38TH SCIENTIFIC CONFERENCE & ANNUAL GENERAL MEETING NSBMB SOKOTO 2021

NIGERIAN SOCIETY OF BIOCHEMISTRY & MOLECULAR BIOLOGY (NSBMB)

Department of Biochemistry
Usmanu Danfodiyo University, Sokoto

Book of Abstracts

38TH

Scientific Conference &

Annual General Meeting

NSBMB Sokoto 2021

THEME

Biochemistry and Molecular Biology: Tools for Innovation, Entrepreneurship and Sustainable Development

Venue: University Auditorium, Main Campus,
Usmanu Danfodiyo University, Sokoto

Date: Sunday 6th - Thursday 10th June, 2021

BOOK OF ABSTRACTS

OF THE

38TH SCIENTIFIC CONFERENCE AND ANNUAL GENERAL MEETING

NIGERIAN SOCIETY OF BIOCHEMISTRY AND MOLECULAR BIOLOGY (NSBMB)

NSBMB SOKOTO 2021

Organized By

DEPARTMENT OF BIOCHEMISTRY
Usmanu Danfodiyo University, Sokoto

Conference Theme:

BIOCHEMISTRY AND MOLECULAR BIOLOGY: TOOLS FOR INNOVATION, ENTREPRENEURSHIP AND SUSTAINABLE DEVELOPMENT

VENUE: University Auditorium Main Campus, Usmanu Danfodiyo University, Sokoto

DATE: 6th to 10th June, 2021

INVITED GUESTS AND PLENARY SPEAKERS

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Federal Ministry of Science and Technology

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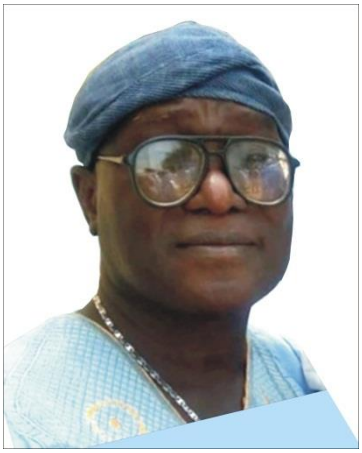
A GOODWILL MESSAGE FROM THE PRESIDENT, NSBMB

Time for Justification of Theme: Biochemistry and Molecular Biology - Tools for Innovation, Entrepreneurship and Sustainable Development



On behalf of the Nigerian Society of Biochemistry and Molecular Biology (NSBMB), I extend my warm felicitations to Biochemists and Molecular Biologists in Nigeria and all over the world who have converged here in the city of Sokoto for the 38th Scientific Conference or participating in one way or the other. I also extend profound thanks and appreciation to all and sundry for the input made in ensuring that Sokoto 2021 is not just a reality, but a successful event.

Now it is time for the justification of the carefully chosen and crafted as well as apt theme for this year's Scientific Conference: **Biochemistry and Molecular Biology – Tools for Innovation, Entrepreneurship and Sustainable Development.** A cursory look at the abstracts assembled in this Book of Abstracts would indeed justify Biochemistry and Molecular Biology as veritable tools for innovation, entrepreneurship and sustainable development. The Abstracts are not only of good quality, but also vary with adequate coverage, spanning all the Sub-Themes of the Scientific Conference.

Distinguished Guests, Ladies and Gentlemen, I crave your indulgence to enjoy the abstracts and presentations. I believe that at the end of it all, our store of knowledge would not only have been enriched, but a formidable package of information concerning the use of Biochemistry and Molecular Biology as tools for innovation, entrepreneurship and sustainable development would have been made available for our nation Nigeria and the world in general. Thank you all.

Prof. O.A. Sodipo, *FNSBMB, FIPESA*
President

ADDRESS FROM THE LOC CHAIRMAN, NSBMB SOKOTO 2021

It is with great privilege and honour I welcome you all to the 38thScientific Conference and Annual General Meeting of the Nigerian Society of Biochemistry and Molecular Biology (NSBMB) tagged "NSBMB Sokoto 2021". The conference is holding in the Seat of the Caliphate, the Centre of Learning and Scholarship in Sub-Saharan Africa.

The last time our prestigious University hosted this event was exactly 13 years ago. We are doing it once again; and we are happy to host seasoned academics and scholars across Nigeria and beyond. The turn of events that gripped the world in 2020 following the outbreak of the SARS-CoV-2 virus infection (COVID -19) has invariably placed the Theme of the 38thConference in the spotlight. The central theme of the conference- **Biochemistry and Molecular Biology: Tools for innovation, Entrepreneurship and Sustainable Development**- was conceived at no better time than now where humanity is once again faced with the challenges of emerging diseases and the need to sustain the world economy through novel approaches to science and technology. Going forward, as Biochemists and Molecular biologists, we remain indispensible to the current futuristic drive for entrepreneurial skills among the citizens for sustainable development.

Permit me at this juncture to use this opportunity to extend our gratitude and appreciation to the Management of the Usmanu Danfodiyo University, Sokoto, other institutions, corporate bodies and individuals who assisted us in cash and kind toward the preparation of the conference. We are equally grateful to authors that submitted abstracts from their various researches. I will also like to acknowledge and express my immense appreciation to the LOC members for the dedication and selflessness towards the successful hosting of this August event.

Do have a wonderful stay in the most peaceful University in Nigeria and enjoy the hospitality of Sokoto, the Seat of the Caliphate.

Dr. A. Y. Abbas
Head of Department, Biochemistry
Usmanu Danfodiyo University, Sokoto

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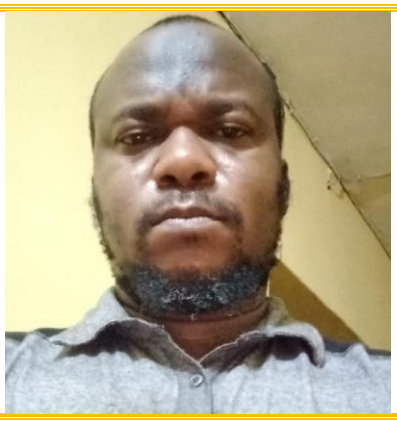

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PRE-CONFERENCE WORKSHOP RESOURCE PERSONS

S/N	Resource Person	Topic	Session
1.	Prof. Y. Saidu	Getting it Right: Proposals Writing	Morning
2.	Dr. M. U. Imam	Gene Expression Techniques	Morning
3.	Dr. M. U. Imam	*Drosophila melanogaster* as a Model of Choice in Biomedical Research	Afternoon
4.	Dr. T. S. Salihu	*in silico* Drug Discovery	Afternoon

APPRECIATION TO CONFERENCE SPONSORS AND DONORS

The local organising Committee (LOC) is immensely grateful to the following institutions and individuals for their kind, material and financial support which helped in making the 38th scientific conference and Annual General Meeting of the Nigerian Society of Biochemistry and Molecular Biology Sokoto 2021, a huge Success:

1. Vice-Chancellor and Management of Usmanu Danfodiyo University Sokoto (UDUS)
2. Federal University Gusau (FUGUS)
3. Sokoto State University (SSU)
4. Abdu Gusau Polytechnic Mafara
5. Usmanu Danfodiyo University Teaching Hospital (UDUTH)
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PROGRAMME OF EVENTS NSBMB SOKOTO 2021

DAY	DATE	PROGRAMME/EVENT	TIME
Sunday	6th June, 2021	i. Arrival for Pre-Conference ii. Conference registration commence	10:00 am – 5:00 pm
Monday	7th June, 2021	i. Pre-Conference Workshop	Morning/Afternoon Session 9:00 am – 5:00 pm
		ii. Arrival and Registration Continues iii. Quiz Competition (First Round)	04:00 pm – 06:00 pm
Tuesday	8th June, 2021	i. Courtesy Visit to the Vice Chancellor	08:30 am – 09: 00 am
		ii. Opening ceremony and **Key Note Address** **TEA BREAK**	09:00 am – 12:00 pm 12:05 pm – 12:25 pm
		iii. Olumbe Bassir Lecture	12:30 pm – 01:00 pm
		iv. Induction of New members	01:10 pm – 02:30 pm
		LUNCH	**02:30 pm – 02:50 pm**
		Plenary Sessions	03:00 pm – 03:30 pm
		Plenary Presentation I	
		Plenary Presentation II	03:35 pm – 04:05 pm
		Plenary Presentation III	04:10 pm – 0 4:30 pm
		Final Round of Quiz competition	04:00 pm – 06:00 pm
		Technical Sessions I	04:30 pm – 05:00 pm
		Lead Presenters	
		Other Oral Presentation	05:10 pm – 06:40 pm
		Cocktail	08:00 pm – 10:00 pm
Wednesday	9th June, 2021	Plenary Sessions	
		i. Plenary Presentation IV	09:00 am – 09:30 am
		TEA BREAK	**09:35 am – 09:55 am**
		Technical sessions II	10:00 am – 10:20 am
		Lead presenters	
		Other oral presentation	10:20 am – 1:30 pm
		LUNCH	**01:30 pm – 02:20 pm**
		Tours and Visitation (Emir Palace, History Bureau etc)	02:30 pm – 04:30 pm
		Annual General Meeting (AGM)	04:40 pm – 07:00 pm
Thursday	10th June, 2021	Departure	

- **POSTERS WILL BE VIEWED DURING THE BREAKS**

TABLE OF CONTENTS

ABSTRACTS

BIOINFORMATICS AND NANOTECHNOLOGY (BN)

ORAL PRESENTATION

BN001

Identification of 3D structure of *Oryza sativa* Starch Branching Enzyme 1

Mohammed, S.

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ABSTRACT

Starch branching enzyme (SBE) is the only enzyme generating glucan branches in green plants and consequently plays a significant role on the final structure of starch. Research on rice (*Oryza sativa*) SBE1 (OsSBE1) structural biology remains untapped. Therefore, there is the need for research on the enzyme molecular structure, which could lead to the protein function annotation, starch production and the design of energy-enhancing drugs. Analysis of the OsSBE1 secondary structure, domains and their interactions, enzyme 3D structure prediction and validation based on C-score were carried out. The OsSBE1 primary sequence was retrieved from GenBank and its secondary structure was predicted to be; α-helix (27.68%), extended strand (22.78%) and higher random coil (949.54%). Enzyme domains were found to be carbohydrate-binding module (CBM) 48 (isoamylase N-terminal domain), α-amylase catalytic domain and α-amylase C-terminal all-beta domain with active sites important amino acids, asparagine and glutamic acid. From the five 3D models generated, model 3 displayed the best prediction. The Ramachandran refinement had 97.3 amino acid residues in the favoured region with a 0.4 C-score. This bioinformatics study elucidates the OsSBE1 molecular model and is the first to report.

Keywords: *Oryza sativa,* Starch, Enzyme, Amino acid

BN002

An Integrated Bioinformatics Approach Revealed Evidence of IGF2BP1 as a Potential Therapeutic Target for Non-Small Cell Lung Cancer (NSCLC)

*[1]Dalhat, M. H., and [2]Bello, A. E.

[1]Department of Biochemistry, Usmanu Danfodiyo University, Sokoto

[2]University of Ibadan, Ibadan, Nigeria

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ABSTRACT

Non-small cell lung cancer (NSCLC) is the highest cause of cancer death globally. These deaths are attributed to cancer progression, metastasis and stemness in NSCLC patients. Insulin growth factor 2 mRNA binding protein 1 (IGF2BP1) was hypothesized to play a crucial role in cancer metastasis and stemness, contributing to cancer relapse and drug resistance. To explore the molecular mechanism of IGF2BP1 in NSCLC, the gene profile of IGF2BP1 knockout/knockdown (GSE146546/GSE146547) analysis were retrieved from the Gene Expression Omnibus (GEO) database. The differentially expressed genes (DEGs) of the two data sets were analyzed using GEO2R web tool. After using cutoff of LogFC (-1≤ LogFC ≥1) and $p \leq 0.05$, the present study identified 64 up regulated and 144 down regulated genes. Annotation studies was carried out using DAVID, QIAGEN ingenuity pathway analysis (IPA) and Cytoscape for gene ontology, pathway analysis and protein-protein interaction respectively. From the analysis, some of the mechanisms observed to be associated with IGF2BP1 function in NSCLC were Tumour micro enviroment(TME) pathways, farnesoid X receptor (FXR)/retinoid X receptor(RXR) activation, glycoprotein VI (GP6) signaling pathway, mitogen-activated protein kinase(MAPK) signaling pathway and extracelluar matrix (ECM) organization. Further analysis using GEPIA tool and UALCAN showed IGF2BP1 is highly expressed in 70-80% of all cancers including NSCLC. An online Kaplan-Meier plotter was used to evaluate the prognostic value of the NSCLC showing significant (Hazard ratio (HR); 1.55, 95% confidence interval (CI); 1.31-1.82, p-value; 1.5E-07) reduction of survival rate in NSCLC patients with over expressed IGF2BP1. In conclusion, the bioinformatic analysis revealed that IGF2BP1 is a promising therapeutic target in NSCLC.

