)
Ya'u, Murtala **345** (EIBSD-19)
Ya'u, Salahuddeen **442** (BMDSWP-21)
Yazdani, Shams **329** (EIBSD-01)
Y.D, Adeoye **60** (NMBCW-29)
Yebo, Gara Theresa **299** (MTDDI-111)
Yetunde, Okegbola Kudroh **498** (BMDSWP-82)
Yohanna, Sarah Tisereh **164** (NMBCW-135)
Yomi-Aina, Mercy Oluwabunmi **394** (EIBSD-71)
Y.R, Alli Smith **218** (MTDDI-26)
Yunisa, Sunday J **455** (BMDSWP-37)
Yunus, Muhammad Amir **316** (MTDDI-129)
Yunusa, Usman **407** (EIBSD-84)
Yusuf **46** (NMBCW-15), **458** (BMDSWP-40)
Yusuf, Amina Bulama **144** (NMBCW-115)
Yusuf, Ruqayyah Sheu **370** (EIBSD-46)
Yusuf, Zahra'u Aminu **93** (NMBCW-62)

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Zango, Umar Sani **442** (BMDSWP-21)
Zayd, Abdulmumin **260** (MTDDI-70)
Zinfa, Yohanna **298** (MTDDI-110)
Z.S, Ololade **311** (MTDDI-124)
Zubair, Aliu Abdulhameed **115** (NMBCW-84)