Keywords: Non-small cell lung cancer, Stemness, Survival rate, Metastasis

BN003

Predictive Mathematical Modeling of the Effects of *Adiantum philippense* Extract on Biofilm Formation and Adhesion in *Shigella flexneri*

*[1]Uba, G., [1]Yakubu, A., [1]Abdulsalam, Z. J., [1]Zandam, N. D., and [2]AbdShukor, M. Y.

[1]Department of Science Laboratory Technology, College of Science and Technology, Jigawa State Polytechnic, Dutse

[2]Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

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ABSTRACT

Adiantum philippense is an ethnomedicinal fern plant. The plant is used as herb with potential for novel bioactive compounds. For the first time predictive mathematical modelling was used to study the effect of this plant extract on biofilms formation and adhesion in *Shigella flexneri*, a food borne pathogen. Experimental data were fitted to the Modified Gompertz model and the biofilm activity of *S. Flexineri* was determined based on the lag time (λ) and the maximum growth rate (μmax) reached. The performance of the model was measured with the least value for root mean square (RMSE), Akaike information criterion (AICc) and the uppermost value for adjusted R^2. The parameters obtained from Modified Gompertz model for *S. flexineri* and chloramphenicol were y_{max} 1.650 (95% C.I 1.59 to 1.72) and 1.455 (95% C.I 1.33 to 1.58), μ_{max} 0.29 (95% C.I 0.25 to 0.33) and 0.177 (95% C.I 0.15 to 0.20) and Lag 0.588 (95% C.I 0.22 to 0.96) 0.95 (95% C.I 0.43 to 1.48) respectively. This indicates the role of Modified Gompertz in studying the effect of the plant on biofilm formation and adhesion with *S. flexineri.*

Keywords: *Adiantum philippense,* Medicinal plant, Biofilm, *S. flexineri*

BN004

Formulation and Characterization of Quinine-Loaded Solid Lipid Nanoparticles as Potential Drug Delivery

*Fakai, I. M., Jega, S. A., Abubakar, A., Sani, I. and Abdulhamid, A.

[1]Department of Biochemistry, Faculty of Life Sciences, Kebbi State University of Science and Technology, Aliero, Kebbi State.

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ABSTRACT

Mortality due to malaria continues to increase worldwide. However, treatment with quinine proved to be promising due to its rapid schizonticidal action against intra-erythrocytic malaria parasites. . Nano formulation of drugs using an appropriate drug carrier system has been extensively studied and showed the potential to improve bioavailability, thereby enhancing activity, reducing dose frequency and toxicity. The study formulated and characterized the quinine-loaded solid lipid nanoparticles (Q-SLNs) using modified solvent emulsification evaporation method based on a water-in-oil-in-water (w/o/w) double emulsion. Particle size, drug loading and encapsulation efficiency of the Q-SLNs as well as the free drug were analysed using standard methods. The result revealed that mean particle size of Q-SLNs were significantly ($P<0.05$) lower (307.1 ± 4.3nm) than that of empty solid lipid nanoparticles (337.4 ± 10.3nm). The drug loading and encapsulation efficiency of the Q-SLNs were found to be 25% and 75% respectively. Similarly, the exact degradation point of nano formulated quinine was found to be 400°C, whereas it is 330°C for free quinine. The present study, therefore, signified that the Q-SLNs may have higher level of distribution with enhanced efficiency of cell internalization than the free quinine due to its smaller particle sizes.

Keywords: Drug delivery, Nanoparticle, Drug loading, Distribution

BN005

Haldane Growth Model Fits for the Kinetics of *Staphylococcus* sp. Strain MY 83295F in *p,p'*-DDT Enrichment Medium

*[1,2]Murtala, Y. [2]Nwanguma, B. C., [3]Ibrahim, S., and [2]Ezeanyika, L. U. S.
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[2]Department of Biochemistry, Faculty of Biological Sciences, University of Nigeria, Nsukka
[3]Centre for Biotechnology Research, Bayero University, Kano
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ABSTRACT
The emergence and frequent use of predictive modeling in environmental biotechnology reaffirmed its promising stand especially in the area of bioremediation technologies. The models allow for the simulations and predictions of growth kinetics parameters under non-experimental setup. Modeling gives a direction upon which a researcher can follow for setting reliable and valid experiments. In this study, the growth kinetics of *Staphylococcus* sp. strain MY 83295F in minimal salt-*p,p'*-DDT enrichment medium has been modeled. The specific growth rate against the initial *p,p'*-DDT concentrations showed a sigmoidal growth curve with maximum growth peak at 60 mg L^{-1}. Thus, in order to describe the strain's sigmoidal growth curve and predict its kinetics towards *p,p'*-DDT substrate, three mathematical growth models; Haldane, Luong and Tessier models were compared. Haldane model was found to fit for the sigmoidal growth curve of this strain. The fitness of Haldane model for strain MY 83295F was verified by lower Akaike Information Criterion corrected (AICc) value and goodness of both Bias and Accuracy Factors. The model predicted 27.23mg L^{-1} and 57.22 mg L^{-1} as concentration at half velocity constant *Ks* and substrate inhibition constant *Ki* respectively. The goodness of these parameters portray the potential of this strain in the bioremediation of *p,p'*-DDT contaminant.

Keywords: *Staphylococcus*, Growth kinetics, Modeling, Substrate inhibition, Bioremediation

BN006

Bio-Nano-Fabrications: Plants Vis-à-vis Microorganisms

*Usman, A., Matazu, N. U.; Yaradua, A. I., Nasir, A., Hamza, I. K., Abdullahi, A. S., Muhammad, I., and Matazu, K. I.
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ABSTRACT
The synthesis and applications of nanoparticles are currently among the most interesting fields of emerging scientific researches. Nanotechnology has become one of the most auspicious technologies and nanomaterials have received global attention due to their extensive applications in human endeavours. At present, synthesizing nanomaterials, using microorganisms and plants is on the rise and recognized as a green and efficient way for further exploring plants and microorganisms as convenient nanofactories. This paper is focused on the various approaches for the biosynthesis and applications of in medicine, environmental remediation and several other human undertakings. The driving approaches in biogenic synthesis of nanoparticles, considering critical parameters, including the choices of biological sources, incubation periods, pH, and temperature ranges are considered. The economic, biomedical, ethical and legal implications of the synthesis and applications of nanomaterial are also discussed.

Keywords: Nanoparticles, Nanomaterials, Synthesis, Plants, Microorganisms.

BN007

Green Synthesis of Silver Nano-Particles (AgNPs) Using Aqueous Extract of Cucumber (*Cucumus sativus*) Peel and Analysis of their Antimicrobial Activity

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ABSTRACT
Green synthesis procedures for the synthesis of nano-particles from agricultural wastes have tremendous prospects for the improvement of diagnosis and treatment of human diseases. In this study, synthesis and

characterization of silver nanoparticles using aqueous peel extract of *Cucumus sativus* and its antimicrobial properties were evaluated. The aqueous peel extract of *Cucumus sativus* was considered as reducing and stabilizing agent and the silver nano-particles (AgNPs) were synthesized using eco-friendly non-toxic biological method and was characterized using Fourier Transform Infrared (FTIR) and Ultraviolet-Visible spectroscopy (UV) while the antimicrobial activity such as MIC and MBC were evaluated by micro dilution and agar well diffusion method respectively. The UV- Visible spectra showed a surface resonance peak of 388.37, 387.71 and 387.78 at concentration of 1mM, 2mM and 3mM respectively which confirmed the presence of silver nano-particle in the aqueous peel extract of *Cucumus sativus.* The *Cucumus sativus* peel silver nano-particles (CSPAgNPs) showed the presence of different functional groups such as C=C stretch, N–H bending, C≡C stretch and OH stretch which indicated the presence of reducing agent such as phenols, Terpenoids and amines. The antimicrobial activities of CSPAgNPs showed the efficacy of the synthesized CSPAgNPs against *Proteus mirabilis* (gram negative) and *Staphylococcus aureus* (gram positive) bacteria. The biologically synthesized silver nanoparticles were found to have some important phyto-constituents and have shown some antimicrobial activity. Hence, the *Cucumus sativus* peel AgNPs has potential pharmacological importance.

Keywords:*Cucumus sativus*, Silver nanoparticle, Antimicrobial activity, Extract

BN008

Investigating the Possible Mechanism of Dihydroartemisinin Inhibition of Human Protein Kinases

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ABSTRACT

Dihydroartemisinin (DHA) is an antimalarial drug derived from artemisinin, an active principle present in the Chinese medicinal plant *Artemisia annua*. Dihydroartemisinin have proven effective in inhibiting cancer cell growth by selectively targeting human protein kinases. From the structural point of view, the underlying mode of DHA action on these targets still remains unexplained. The present study employed molecular docking simulation techniques using Autodock suits to access the binding mode of dihydroartemisinin to multiple human protein kinases implicated in cancer pathogenesis. Its potential protein kinase targets with comprehensive pharmacophore were predicted using a PharmMapper database. The co-crystallised structures of the human protein kinases were obtained from a Protein Data Bank and prepared for docking simulation study. Out of the 12 protein kinase targets identified, DHA have shown to bind (33.3%) excellently to the protein kinase targets compared to their co-crystallised ligand. Hydroxyl functional group of DHA considerably contributed to the total hydrogen interactions compared to pyran, endoperoxide, and oxepane, which contributed to the remaining hydrogen bonding. The present findings have elucidated the possible mechanisms of antitumor properties of DHA through the structural-based virtual studies.

Keywords: Dihydroartemisinin, Cancer, Molecular docking, Autodock

BN009

Exosomes as Clinical Drug Delivery Systems for Cancer Treatment

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ABSTRACT

Cancer is a public health challenge and the disease is among the leading cause of death worldwide. Despite progress in cancer treatment, toxicity, off-target delivery and poor ability of the cancer drugs to reach tumour site are the major challenges that hindered their success in clinical application. The unearthing of exosomes

as natural nanocarriers for drug delivery has attracted the attention of scientists as carriers for drug delivery to the target site. These nanovesicles are capable of crossing the blood-brain barrier that made them excellent carriers for the treatment of brain tumours. In addition to this uniqueness, exosomes may also circumvent the reticuloendothelial system for destruction by the immune system and remain in systemic circulation for a longer time to deliver the drug to the tumour site without causing toxicity to the healthy cells. Furthermore, exosomes contained assorted cargoes that have therapeutic benefits and can be delivered along with the loaded drug that gave them an advantage over synthetic nanocarriers for targeted delivery. Thus, this review discusses evidence of exosomes as delivery systems for cancer treatment, challenges and future directions for effective clinical utilization as drug delivery systems to combat cancer.

Keywords: Exosomes, Cancer, Cargoes, Blood-brain barrier, Drug delivery system, Nanovesicle

BN010

In Silico Study of Antidiabetic Properties of *Balanites aegyptiaca* Leaf Phenolic Compounds

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ABSTRACT

Several medicinal plants including *Balanites aegyptiaca* and some of their isolated compounds have been reported to be effective in managing diabetes mellitus with fewer or no side effects. However, the modes of action of these phytochemicals are largely unknown. Thus, the present *in silico* drug discovery study on some phenolic compounds was designed to evaluate the potential mechanisms of action of the antihyperglycemic phytochemicals of *Balanites aegyptiaca* leaf extract. The study deployed *in-silico* drug-like studying techniques such as; Lipinski's rule of 5 (PLOP), prediction of adsorption, distribution, metabolism, excretion, and toxicity (ADMET), predict activity spectra of substances (PASS), and molecular docking. The study reveals about 6 compounds to have promising drug-like properties such as cLogp, hydrogen bond donor/acceptor and molar refractivity. In addition, ADMET and drug properties like kinase inhibitors, ion channel modulators, and nuclear receptors were positive for the compounds. Each of the phenolic compounds showed one or more antidiabetic activities like insulin promoter, insulin sensitizer, and inhibitors of α-amylase and α-glucosidase. Docking result predicted that the phenolic compounds inhibited either α-amylase or α-glucosidase while one of the compounds; *2-methoxy-4-(1-propenyl)-phenol* (Isoeugenol) inhibited bothα-amylase and α-glucosidase with binding energies of -4.4 and -4.2 kcal/mol against -3.8 and -4.8 kcal/mol by acarbose (standard antidiabetic drug). In conclusion, the study revealed that phenolic compounds of *Balanites aegyptiaca* leaf possessed drug-like properties including the ability to interact with some proteins that are important targets in the management of diabetes mellitus. The data from the *in silico* study could serve as a step forward toward pharmaceutical discovery of antidiabetic drug potential of *Balanites aegyptiaca* leaf.

Keywords: *In Silico,* Antidiabetic drug properties, Phenolic compounds, *Balanites aegyptiaca,* Leaves extract

BN011

In-silico Representation of E6 Oncoprotein Variants in Carcinogenesis

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ABSTRACT

Cervical cancer is the third most common cancer and a leading cause of cancer-related death in women. It is caused by long-lasting infection with the sexually transmitted Human Papillomavirus (HPV). In this study, the oncogenic interaction of the viral oncoprotein E6 as it interferes with the tumor suppressing activity of

p53; was evaluated *in-silico*. Using sequences of reference E6 oncoprotein (RefE6): P03126.1 and three African variants (Afr1a: AAQ10720.1, Afr1b: AFP44631.1 and Afr2a: AAO15705.1), the variation in binding pattern with p53 and E3-ubiquitin ligase E6AP postulated to be responsible for the transfer of ubiquitin peptides from E6AP to p53 in the p53 degradation seen in carcinogenesis was assessed. Changes on the primary and secondary structures were evaluated by multiple sequence alignment, structural superimposition and protein-protein docking using Clustal W, Chimera 1.14 and ClusPro 2.0 respectively. Multiple sequence alignment showed changes in the primary structure without significant change in 3D structures, validated with ERRAT and Ramachandran plots, upon superimposition. The binding of E6:p53:E6AP, showed differences in the number of hydrogen bond interaction among the variants. This led to the conclusion that although structural differences were not apparent, the differences in primary structure and H-bonds results in a change in functionality and intermolecular interaction which can be linked to different persistence levels of E6 variants.

Keywords: *In-silico* Study; Cervical Cancer; E6 Oncoprotein.

BN012

Enhanced Anti-Inflammatory and Antioxidant Effects of Ibuprofen-Loaded Lipid Vesicles

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ABSTRACT

This study was aimed at enhancing the anti-inflammatory and antioxidant effect of ibuprofen entrapped in lipid vesicles formulated through multiple emulsification and solvent-evaporation integrated process. The prepared ibuprofen-loaded lipid vesicles (IBU-LLV) were characterized for encapsulation efficiency, and *in vitro* drug release. Its anti-inflammatory and antioxidant effects were evaluated in inflamed animal model. Inflammation was induced in the subplantar surface of the right hind paw of male Wister albino rats using 1 wt% carrageenan. Eighteen male Wister albino rats were used for the study and were divided into six groups of three animals per group. Group 1 (normal), group 2 (oedema control), group 3 (50 mg/kg of free ibuprofen), group 4, 5, and 6 were administered 50, 100, and 200 mg/kg of ibuprofen-loaded lipid vesicles, respectively. From the result, it was observed that 100 and 200 mg/kg of IBU-LLV showed significant decrease ($p<0.05$) in the mean percentage oedema volume and significant increase in percentage inhibition of the inflammation. For antioxidant enzyme activity, groups treated with IBU-LLV demonstrated enhanced increase ($p<0.05$) in catalase, superoxide dismutase, and glutathione peroxidase activities; glutathione, vitamins C and E levels when compared to the free ibuprofen. Moreover, a significant decrease in malondialdehyde levels for 50, 100, and 200 mg/kg of IBU-LLVs was observed when compared to the pure ibuprofen. Therefore, it can be inferred that entrapment of ibuprofen into lipid vesicles could improve its efficacy with a potential to reduce unwarranted adverse effects.

Keywords: Anti-inflammatory, Antioxidant, Lipid vesicles, Ibuprofen.

ETHNOPHARMACOLOGY AND DRUG DISCOVERY (ED)

ORAL PRESENTATION

ED001

Cleistopholis Patens Extracts Attenuate Inflammatory Cytokine and Oxidative Stress in Complete Freund's Adjuvant-Induced Rheumatoid Arthritis in Wistar Albino Rats

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ABSTRACT

Rheumatoid arthritis (RA) is an autoimmune inflammatory disease. Accumulating evidences show that natural products use for RA treatment is gaining importance in the medical world due to negative effects associated with orthodox medicines. This study investigated the anti-inflammatory and antioxidant potentials of ethanol and aqueous extracts of the stem bark of Cleistopholis patens (SBCP) on Chicken Type II collagen in complete Freund's adjuvant (CFA) induced rheumatoid arthritis (RA) in rats. Experimental rats were divided into nine groups (n= 15). RA was established in the rats by a single intraperitoneal injection of 0.1ml of Chicken Type II collagen in complete Freund's adjuvant (CFA) into the left hind paw. The serum concentrations of interleukin-1beta (IL-1β), interleukin-6 (IL-6), tumor necrosis factor apha (TNF-α), malondialdehyde (MDA), nitric oxide (NO), superoxide dismutase (SOD) and catalase (CAT) were evaluated. Unlike the untreated arthritic group, the groups (4-9) treated with the ethanol and aqueous extracts of the SBCP at (400, 600 and 800 mg/kg) orally for twenty one days showed significant reduction in concentrations of IL-1β, IL-6, TNF-α, MDA and NO while the activities of the antioxidant enzymes, SOD and CAT were significantly increased relative to the negative control. The anti-inflammatory and anti-oxidative effects of the extracts were analogous to that of the reference drug, indomethacin. This study indicates that SBCP ethanol and aqueous extracts could suppress proinflammatory cytokines and reduce oxidative stress in rheumatoid arthritis rats.

Keywords: Rhematoid arthritis, Inflammation, Cytokine, Oxidative stress

ED002

Phytochemical Screening, Elemental and Proximate Composition of Aqueous Seeds Extract of *Abrus precatorius*

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ABSTRACT

Phytochemical rich plants have played important roles in treatment of diseases of men and animals. They also served as source based material for the orthodox medicine development. Plants are endowed with phyto-constituents such as alkaloids, flavonoids, tannins which hitherto have been used for the cure of diseases. Various parts of plants are used for the treatment of a range of diseases. The present study was designed to determine the phytochemical, elementals and proximate composition of aqueous extract of *Abrus precatorius* seeds (APS). *Abrus precatorius* belongs to family *Fabaceae*. Qualitative and Quantitative phytochemical careening, Proximate Analysis was carried out according to method described by A.O.A.C. , and Atomic Absorption Spectroscopy (AAS) was used for elemental analysis.From the qualitative results, it is evident that, APS contain alkaloids, flavonoids, saponins, steroids, tannins and terpenoids. Quantitative results showed that the aqueous extract of APS contain high amount of flavonoids 217.21mg/kgand Saponins 124.41mg/kg, moderate amount of alkaloids 11.65mg/kg and Tannins 2.83 mg/kg. Proximate analysis showed moisture content of 8.04%, crude lipid 17.46%, crude fibre 12.16%, crude protein 22.38%, ash 4.26 % and nitrogen free extract of 35.69%. Elemental analysis results areCa (14.94 mg/kg), Mg (10.82 mg/kg), Na (45.14 mg/kg) and Zn (14.31 mg/kg). The Presence of different phytochemicals in the aqueous extracts of APS revealed the therapeutic potential of APS for possible exploitation by pharmaceutical industries.

Keywords: *Abrus precatorius,* Phytochemical, Proximate composition, Minerals

ED003

Anti-Snake Venom Activity of *Parkia biglobosa* Stem-Bark Ethanol Extract on Albino Rats

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ABSTRACT

Snakebite is a major health hazard that results in severe morbidity and mortality. Considering the high cost of commercial antivenom, the lack of proper storage facilities and the availability of medicinal plants in rural areas where snakebite is common, an investigation of plant-based remedies for snakebites is justified. In this study, the antisnake venom activity of *Parkia biglobosa* stem-bark extract on *Naja nigricollis* venom was investigated using albino rats. Freshly collected stem-bark was air dried, ground to powder and extracted using 95% ethanol. Phytochemical constituents were screened. Albino rats of both sexes weighing between 150 and 250 g were randomly divided into six (6) groups of four (4) rats each and used for the antivenom screening of the stem-bark extract. Group 1 received distilled water, group 2 received LD100 of the venom, groups 3 and 4 received LD100 of the venom and 200mg or 400mg/kg body weight of the extract, respectively, group 5 received 400mg/kg body weight of extract alone, while group 6 received LD100 of the venom and the standard antivenin. Phytochemical composition of the extract revealed the presence of saponins, tannins, glycosides, alkaloids, steroids, terpenoids, and phlobatannins. The *P. biglobosa*ethanol stem-bark extract was able to increase the mean survival time of the rats treated with the extract to 12.43 ± 0.69 h in group 3 and 14.59 ± 1.06 h in group 4 compared to the venom control group that survived for 0.82 ± 0.06 h. These results indicate that the extract possesses *N. nigricollis* venom-neutralizing effect and can be used for therapeutic purposes in the case of snakebite envenomation involving *N. nigricollis*.

Keywords: Anti-snake venom, *Parkia biglobosa*, *Naja nigriollis,* Phytochemicals

ED004

Phytochemical Content and In vitro Antioxidants Activity of Crude Methanol Leaf Extract of *Ficus exasperate* Vahl (Sand Paper Leaf)

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ABSTRACT

Ficus exasperata vahl belongs to the family of Moraceae with various species widely used as a folk medicine in different part of Africa.In Nigeria, it is found mostly in the Northern part. This study aimed to determine the phytochemical constituents and *in vitro* antioxidants activity of crude methanol leaf extract of the plant.Standard methods were used to determine the qualitatively and quantitatively screen the phytochemicals.The 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical and the ferric reducing antioxidant power (FRAP) assays were used to determine the *in vitro* antioxidant activity. The qualitative phytochemicals screening revealed the presence of alkaloid, tannin, flavonoid, cardiac glycoside, saponin and steroids. The total flavonoid contents(in mg of quercetin equivalent/g of extract) was found to be 46.77±2.67mg, total phenolic contents(in mg of gallic acid equivalent/g extract) was found to be 50.08±1.72mg and the total tannins contents (in mg of tannic acid equivalent/g extract) was found to be 38.83±0.93 mg. The percentage DPPH free radical scavenging activity increased with increase in concentration of the extract. Standard was found to have the highest percentage free radicals inhibition range of 80.03 ±0.40% to 96.05±0.77% and the leaf extract was found to have the percentage free radicals inhibition of 30.46 ±0.85% to 76.89±0.52%. The result of ferric reducing antioxidant power (FRAP) revealed that the methanol leaf extract of had a reduction potential of 400.33 ± 2.08µmol Fe(Π)/g extract) while the standard (Ascorbic acid) had (614.35±2.52µmolFe(Π)/g extract). This study has revealed the in vitro antioxidant potentials possessed by the methanol extracts of *Ficus exasperata* due to the presence of important phytochemicals.

Keywords: Phytochemicals, Free radicals, Oxidative stress, Antioxidants, *Ficus Exasperata* vahl.

ED005

Determination of Blood Platelets and other Haematological Parameters in Response to Oxidative Stress: Treatment with Ethanolic Seed Extracts of *Garcinia kola* and *Curcuma longa* Treated Wistar Albino Rats

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ABSTRACT

Garcinia kola and *Curcuma longa* are widely used plants in alternative medicine. They possess antioxidant, anti-inflammatory and anti-toxic properties which makes them ideal choices for traditional medicine men. Kolaviron and curcumin are ethanolic extracts of *Garcinia kola* and *Curcuma longa* respectively. These extracts have shown ample beneficial health effect in animal models of diseases and have been used traditionally in the treatment of various ailments. The aim of this study was to understand the effects of kola viron and curcumin on haematological parameters in female wistar rats. Eighty-four female rats were used for this study. White Blood cell count, Lymphocyte count and Platelet counts were assayed using standard methods. Our result shows that kolaviron and curcumin increased the white blood cells, lymphs and platelets in the experimental animals, thereby increasing the immunity and subsequently preventing infection in the animals. Based on the aforementioned, it was concluded that both extracts, through their antioxidant property, possess haematopoietic, stimulating and enhancing effects on immunological parameters.

Keywords: Blood platelets, *Garcinia kola, Curcuma longa*, Oxidative stress

ED006

Isolation and Characterization of *Opisthacanthus capensis* (Black Creeping Scorpion) Venom Phospholipase A_2 and Inhibitory Effect of Aqueous Leaves Extract of *Annona senegalensis* on the Enzyme

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ABSTRACT

Scorpion sting is a global health distressing matter, inflammation, pulmonary edema and death in children occur in severe cases due to some scorpion's envenomation. *Opisthacanthus capensis* venom phospholipase A_2 (PLA_2) was isolated and characterized. The PLA_2 activity was determined by a modification egg yolk coagulation method of Haberman and Neumann, hence the inhibitory effect of the leaves aqueous extract of *Annona senegalensis* on PLA_2 was studied by the assay method. The PLA_2 had an optimum pH and temperature of 6 and 60 ^oC respectively. The Km and Vmax of PLA_2 were found to be 1.67mM and 0.00014µmol/min respectively, with activation energy of 3565.1cal/mol. Aqueous extract of *Annona senegalensis*at different concentrations inhibited phospholipase A_2 activity exhibiting classical competitive inhibition. Therefore, *A. senegalensis* can contribute in neutralizing *O. capensis* venom PLA_2 activity.

Keywords:*Opisthacanthus capensis*, *Annona senegalensis,*Phospholipase A_2

ED007

In Vitro Antioxidant Activity and Inhibitory Property of Aqueous Leaf Extract of *Chrysobalanus orbicularis* in Type 2 Diabetes Mellitus

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ABSTRACT

Chrysobalanus orbicularis is commonly used as food, and its leaves are traditionally used for managing type 2 diabetes (T2DM) in the Niger Delta area of Nigeria. Due to the limited scientific evidence on the use of *C. orbicularis*, this study investigated its antioxidant activity and inhibitory property against major enzymes relevant to T2DM. Antioxidant activity was tested via ferric reducing antioxidant properties, DPPH radical, nitric oxide and hydrogen peroxide radical abilities. The α-amylase and α-glucosidase inhibitory activities were also examined.The *C. orbicularis* aqueous leaf extract compared favorably well to the standard compounds (gallic acid, butylated hydroxyl toluene, and acarbose) by scavenging the free radicals in a concentration-dependent (100 – 500 µg/mL) manner. Thus, revealing possible high antioxidant activity as well as inhibitory property against α-amylase and α- glucosidase. The findings support the potential application of *C. orbicularis* in the treatment of patients with type 2 diabetes mellitus and other oxidative stress-related disorders.

Keywords: Antioxidant activity, C. Orbicularis,α-amylase, α- glucosidase, Medicinal plant

ED008

Isolation and Antioxidant Activity Screening of a Peptide from *Bauhinia rufescens* (Lam. Fam.) Seed on Albino Mice Challenged with Snake Venom Phospholipase A2

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ABSTRACT

Snakebite envenomation affects as many as 2.7 million people every year. However, several studies have been reported on active peptides from medicinal plants, which are safe and effective against snake venom induced toxicities. Hence, this research work was aimed at isolating and Antioxidant activity screening of a plant peptide from *Bauhinia rufescens* seed on albino mice challenged with snake venom phospholipase A2(VPLA2). Peptide (BRS-P19) and VPLA2 enzyme were isolated and purified.Peptide from the*B rufescens* seed with molecular weight of ~19 kD (BRS-P19) was obtained. The percentage *in vitro* inhibitory effect of BRS-P19 and antivenin on VPL2 was determined to be 91.85 ± 0.32% and 73.17 ± 0.50%, respectively. For study, the animals treated with0.4 mg/kg b.w.BRS-P19 showed a significant ($P<0.05$) decrease in the level of mice hepatic and renal ROS and MDA to 0.16±0.02 mmol/g and 0.05±0.01 mmol/g for ROS and 1.17±0.07 mmol/g and 1.09±0.04 mmol/g for MDA respectively, when compared to the VPLA2 untreated group with 3.84±0.20 mmol/g and 3.06±0.08 mmol/g for ROS and 6.91±0.18 mmol/g and 6.01±0.14 mmol/g for MDA respectively. The activities of the mice hepatic and renal SOD, CAT and GPx were significantly ($P<0.05$) increased to 55.73±0.57 U/g and 48.39±1.80 U/g for SOD, 37.06±0.24 U/g and 30.54±0.64 U/g for CAT and 145.12±1.07 U/g and 125.11±0.20 U/g for GPx respectively by BRS-P19 (0.4 mg/kg), as compared to the VPLA2 untreated group with 11.13±0.11 U/g and 7.12±0.02U/g for SOD, 6.23±0.10 U/g and 9.50±0.50 U/g for CAT and 23.02±0.32 and 31.09±1.87 U/g for GPx, respectively. Based on these results, it has been established that, BRS-P19 has inhibitory effect on the VPLA2 activity and antioxidant effect of *B. rufescens* seed peptide might be the possible mechanism of action against VPLA2 induced free radicals formation.

Keywords: Envenomation, Peptide from *Bauhinia rufescens,* Phospholipase A2

ED009

Therapeutic Proteins Development: Prospects and Challenges

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ABSTRACT

Some specific proteins are low or absent in patients with diseases such as diabetes mellitus, cancer, multiple sclerosis, hepatitis, etc. These therapeutic proteins can be synthesized through genetically modified host cells and delivered for effective treatment of the diseases. The emergence of therapeutic proteins has proven to be of enormous potential against several diseases and syndromes. Recent evidence has explored the complex role that therapeutic proteins play in the treatment/management of several chronic diseases. Pharmaceutical industries are increasingly focusing on research using proteins in search of striking effective and efficient therapeutics. Over the last few years, an increasing number of therapeutic proteins are in clinical trials or received approval for product registration. Most of these proteins are genetically engineered hormones, lymphokines and growth factors. In this review, we study the development of therapeutic proteins and their impact on human health and economy. Some of the possible factors that are linked with the basis of therapeutic proteins, including the role of biotechnology in the production of protein-based drugs with reduced immunogenicity, classification, purification, transport and pharmacokinetics have been discussed. Some of the challenges faced in the development of these drugs from the discovery of new molecules to their entrance into the pharmaceutical market, as well as possible solutions to these challenges have also been highlighted.

Keywords: Proteins, Therapy, Chronic diseases, Genetic engineering

ED010

In-vitro Antioxidant Effect of *Melastoma malabathricum* Methanol Leaf Extract

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ABSTRACT

Traditional medicine is still recognized as the preferred primary health care system in many communities, with over 60% of the world's population and about 80% in developing countries depending directly on medicinal plants for their medical purposes. The aim of this study is to evaluate the antioxidant effect of *Melastoma malabathricum* leaf using free radical scavenging with 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and Ferric Reducing Antioxidant Power (FRAP) assays. Leaf was extracted by soaking in 80% methanol for 3 days followed by concentration with rotary evaporator at 42°C. Crude extract concentration was prepared using serial dilution (1000 to 15) µg/mL. Antioxidant effect of the extract was evaluated with quercetin and trolox as standard for comparison. Result shows high activities with IC_{50} of 1.26 µg/mL with DPPH assay and 7.5 with FRAP assay. There is high significant different $p< 0.001$ between 15 to 250 µg/mL of the crude extract and the references as well as $p< 0.01$ between 500 to 1000 µg/mL and the references. High antioxidant effect of this plant may be due to the present of several bioactive compounds present. Hence, extract from this plant can be recommended for the prevention or treatment of diseases cause by free radical accumulation. Phytochemical studies to reaffirm activities as well as identify or isolate the bioactive compounds are also recommended.

Keywords: Antioxidant, Medicine, Quercetin, Traditional, Trolox

ED011

Toxicity Effect of *Melastoma malabathricum* Methanol Leaf Extract on Zebrafish Embryo

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ABSTRACT

Medicinal plants are used for therapeutic purposes against several diseases. Most of these plant content high concentration of secondary metabolites that are of benefit to animals. When use in high concentration, plant extract can cause several side effects including malformation of tissue organs and mortality. Therefore, the aim of this research is to study the toxicity effect of *Melastoma malabathricum* 80% methanol leaf extract on zebrafish embryo. Leaf was extracted by soaking in 80% methanol for 3 days followed by concentration with rotary evaporator at 42°C. Fertilized Zebrafish embryos were exposed 15.60, 31,25, 62.5, 125, 250 and 500 µg/mL of the crude extract for 0-7 days. Results show low mortality with significant different ($p<0.05$) between the groups that were exposed to high concentration (250 and 500 µg/mL) and those that were exposed to the low concentration (15.60, 31,25, 62.5 and 125 µg/mL. the calculated LC_{50}, LC_{70}, LC_{90} of 520.1, 2416.7 and 8335 µg/mL was recorded. No toxicity effect of this plant leaf revealed it benefit to be used as medicinal supplement to prevent diseases caused by radicals.

Keywords: Embryo, Methanol extract, Toxicity, Zebrafish

ED012

Toxicity and Acetylcholinesterase Inhibitory Effects of *Melastoma malabathricum* Methanol Leaf Extract on *Javanese medaka* Fish Model

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ABSTRACT

Oxygen is a unique element that is indispensable for life. Imbalance between the free radicals and antioxidants affect the vital role of the body system and could result in cellular responses that are detrimental to life. Therefore, the aim of this research ist o study neuroprotective effect of *Melastoma malabathricum* methanol leaf extract through acetylcholinesterase inhibitory assay on *Javanese medaka* fish.Leaf was extracted by soaking in 80% methanol for 3 days followed by concentration with rotary evaporator at 42°C. A toxicity study was carried out by exposing fishes to 62.5, 125, 250 and 500 g/mL alongside with the control group maintained in tap water. Acetylcholinesterase inhibitory activities were evaluated on the fish by initially exposing them to safe dose concentration of the plant crude extract for 24 hours and addition of arsenic for 9 days. Results revealed LC_{50}, LC_{70}, LC_{90} of 346.7, 1148.2 and 6760 g/L. A high significant ($P<0.01$) of total protein content and acetylcholinesterase inhibitory were recorded in groups that were treated with crude extract only, group treated with crude extract and exposed to arsenic compared to the group that were exposed to arsenic only. It can be concluded that low toxicity and high acetylcholinesterase inhibitory effect of the plant crude extract might be responsible for it neuroprotective effect.

Keywords: Acetylcholinesterase, Inhibitory-effect, Methanol, Neuroprotective, Toxicity

ED013

Biochemical Constituents of *Melastoma malabathricum* Methanol Leaf Extract and its Inhibitory Activity on Butyryl-Icholinesterase of *Javanese medaka* Fish

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ABSTRACT

Oxidative stress occurs when there is an imbalance between production of free radicals and endogenous scavenging capacity of cellular antioxidants as a result of aging, exposure to heavy metals or unknown

causes. Therefore, the aim of this research is to determine the toxicity and neuroprotective effect of *Melastoma malabathricum* leaf extract biochemical constituents through butyryl-cholinesterase Inhibitory assay. Leaf was extracted by soaking in 80% methanol for 3 days followed by concentration with rotary evaporator at 42°C. A toxicity study was carried out by exposing fishes to 62.5, 125, 250 and 500 g/mL alongside with the control group maintained in tap water. Butyryl-cholinesterase inhibitory activities were evaluated on the fish by initially exposing them to safe dose concentration of the plant crude extracts 24 hours and arsenic for 9 days. Results revealed the LC_{50}, LC_{70}, LC_{90} of 346.7, 1148.2 and 6760 g/L. There is significant ($P<0.001$) for total protein content and butyryl-cholinesterase inhibitory between the group that were treated with crude extract only, group treated with crude extract and exposed to arsenic as well as group that were exposed to arsenic only compared to the control group. It can be concluded that low toxicity and high butyryl-cholinesterase inhibitory effect of the crude extract mightbe responsible for it neuroprotective effect.

Keywords: Butyryl-cholinesterase, Inhibitory-effect, Methanol, Neuroprotective, Toxicity

ED014

Toxicity profile and Propionyl-cholinesterase Inhibitory Effect of *Melastoma malabathricum* Methanol Leaf Extract on *Javanese medaka Fish* Model

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ABSTRACT

Normal mitochondrial metabolism inevitably generates reactive oxygen species (ROS) and increase inROS has been linked to various pathologies such as denaturation of neurotransmitters. Therefore, the aim of this research is to study neuroprotective effect of *Melastoma malabathricum* leaf extract through propionyl-cholinesterase inhibitory assay on *Javanese medaka* fish. Leaf was extracted by soaking in 80% methanol for 3 days followed by concentration with rotary evaporator at 42°C. A toxicity study was carried out by exposing fishes to 62.5, 125, 250 and 500 g/mL alongside with the control group maintained in tap water. Propionyl-cholinesterase inhibitory activities were evaluated on the fish by initially exposing them to safe dose concentration of the plant crude extract for 24 hours and addition of arsenic for 9 days. Results revealed LC_{50}, LC_{70}, LC_{90} of 346.7, 1148.2 and 6760 g/L. A high significant ($p<0.05$) of total protein content and propionyl-cholinesterase inhibitory were recorded in groups that were treated with crude extract only, group treated with crude extract and exposed to arsenic compared to the group that were exposed to arsenic only. It can be concluded that low toxicity and high propionyl-cholinesterase inhibitory effect of the plant crude extract might be responsible for it neuroprotective effect.

Keywords: Inhibitory-effect, Methanol, Neuroprotective, Propionyl-cholinesterase, Toxicity

ED015

Protective Effects of *Nigella Sativa* Seed Oil and Zinc Gluconate on Ethanol Induced Gastric Mucosal Damage in Wistar Rats

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ABSTRACT

Gastric ulcers are common digestive disorders involving stomach mucosal lesions. The aim of this study is to investigate the gastroprotective effects of *Nigella sativa* seed oil and zinc gluconate on ethanol induced gastric mucosal damage in wistar rats. A total of 25 rats were divided into 5 groups of 5 rats each. Group 1 received distilled water 10ml/kg, Group 2 was administered absolute ethanol 1ml/kg. Group 3 received *Nigella sativa* oil at a dose of 5ml/kg, Group 4 was administered 50 mg/kg of zinc gluconate while Group 5 received zinc gluconate (50 mg/kg) plus *Nigella sativa* oil (5 ml/kg) respectively via oral route. Group 2

showed severe necrosis of gastric epithelium, with ulcer index of 10.25 ± 0.85 mm. Group 3, 4 and 5 demonstrated significant decrease ulcer index compared to the group 2 control with ulcer indices of 5.50 ± 1.04 mm, 4.75 ± 0.25 mm and 3.75 ± 1.44 mm, respectively. The results further showed the percentage protections of group 3, 4 and 5 as 48.8%, 53.6% and 63.4%, respectively. In conclusion, *Nigella sativa* seed oil and zinc conferred protection to gastric mucosa but combination of the two produced an additive effect.

Keywords: Gastric ulcer, *Nigella sativa,* Zinc gluconate, Ethanol

ED016

Chrysin Attenuates Osteoporosis-Induced Hyperlipidemia in Ovariectomized Rats through Inhibition of Oxidative Stress Markers

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ABSTRACT

Cardiovascular disease (CVD) and postmenopausal osteoporosis are both age-related diseases with significant morbidity and mortality in the elderly especially women. This study investigated the potential attenuating effect of chrysin in osteoporosis-induced hyperlipidemia and oxidative liver damage in ovariectomized (OVX) rats. The results indicated significant ($p<0.05$) increases in body weight gain, total cholesterol, triacylglycerol, and low-density-lipoprotein (LDL-c) with concomitant decrease in high-density-lipoprotein (HDL-c) levels in the OVX rats when compared to the sham-operated group. Interestingly, treatment of the OVX rats with chrysin significantly ($p<0.05$) reduced the body weight gain and reversed the alterations of lipid profile parameters in a dose-dependent manner in comparison to the untreated OVX rats. Moreover, malondialdehyde (MDA) level was significantly ($p<0.05$) higher whereas glutathione (GSH), superoxide-dismutase (SOD) and catalase (CAT) activities were significantly ($p<0.05$) reduced in the OVX rats when compared to the sham group. However, all these parameters were significantly ($P<005$) restored upon administration of chrysin to the OVX rats. Furthermore, treatment of the OVX rats with chrysin caused significant ($p<0.05$) reduction in the expression of liver enzymes compared to the untreated OVX rats. In addition the femur bone of the OVX rats had significant ($p<0.05$) decreases in calcium, phosphorus, magnesium and zinc contents compared to the sham group. Conversely, treatment of the OVX rats with chrysin significantly ($P<0.05$) attenuated the loss of these bone mineral contents when compared with the untreated OVX rats. Altogether, the present study demonstrated that chrysin, a natural antioxidative compound, was able to attenuate osteoporosis-induced hyperlipidemia and oxidative liver damage partly through alleviating oxidative stress in OVX rats.

Keywords: Chrysin, Postmenopausal-osteoporosis, Hyperlipidemia, Liver damage, Antihyperlipidemic effect

ED017

In-vitro Neutralization Effect of Methanolic Root Bark Extract of *Annona senegalensis* against Toxicity Induced by *Naja nigricollis* Venom

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ABSTRACT

Snake envenomation is a serious and frequently neglected public medical issue in developing countries. Ethnomedicinal plant extracts and their isolates have demonstrated significant inhibitory effect against various snake venom enzymes activities and therefore can be used as an alternative medicine against snake envenomation. This study evaluates *in-vitro* neutralization effect of methanolic root bark extract of *Annona senegalensis* against toxicity induced by *Naja nigricollis* venom. Methanolic root bark extract of *Annona senegalensis* was fractionated based on liquid-liquid fractionating method. Inhibition of phospholipase A2, hyaluronidase enzymatic activities, procoagulant and haemolytic activity of the venom were evaluated *in vitro* using pre-incubation protocol. Phytochemicals in the fractions were determined using

standard methods and fractions were analysed using gas chromatography-mass Spectrometry. AM Fraction demonstrated the highest significant effect against the activities of PLA_2s, hyaluronidase and haemolytic activity of the venom. All fractions tested in this study gave 100% protection against procoagulant activity of the venom. GC–MS analysis indicated that a total 10 compounds were present in AM infraction. The major bioactive constituents were found to be Z-8-Methyl-tetradecenoic acid (54.38%) in AM infraction. The results obtained showed that the methanolic root bark extract of *Annona senegalensis* possesses significant anti-venom activity and could be considered as a potential source for anti-snake venom.

Keywords:*Annona senegalensis* (Pers), *Naja nigricollis (*Hallowell.), Envenomation, Inhibitory

ED018

Anti Diabetic and Anti-inflammatory Effects of *Vitellaria paradoxa* Stem Bark Crude Extracts in the Plasma of Alloxan Induced Diabetic Male Rats

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ABSTRACT

Vitellaria paradoxa stem bark crude extracts (VPSBE) is rich in bioactive component with good anti-bacterial effect, anti-fungal and anti-viral have been documented. This study investigates the immunomodulatory effect of *Vitellaria paradoxa*stem bark extract (VPSBE) in diabetic rats induced by alloxan through serum cytokine quantification.Rats weighing between 150 g and 200 g were randomly divided into 5 groups: Non-DM group, DM group, DM + 100VPSBE group, DM + 200VPSBE group and DM + 200 Metformin group. A single dose of diabetogenic agent–Alloxan, 150mg/kg was used to induce diabetes in rats. Tumour necrosis factor (TNF) -α, Interleukin (IL)-6, Interleukin (IL) -10 were assayed and neutrophils to lymphocyte ratio (NLR) were calculated. Diabetic rats treated were compared with untreated diabetic rats. Induced hyperglycaemia up regulated the concentration of TNF-α, IL-6 while down regulated the concentrations of IL-10; induced hyperglycaemia caused mark reduction in Neutrophils population and mark increased in lymphocytes population. Significant reduction in the levels of TNF-α and IL-6 was observed in diabetic treated rats. Significant increase in the levels of IL-10 and NLR were observed in diabetic treated rats.This study demonstrates that VPSBE exerted immunomodulatory properties in diabetic rats due to its capacity to reduce the levels of pro-inflammatory cytokines and increase the levels of anti-inflammatory cytokines. These effects might be due to the presence of abundant active natural compounds in VPSBE.

Keywords: Anti-inflammatory, Immunomodulation, Alloxan, Pro-Inflammatory cytokines, Phytotherapy,

ED019

In Vitro Antioxidant and Red Blood Cell Protective Activities of Aqueous Extract of *Trigonella foenum-graecum* L. Seed

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ABSTRACT

Trigonella foenum-graecum L. is medicinally important plant used in the management of a wide range of diseases. In Nigeria, *Trigonella foenum-graecum*(Hulba) seed are locally used after childbirth to facilitate the removal of clothing blood. This study evaluated the *in vitro* antioxidant and red blood cell protective activities of *T. foenum-graecum* seeds. Aqueous extract of *T. foenum-graecum* seeds expressed significant antioxidant activities. IC_{50} for 2,2-diphenyl-1-picrylhydrazyl scavenging activities of the seed and vitamin C were7.73 and1.39 mg/ml. Furthermore, IC_{50} for total antioxidant capacity and hydrogen peroxide scavenging activities of the seed and vitamin C were4.40, 3.84 mg/ml and5.90 and 1.28 mg/ml respectively. While the IC_{50} values for hydroxyl radical scavenging activities and nitric oxide reducing power were 5.43, 1.44 mg/ml and 7.37, 2.32 mg/ml respectively. However, no significant difference were found in ferric ion reducing

properties of the extract and vitamin c.The extract expresses 47.61±8.69% erythrocyte lysis activities at a concentration of 100 µg/ml. Protective effects of the extract of *T. foenum-graecum* seeds against accumulation of $CuSO_4$-induced conjugated dienes in plasmawere concentration dependent (6.25 – 100 µg/ml) and comparable to that of vitamin C. Thrombolytic activity of the seed was comparable to vitamin c and lower compared with acetylsalicylic acid and streptokinase. The extract significantly ($p<0.05$) inhibited (32.64%)hypotonic solution-induced erythrocyte membrane lysis when compared to vitamin C (75.59%) and NaCl control (100%) respectively. The highest erythrocytes protection of the extract was 42.77% compared with Phosphate Buffer Saline (66.94%) and vitamin C (46.12%). The study demonstrated the i*n vitro* antioxidant properties and red blood cell protective activities of *T. foenum-graecum* seeds and providing evidence for some ethnopharmacological usage of the seeds.

Keywords: *Trigonella foenum-graecum*, Antioxidant activities, Red Blood Cell Protection, Seed, Hulba

ED020

In vitro Antioxidant, Antihyperglycemic and Preliminary Toxicological Evaluations of Aqueous Seed Extract of *Adansonia digitata* L. in Mice

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ABSTRACT

Adansonia digitata L. (*Malvaceae*) is an African medicinal plant known for its nutritional values. They are used in the treatment of various ailments including diarrhea, malaria, microbial infections and diabetic. The seed of *A. digitata* are used as thickening agent in soups, fermented and used as a flavouring agent or roasted as snacks. This study investigates the *in vitro* antioxidant and toxicological effects of aqueous seeds extract of *A. digitata.* The extract expressed *in vitro* antioxidant activities at 0.2 – 1.0 mg/ml with 2, 2-diphenyl-1-picrylhydrazyl (DPPH) scavenging (IC_{50} = 0.14±0.00 mg/ml), total antioxidant capacity (IC_{50} = 0.23±0.01 mg/ml), nitric oxide scavenging (IC_{50} = 0.85±0.15 mg/ml) and hydrogen peroxide decomposing activities(IC_{50} = 0.17±0.03 mg/ml). Following an oral administration of glucose (2 g/kg bwt.), distilled water, metformin (14.2 mg/kg bwt.) and *A. digitata* seed extracts at 500 and 1000 mg/kg bwt, respectively. The untreated mice had an average of 11.09% increase in glucose, while an average of 17.05%, 0.99% and 19.21% glucosedecrease was recorded in the test groups respectively. The acute toxicity did not result in death of any mice and the LD_{50} was found to be above 5000 mg/kg body weight. Administration of aqueous seed extract of *A. digitata* at 500 and 1000 mg/kg body weight respectively, did not cause any alterations in lipid profile and plasma total protein except in plasma triglyceride and liver total protein when compared with control animals after fourteen days administrations. The extract did not significantly alter coronary, cardiac and atherogenic indices. However, the administration significantly increases plasma concentrations of aspartate aminotransferase (AST) when compared with the control mice. The study concludes that aqueous seed extract of *A. digitata* possess glucose lowering and *in vitro* antioxidant properties, and are practically safe at the doses and duration tested.

Keywords: *In vitro*; Antioxidants; *Adansonia digitata*; Seeds; LD_{50}; Antihyperglycemic; Antihyperlipidemic

ED021

Effect of *Anisopusmannii* Leaves and Stem Bark Extracts on the Organ Function and Lipid Profile of High Fat-Fed Albino Rats

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ABSTRACT

Serum lipid levels in rats with hyperlipidaemia induced by diet and biochemical indices of organ functions were determined after oral administration of ethanol extracts of *Anisopusmannii* leaves and stem bark. Hyperlipidaemia was induced by feeding the rats for 28 successive days with high fat diet constituted of 70% normal feed and 30% commercial butter (margarine). Administration of methanolic extracts of these plants for 28 consecutive days produced significant reduction in serum triglycerides, cholesterol, HDL, LDL and VLDL. Serum urea, creatinine, Na^+ and K^+ ions were significantly altered. AST, ALP, ALT, Total and conjugated bilirubin, total protein and albumin were not significantly affected. Thus, these extracts could possess some hypolipidaemic, hepatoprotective and nephroprotective properties.

Key words: *Anisopusmannii*, Hyperlipidaemia, Hepatoprotective, Nephroprotective

ED022

Anti-Hyperglycemic Activity of the Aqueous Leaf Extract of *Lawsonia inermis* in Alloxan-Induced Diabetic Wistar Rats

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ABSTRACT

Alterations in metabolism of fuel molecules in diabetes increase blood glucose. This causes long-term complications in many organs. Currently, available treatment options to maintain glycemic control are accompanied by various side effects. Therefore, there is the need to develop newer anti-hyperglycemic agents of plant origin with less side effects. This study aimed to evaluate the anti-hyperglycemic effects of the aqueous leaf extract of *Lawsonia inermis*(ALELI) in diabetic rats.Thirty albino rats (203.21 ± 6.57 g) were randomly divided into six groups. Diabetes was induced through intraperitoneal administration of 150 mg/kg body weight of alloxan in all animal groups except one. Group A, non-diabetic rats, and group B, a diabetic control group were treated with 0.5 mL of normal saline while group C was treated with 50 mg/kg body weight of metformin. Groups D, E and F were administered daily doses of 200, 400, and 600 mg/kg body weight of theALELI, respectively for a period of 3 weeks. Fasting blood glucose using glucometer, body weight, serum chemistry and liver enzyme markers were monitored. Administration of the ALELI showed a significant ($p < 0.05$) reduction in fasting blood glucose of diabetic rats in a dose dependent manner. Also, administration of the ALELI had no negative effect on the body weight, serum chemistry and liver enzymes of diabetic rats. Thus, the ALELI possesses potential antidiabetic activity with observable toxicity.

Keywords: Alloxan, Diabetes mellitus, *Lawsonia inermis,* Blood glucose, Serum chemistry

ED023

Antiplasmodial Activity of Protoberberine Alkaloids Isolated from *Annickia affinis* (Exell) Versteegh & Sosef

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ABSTRACT

Malaria, a disease caused by a mosquito-borne protozoan parasite remains a major threat to individuals in malarious regions of the developing world with pregnant women and children under 5 years of age being the sub-populations most affected. In the absence of a credible vaccine, the disease is currently managed using chemotherapeutic agents (against the parasite) and insecticides (against the vector). Although orthodox medications abound, many individuals in developing regions of the world due to several reasons including those of cost, rely on herbal medicines to treat their diseases. *Annickia affinis* is one of several plants indicated for the ethnomedicinal management of malaria in the Pharmacopeia of some African countries including Nigeria. To isolate the components responsible for the antiplasmodial activity of this plant, its methanol stembark extract was subjected to antiplasmodial activity-guided isolation. Following full characterization on the basis of NMR and mass spectroscopic analysis, highly potent and selective protoberberine alkaloids Berberine and Palmatine{whose IC_{50} against drug sensitive and drug resistant strains of the parasite ranged from 0.07 – 3.21 µg/ml while CC_{50} against Human embryonic kidney (HEK) cell and the human hepatoma cell line (HUH-7) ranged between 21 to > 100 µg/ml} were identified to be responsible for its antiplasmodial activity. The ethnomedicinal use of *Annickiaaffinis* is thus justified.

Keywords: *Annickia affinis,* Traditional complementary medicine, Antimalarial, Protoberberine alkaloids, Berberine, Palmatine

ED024

Hypolipidemic Properties of Bioactive Fraction(s) of *Mentha piperita* Leaves in Poloxamer 407-Induced Hyperlipidemic Rats

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ABSTRACT

Hyperlipidemia is a condition characterized by high lipid level in the blood, and among the major risk factors of cardiovascular diseases. This study was primarily designed to investigate the hypolipidemic, activities of the extracts and bioactive fraction(s) of *Mentha piperita* leaves in Poloxamer 407-induced hyperlipidemic rats. Hypolipidemic activity of hexane, ethyl acetate and methanolic extracts (100,200 and 300 mg/kg) was evaluated *in vivo* by determining triglcerides, cholesterol, high density and low density lipoproteins levels in serum. The most potent hypolipidemic extract (Ethyl acetate at 100mg/kg body weight) was fractionated by column chromatography. Twelve (12) fractions coded F1-F12 were thereafter collected based on gradient elution system of 100% hexane, followed by different combinations of hexane: ethylacetate (90:10, 80:20, 70:30, 60:40, 50:50, 40:60, 30:70, 20:80, 10:90, 100% ethyl acetate) and finally washed with 100% methanol. Hypolipidemic activity of the fractions was further evaluated *in vivo.* The findings indicate that ethyl acetate extract of *Mentha piperita* leaves exhibited higher hypolipidemic effects than hexane and methanol extracts at a lower dose (100mg/kg body weight). Column chromatographic fractions exhibited similar pattern of hypolipidemic activity. However, fractions 2, 3, 4, 6 and 12, were more hypolipidemic than the other fractions, with fraction 2 (F2) being the most potent. Overall, the findings suggest that ethyl acetate extract of *Mentha piperita* leaves and its fractions possess hypolipidemic properties and thus may potentially be explored in the management of hyperlipidemia and its related diseases.

Keywords: Hyperlipidemia; *Mentha piperita* leaves; Lipid profile; Ethylacetate extract; Fractions

ED025

Aqueous Extract of *Phyllanthus amarus* Leaves Attenuated the Alterations in Fluoxetine-Induced Anti-Estrogenic Activity in Female Rats

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ABSTRACT

Aqueous extract of *Phyllanthus amarus* leaves is widely implicated to be of immense importance in the management of female sexual dysfunction in Nigeria. This study aimed to investigate the effects of aqueous extract of *P. amarus* leaves on estrogenic and ovarian functioning indices of fluoxetine-treated female rats. Sixty sexually active female rats (141.52 ± 6.26 g) were randomly assigned into six groups (A-F) of ten animals each. Animals in Group A (control) received distilled water while those in Groups B, C, D, E and F which were induced with estrogenic agent (fluoxetine (15 mg/kg) orally for 14 days, received in addition 0.5 ml of distilled water, 10 mg/kg body weight of a reference drug (Tadalafil), 20, 40 and 80 mg/kg body weight of the extract respectively, orally and once daily (08:00 - 08:45 h) for 7 days. Administration of fluoxetine significantly ($P< 0.05$) reduced the levels of total protein, glycogen, total cholesterol, progesterone and estrogen as well as the activities of alkaline phosphatase and acid phosphatase in the ovaries and uterus of the animals. In contrast, these decreases were dose dependently reversed by the aqueous extract of *P. Amarus* leaves compared to control animals. The extract (80 mg/kg) ameliorated the decreased levels of these estrogenic parameters when compared with the control animals. The potentiating effect of *P. amarus* leaves on endogenous estrogen's activity and/or induction of gonadotrophin synthesis or secretion which restored the alterations in the functioning parameters may further lend support to the popular use of *P. amarus* leaves in handling some sterility/infertility problems in women.

Keywords: Estrogenic parameters, Ovarian parameters, *Phyllanthus amarus;* Euphorbiaceae**,** Fluoxetine, Progesterone.

ED026

Effect of *Solanum* Vegetables on $HgCl_2$-Induced Memory Impairment in *Drosophila melanogaster*

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ABSTRACT

In this study, we addressed the efficacy of two green leafy vegetables, African eggplant (AE) and Black nightshade (BN), in mitigating mercuric chloride ($HgCl_2$)-induced neurotoxicity in *Drosophila melanogaster.* Flies were exposed to $HgCl_2$ (50 µg/g) alone or in combination with the vegetables (0.1 and 1.0%) of both samples in their diets for seven days. The results showed that $HgCl_2$ (Hg)-exposed flies had significantly reduced survival rate and memory index, which were ameliorated in the Hg-exposed flies fed dietary AE or BN. This was accompanied by increased reactive oxygen species levels, and reduced total thiol, catalase, glutathione transferase and acetylcholine esterase activities in Hg-exposed fly heads. Conversely, these $HgCl_2$-induced changes were ameliorated in Hg-exposed flies fed dietary AE or BN. In addition, the Hg-induced alterations in SOD, NF-κB/Relish, Dronc and Reaper mRNA levels were statistically indistinguishable from controls in the Hg-treated flies fed diets containing AE or BN. Normalization of cnc/Nrf2 and FOXO were observed only in Hg-treated flies fed dietary BN. These findings suggest that dietary AE or BN leaves offer protection against Hg-induced memory impairment and neurotoxicity in *D. melanogaster,* and may serve as functional foods with neuroprotective properties.

Keywords: Fruit fly, Solanum vegetables, Oxidative stress; RT-PCR

ED027

Lipid Profile, Antioxidant and Hematological Status of Aqueous and Cow Urine Extracts of *Nicotiana tabacum* Leaf in Rats

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ABSTRACT
Nicotiana tabacum, popularly called tobacco, is extracted with cow urine locally to produce the concoction called "*adimenu*" which has been claimed to be effective in managing various ailments. This study aimed to determine the antioxidant level, lipid profile and hematological status of aqueous and cow urine extracts of *N. tabacum* leaf in Wistar rats. Thirty-five Wistar rats were randomly assigned into groups and administered different doses; groups A & D were orally administered 8 mg/kg b.w. (single dose) extracts of *N. tabacum* leaf while, groups B & E, C & F were orally administered 16 and 32 mg/kg b.w. (repeated dose) extracts of *N. tabacum* leaf respectively for 28 days. Administration of single and repeated doses of the extracts significantly ($P<0.05$) modulatedthe lipid profile, elevated the antioxidant level and cause a significant ($P<0.05$) decrease in some hematological parameters (Hb, HCT, MCV, MPV) when compared with the control. The results suggest that the extracts of *N. tabacum* leaf might increase the risk of atherosclerosis due to an increase in LDL level as well as anemia owing to decreased number and percentage of red blood cell. The extracts due to itsincreased antioxidant level might also help prevent oxidative stress induced-diseases and maintain membrane integrity by mopping up free radicals. This research, therefore, recommends that the repeated consumption of "*adimenu*" should be discouraged.

Keywords: *Nicotiana tabacum,* Antioxidant, Atherosclerosis, Anemia, Lipid profile

ED028

Anti-Coccidial Effect of n-Hexane Fraction of Cashew *(Anacardium occidentale*) Nut Shell Extract on *Eimeria Tenella* Infection in Broiler Chickens

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ABSTRACT
Avian coccidiosis for many years has been a disease of major economic importance in the poultry industry worldwide. The anti-coccidial effect of n-hexane fraction of cashew nut shell (CNS) pentane extract on *Eimeria tenella* infection in broiler chickens was studied. Median lethal dose (LD_{50}) was used to establish doses for the *in vivo* studies. The chicks (2 weeks old) were grouped into five groups (A-E) of five chicks each; A: Normal control group (uninfected and untreated), B: Infected with 5000 sporulated *E. tenella* oocysts and untreated, C: Infected and treated with 1.5%w/v Amprolium®, D: Infected and treated with n-hexane fraction (750mg/kg), E: Infected and treated with n-hexane fraction (1500mg/kg). Preparative TLC, GC-MS and FTIR spectroscopy were used to further purify and identify active ingredient in the fraction. The median lethal dose (LD_{50}) was found to be >5000mg/kg body weight. There was a significant ($p<0.05$) increase in body weight of the chicks in group A (368.2±54.2g), C (417.00±42.8g), D (387.4±35.8g) and E (427.4±35.8g) at 7 days post infection with *E. tenella* oocysts when compared with group B (222.8±48.0g). The oocyst per gram (OPG) in the caecum of group B was significantly ($p<0.05$) higher (394120.0±115414) than group A (23.0±07.2), C (101±66.1), D (10149±6656.1) and E (2249.3±232.1). The gross lesion scores of +3 and +1 were recorded for groups B and C, respectively. Further fractionation revealed four sub-fractions (A_1, A_2, A_3 and A_4) with A_2 having the highest inhibitory activity against sporulated *E. tenella* oocysts based on the percentage oocysts lysis (91.5%) and unviability of the remaining 8.5%. Based on GC-MS and FTIR, the active sub-fraction A_2 of the CNS n-hexane fraction to be 2-(5-bromopentyl)- 7,9-Diethyl-2,4-bis(dimethylamino) -10-imino-8-thio-1,7,9-triazaspiro [4.5]-1,3-decadiene-6,8-dione. This finding

suggested that, sub-fraction A_2 of CNS extract possess anticoccidial activity against *E. tenella* infection in broiler chicks.

Keywords: Avian coccidiosis, *Eimeria tenella*, N-hexane fraction, Fractionation

ED029

H**ypoglycemic Activity of *n*-Hexane, Chloroform, Ethylacetate, Acetone and Aqueous fractions of *Anacardium occidentales* Leaf Extract in Streptozotocin Induced Diabetic Rats**

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ABSTRACT

Herbal remedies for diabetic treatment have gained popularity globally due to numerous side effects of the orthodox drugs. This study was designed to evaluate the hypoglycemic potentials of the various fractions of *Anacardium occidentals* leaf extracts in streptozotocin induced diabetic rats. Partitioning of the crude methanol extract was carried out by solvent-solvent extraction method. Induction of diabetes was performed by a single intraperitoneal injection of streptozotocin dissolved in 0.1 mL fresh cold citrate buffer at pH 4.5 at a dose of 45 mg/kg body weight. The dose of fractions administered were200 and 400 mg/kg body weight. The result of the hypoglycemic effect showed that rats administered Glibenclamide had 65.10 % ± 2.36 activity and animals administered 400mg/kg body weight of ethylacetate fraction had the highest percentage glucose reduction of 56.54%± 2.57 followed by chloroform fraction (55.47 % ± 3.46), acetone (28.02 % ± 3.72)and aqueous fraction 2.08 % ± 3.78. All *Anarcardium occidentales* fractions with the exception of aqueous fraction caused significantly ($p<0.05$) hypoglycemic effect in dose dependent manner. In animals treated with200 mg/kg body weight, the hypoglycemic effect of the Chloroform fraction was significantly ($p<0.05$) higher than the other fractions. *Anarcardim occidentales* fractions have some hypoglycemic potential and could be further processed towards the management of diabetes mellitus

Keywords: Streptozotocin, Intraperitoneal, Glibenclamide, Diabetes mellitus, *Anarcardim occidentales*

ED030

Evaluation of Immunomodulatory Potential of *Adansonia digitata* in Wistar Albino rats

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ABSTRACT

The rise in immunosuppressive diseases has led to the demand for drugs that can regulate the immune system. This study was aimed at evaluating the immunomodulatory potentials of *Adansoniadigitata*in albino rats. The phytochemical contents of the methanolic seed extract were determined using acid-base titrimetric method for alkaloid content, Folin-Ciocalteu method for phenol content, aluminum chloride colorimetric method for flavonoid content and Folin Denis reagent for tannin content. The animals were divided into 5 groups of 6 animals each. The immune system of all the animals except the positive control was suppressed using 200 mg/kg bwt of cyclophosphamide prior to treatment. Group 1 received normal saline, group 2 servedas the negative control, group 3 received levamisole 40 mg/kg bwt while group 4 and 5 received 150 and 250 mg/kg bwt of methanolic seed extract of *A. digitata* respectively for 7 days. The immunomodulatory potential was evaluated using delayed-type hypersensitivity test for cell-mediated responses, hemaglutinationtiter for humoral response and the haematological profile. Increase in paw thickness was observed after immunization and challenge with sheep red blood cell in all groups which lasted for 24 hours and began to clear began after 48 hours as indicated by decrease in paw volume. The extract at 150mg/kg produced a significant increase in hemaglutination titer values (3.19±0.06) and significant increase in white blood cell count, red blood cell count, packed cell volume, neutrophils, lymphocytes and monocytes. Thus, *A. digitata* seed extract acted as a promising immunomodulatory drug by stimulating both innate and adaptive immunity as inferred from the results of haematological parameters, cell-mediated and humoral responses.

Keywords: Immunomodulatory, Cell-mediated, Humoral response, *Adansonia digitata*

ED031

Antivenom Effect of *Sterculia setigera* against *Naja nigricollis* Venom-Induced Albino Rats Mortality

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ABSTRACT

Snake envenomation is a neglected public medical issue in developing countries, with high mortality rate. This study aimed to investigate the anti-snake venom activity of the methanolic root bark extract of *Sterculia setigera* and its fractions against *Naja nigricollis* venom-induced mortality. The crude extract was fractionated based on liquid-liquid fractionating method. The crude extract and its fractions were pre-incubated with minimum lethal dose (LD99) of the venom at 37^0C for 1h. Twenty-seven albino rats were allocated into two major groups A and B. Group A was further subdivided into four groups with three rats each designated as A1-A4. Groups A2-A4 received 100, 200 and 300 mg/kg of the extract respectively for seven days orally, before injection of the venom. Group B was further subdivided into five groups of three rats each; designated as B1-B5. Group B3, B4 and B5 received 100mg/kg of the dichloromethane (DCM), ethylacetate (EA) and aqueous methanol (AM) fractions incubated each with LD99 (10 mg/kg) of the venom, while group B2 received only the anti-venom and group B1 received only normal saline. LD99 of thevenom produced 100% death in groups A1 and B1. However, 300mg/kg of extract offered 33.3% protection to rats in group A, but could not protect rats from death. The AM fraction significantly increased the mean survival time of the rats but could not protect the rats from death. The anti- snake venom offered 100% protection to rats in group B2. All together, the results highlight the anti-snake venom potential of *Sterculia setigera*

Keywords: Snake envenomation, *Sterculia setigera, Naja nigricollis,* Anti-snake venom

ED032

Effect of *Ximenia americana* Stem Bark Extract and Fraction on *Salmonella typhi* - Infected Rats

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ABSTRACT

Typhoid/enteric fever remains a major public health problem in developing countries giving rise to intestinal perforation if poorly treated or untreated. The anti-typhoid efficacy and safety of *Ximenia americana* stem bark extracts on the nephrocytes, hepatocytes, and haematological parameters of *Salmonella typhi* infected Wistar albino rats was evaluated. Experimental rats in their respective groups were infected with *S. typhi* while group 1 were uninfected. Group 2 were not treated, group 3 were treated with the standard drug (ciprofloxacin), while groups 4, 5, 6 were treated with (100, 200, 300) mg/kg bodyweight of the methanol extract of *X. Americana* stem bark, and groups 7, 8 and 9 were treated with (100, 200, 300) mg/kg bodyweight of the ethyl-acetate fraction of *X. americana* stem bark for 7 days. *Salmonella* infection led to a significant ($p<0.05$) increase in serum urea, sodium, chloride levels, bilirubin concentration, total white cell count and activities of the liver enzymes as compared to normal and apparently healthy rats. A significant ($p<0.05$) decrease in PCV, haemoglobin concentration, RBC count, serum potassium, total protein and creatinine levels of the infected groups was observed as compared to the normal uninfected group. The administration of both extract and fraction was accompanied by a significant ($p<0.05$) dose-dependent decrease in serum electrolytes and alkaline phosphatase in the treated groups. *X. americana* could be a safe natural alternative therapeutic source for enteric fever.

Keywords: *Ximenia Americana*, S*almonella typhi*, Enteric fever; Extracts; Experimental rats.

ED033

Isolation, Characterization and Antidiabetic Evaluation of Leaves Extracts of *Vernonia glaberrima* in Streptozocin-Induced Diabetic Rats

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ABSTRACT

Diabetes mellitus (DM) is a metabolic disorder with symptoms of chronic hyperglycaemia and disturbances in metabolism of carbohydrates, fats and proteins due to insulin deficiency, insulin resistance or inability of β-cells of pancreas to produce insulin. A variety of plants from different part of the world have been investigated for anti-diabetic effects. The aim of the study is to isolate and characterize antidiabetic agents from the leaves extracts of *Vernonia glaberrima* in streptozocin induced diabetic Wister rats. The Methanol crude extract was sequentially extracted with Ethyl acetate, chloroform and finally hexane. The chloroform fraction, as the most potent antidiabetic activity was subjected to isolation of antidiabetic agents using chromatographic techniques. All the fractions and pure compounds were screened for antidiabetic activity in streptozotocin induced diabetic rats by estimating serum glucose level and lipid parameters. The isolated bioactive component was elucidated on the basis of extensive spectroscopic (UV, IR, 1H and 13C NMR) data analysis. The bioactive fraction was found to be potent antidiabetic by ameliorating glucose and lipid parameters (total cholesterol, triglycerides, low and high density lipoprotein cholesterol). The extensive spectroscopic data analysis reveals that, the isolated bioactive compound elucidated to be lupeol. Our study concluded that, *lupeol* isolated from leaves extracts of *Vernonia glaberrima*has a great anti-diabetic potential.

Keywords: Diabetes, Lupeol, Chloroform, *Vernonia Glaberrima*

ED034

Effect of Alkaloids - Rich Fraction of whole Plant Extract of *Centaurea perrottetii* D.C. on some Selected Bacteria Strains

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ABSTRACT

Increasing resistance to antibiotics by antibiotic- resistance pathogens has been a major concern over the years. This has led researchers to continuously exploit plant for the discovery of new and effective antibacterial agents. Studies have shown that alkaloid, useful secondary metabolites possess several antimicrobial and other pharmacological activities. This study aimed at evaluating the effect of the alkaloid-rich phase/fraction of the whole plant extract of *Centaurea perrotetii* on *Bacillus subtilis*, *Staphylococcus aureus*, *Escheria coli* and *Pseudomonas aeruginosa*. Preliminary phytochemical screening and TLC analysis were carried out on the alkaloid fraction. Agar-well diffusion and nutrient broth dilution methods were selected for the assessment of antibacterial activity. The diameter zone of inhibition ranges from 3 - 17 mm against all tested organisms. The Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) was found to be 50 mg/mL and 100 - 200 mg/mL respectively. The result of this research shows that, the plant contains alkaloids with potent antibacterial activities and this validates its ethno-medicinal use in bacterial infections.

Keywords: Antibacterial, Whole plant, *Centaurea perrottetii*, Alkaloid, Antibiotics

ED035

Cardioprotective Effects of Methanol Extract of *Sclerocarya birrea S*tem-Bark on Doxorubicin Induced Myocardial Infarction in Rats

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ABSTRACT

Diverse use of *Sclerocarya birrea* stem bark in Africa is attributed to its biological and pharmacological properties in treating numerous ailments. This study was designed to investigate the protective effect ofmethanol extract *S. birrea*stem bark on doxorubicin induced myocardial infarction in rats. Group 1 were orally given normal saline only for 16 days. Group 2 were pre-treated with normal saline for 14 days followed by a single dose of DOX at 20 mg/kg body weight. The extract of *S. birrea*at doses (200, 400 and 600 mg/kg body weight), respectively was orally administered for 14 days followed by a single dose of DOX at 20 mg/kg body weight intraperitoneally. On the 16th day, rats were anaesthetised for ECG recordings and serum was collected to estimate cardiac marker enzymes; troponin (TROP), myoglobin (MYO), creatine kinase-MB isoenzyme (CK-MB) and aspartate aminotransferase (AST). DOX treated rats showed significant increase($P< 0.05$) in the heart rate (HR), prolonged QT, QTc, PR interval, QRS complex, P and T wave, and PR interval compared to the normal control. These ECG abnormalities have significantly ($p< 0.05$) decreasedby pretreatment with *S. birrea* extract in a dose-dependent manner. Similarly, significant decrease ($P< 0.05$) in serum TROP, CK-MB, MYO, and AST was observed in groups pretreated with extract of *S. birrea*stem bark in a dose dependent manner. Histopathological alterations of *S. birrea* pretreated groups showed dose dependent gradual improvement and protection against myocardial toxicity induced by doxorubicin. In conclusion, results from electrocardiographic, biochemical, and histopathological parameters indicates that *S. birrea* provided cardioprotection against DOX toxicity.

Keywords: Doxorubicin, *Sclerocarya birrea,* Myocardial infarction, Electrocardiographic, Chemotherapeutic,

ED036

In vitro Antioxidant and Anti-diabetic Activities of Ethanolic Leaves Extract of *Blighia sapida* (K.D. Koenig)

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ABSTRACT

Diabetes mellitus still remain a major health challenge particularly in sub-Saharan Africa. Ethanoic leaves extract of *Blighia sapida* was investigated for its antioxidant and anti-diabetic activities *in vitro*. *B sapida* pulverized dried-leaves were extracted with absolute ethanol (99.8%) and screened for chemical constituents using standard methods. The antioxidant activity of the extract on 1,1 dipheyl-2-picryhydazyl (DPPH), hydrogen peroxide(H_2O_2) radical and ferrous ion metal cheating as well as itsanti-diabetic effect on alpha-amylase and alpha-glucosidaseat varying concentrations (0.0312, 0.06125, 0.125, 0.25, 0.5 and 1 mg/ml) was investigated *in vitro*. The extract demonstrated a dose-dependent DPPH, H_2O_2 radical and metal chelating inhibitory activity similar with ascorbic acid and EDTA used as the reference antioxidant agents but with only a stronger inhibition for H_2O_2 radical than the reference drug.The *in vitro* effect of the extract on alpha-amylase and alpha-glucosidase activitieswere also dose-dependent and similar to acorbose used as the reference anti-diabetic drug. It demonstrated a significantly ($p < 0.05$) mild inhibitory activity againstα-amylase as opposed a stronger inhibition on α-glucosidase activity, a similar characteristic exhibited by the

reference agent (acarbose). The study concluded that the antioxidant and anti-diabetic activities exhibited by the ethanoic leaves extract of *B. sapida*is owed to the presence of alkaloids, tannins, flavonoids and phenolsas the chemical constituents identified in the extract and whose anti-diabetic activity has been substantially reported in literature, thus suggesting *B. sapidia* as a potential alterative in the discovery of new drugs for the management of diabetes.

Keywords: Diabetes mellitus, *Blighia sapida*, Antioxidant, Free radical, Amylase, Glucosidase

ED037

Borassus aethiopum (Mart.) Ethanol Fruit Extract Reverses Alloxan-Induced Changes in Wistar Rats

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ABSTRACT

This study was aimed at evaluating the antidiabetic activity of ethanol fruit extract of *Borassus aethiopum* (EFEBA) in alloxan-induced diabetic rats. A total of 36 rats were placed in six groups (A-F) of 6 animals each. Animals in group A (control) were administered 0.5 ml of distilled water while those in groups B, C, D, E and F which were induced with diabetes (by administration of 150 mg/kg body weight [b.w] of alloxan) were also administered distilled water, 50 mg/kg b.w of metformin, 25, 50 and 100 mg/kg b.w of EFEBA respectively, once daily for 14 days. Blood glucose, urea, insulin, hexokinase among others were determined after treatment. Using the Harborne method, flavonoids,anthraquinones, alkaloids, saponins, phlobatannins,phenolics and cardiac glycosides were detected in the extract with flavonoid (24.04 mg/ml) occurring the most andphenolic (0.35 mg/ml) the least. Alloxan notably ($p<0.05$) increased the levels of bloodglucose, serum urea, creatinine, albumin and cholesterol, liver activity of glucose-6-phosphatase as well as feed and waterintake. Body weight,insulin,weight of pancreas, red/white blood cell and their related indices, liver hexokinase activity were significantly reduced ($p<0.05$)by alloxan. However, the extract significantly ($p<0.05$) reversed all the alloxan-inducedchanges, with the extract at 100 mg/kg b.w giving values that compared ($p>0.05$) well with the distilled water treated non-diabetic animals and metformin treated diabetic animals.The extract also renewed the wholeness of histological damage in pancreas.

The study showed that *B.aethiopum*exhibited antidiabetic activity by reversing alloxan-treatment changes in the animals.

Keywords: *Borassus aethiopum*, Arecaceae, Diabetes mellitus, Insulin, Metformin

ED038

Effect of Aqueous Extract of Cauliflower Leaves on Serum Lipid Profile, Feed and Fluid Intake in Rats Fed High-Fat Diet

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ABSTRACT

Hyperlipidemia is a component of metabolic syndrome that is linked to increase risk of cardiovascular disease. The aim of the present study is to determine the antihyperlipidemic potential of Cauliflower leaves aqueous extract. Twenty-five wistar rats were grouped into five and treated for three weeks as follows: High-fat diet control (fed high-fat diet only), high-fat diet + Lipitor (standard drug, 71.0mg/kg), high-fat diet + Cauliflower extract (200mg/kg), normal control (fed normal diet only), and extract (200mg/kg) treated group. Feed and fluid intake were measured daily during the experimental period. At the end of the third week of treatments, the rats were humanely sacrificed and blood samples collected for biochemical analysis. Preliminary phytochemical analysis of the extract revealed the presence of alkaloids, anthraquinones, tannins, saponins, and triterpenes. There was significant ($p<0.05$) decrease in feed intake in all the treated

animal groups when compared to normal control. There was no significant difference ($p<0.05$) in percentage bodyweight and HDL-Cholesterol in all the animal groups. However, there was significant ($p<0.05$) increase in serum total cholesterol and triglycerides in high-fat diet control group compared to other groups, but there was no significant difference between the normal and extract treated group as well as those fed high-fat diet and treated with Atorvastatin (Lipitor®) or extract.It was concluded that aqueous extract of Cauliflower leaves do not exhibit antihyperlipidemic activity at 200mg/kg dose for three weeks in wistar rat model.

Keywords: Cauliflower leaves, Hyperlipidemia, High-fat diet, Antihyperlipidemic activity, Wistar rats

ED039

Effect of Sicklo-N200 in the Management of Sickle Cell Anaemia

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ABSTRACT
Sickle cell anaemia (SCA) is a major public health concern and its management has remained inadequate. This study investigated the effect of a nutraceutical Sicklo-N200 in the management of SCA. Thirty nine (39) patients were recruited, randomly divided into 3 groups and administered placebo, and 2.5 g and 5 g of Sicklo-N200, respectively. Foetal haemoglobin (HbF), haemoglobin polymerisation rate and Fe^{2+}/Fe^{3+} ratio were analyzed before treatment and monitored every 4 weeks for 12 weeks using standard analytical procedures. HbF levels of patients treated with both doses of Sicklo-N200 were found to increase significantly ($P<0.05$) after 8 and 12 weeks of treatment. Significant ($P<0.05$) decreases in haemoglobin polymerisation rates of patients administered 2.5g and 5g of Sicklo-N200 were observed at weeks 12 and 8 of treatment, respectively. Both treatment groups showed significant increase in Fe^{2+}/Fe^{3+} ratio. Placebo had no significant effects on HbF, haemoglobin polymerisation rate and Fe^{2+}/Fe^{3+} ratio. This study showed that Sicklo-N200 had antisickling effects.

Keywords: Sicklo-N200, Sickle cell anaemia, Haemoglobin, Antisickling

ED040

Phytochemical and Ameliorative Effect of Methanol Extract of *Sclerocarya birrea S*tem Bark Against Doxorubicin-Induced Cardiotoxic Rats

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ABSTRACT
Sclerocarya birrea also known as "marula'' has gained substantial attention across Africa in the areas for its abundant and ethnomedicinal potentials. This study was designed to investigate the phytochemical properties and antioxidant potential of methanol extract of *S. birrea*stem bark on doxorubicin-induced rats.Normal group rats were orally given normal saline only for 16 days. Group 2 rats were pre-treated with normal saline for 14 days followed by a single dose of DOX at 20 mg/kg body weight. The methanol extract of *S. birrea*at doses (200, 400 and 600 mg/kg body weight) respectively, was orally administered for 14 days followed by a single dose of DOX at 20 mg/kg body weight intraperitonially. After anesthetizing the animals on the 16th day, the heart tissues were isolated and homogenised for biochemical assays. Quantitative studies revealed that the plant is rich in secondary metabolites such as tannins, total phenol compounds, saponins, flavonoids and alkaloids were (51.98, 12.58, 7.71, 4.49, and 2.58 mg %) respectively. Vitamin E content was 7.084 mg %. The extract showed maximum DPPH inhibition of 86.3 %, which is equal to that of

ascorbic acid used as reference. Cardiotoxocity was confirmed by marked increase in tissue MDA level in DOX treated group while activities of antioxidant maker enzymes, catalase (CAT), superoxide dismutase (SOD) and reduced glutathione (GSH) level were significantly decreased (P< 0.05). Pretreatment of *S. birrea* resulted in significant increase (P< 0.05) in the cardiac antioxidant enzymes and significantly inhibited DOX-provoked increase in MDA level in the cardiac tissue in a dose dependent manner compared to DOX treated group. These results suggested that the secondary metabolites and high antioxidant capacity of *S. birrea*stem bark could attribute to its ameliorative effect.

Keywords: *Sclerocarya birrea,* Ethnomedicinal, Secondary metabolites, Cardiotoxicity, DPPH.

ED041

Effect of Homogenates of *Persea americana* Seeds and *Telfairia occidentalis* Leaves Co-Administered with Anti-Tuberculosis Drugs on Liver Enzymes of Albino Rats.

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ABSTRACT

This study was designed to evaluate the effects of homogenates of *Perseaamericana*(avocado) seeds and *Telfairiaoccidentals* (fluted pumkin) leaves co-administered with anti-tuberculosis drugs on liver enzymes of albino rats. Twenty albino rats were divided into five groups of four rats each and designated I, II, III, IV and V (negative control). A dose of 51.4mg/kg body weight of first-line tuberculosis (TB) drugs (isoniazid, rifampicin, pyrazinamide and ethambutol) was administered orally to two (2) rats in group I, II, III, and IV for seven (7) days and the remaining two rats in each group for fourteen (14) days. Avocado pear seeds (at a dose of 250mg/kg/B.W), fluted pumpkin leaves (at a dose of 250 mg/kg/B.W), and a mixture of avocado pear seeds and fluted pumpkin leaves (at a dose of 125mg each per kg/B.W) were co-administered with the anti-TB drugs to group (II), (III) and (IV), respectively. Group (I) serve as a positive control. From the results obtained, it was observed that the values of AST, ALT and ALP were significantly higher ($p<0.05$) in rats administered with 51.4 mg/kg of first-line anti-tuberculosis drugs (negative control) when compared with rats co-administered with the same anti-TB drugs and 250 mg/kg plants homogenates (avocado pear seeds, fluted pumpkin leave) and a combination of the two (125 mg/kg each of avocado pear homogenate and fluted pumpkin leaves homogenate). The AST, ALT and ALP levels were found to decrease progressively in groups II, III, and IV. This result also showed that anti-tuberculosis drugs are hepatotoxic from the values of (AST: 47.2 ± 0.28, ALT: 54.05 ± 2.90 and ALP: 86.85 ± 0.21 mg/dl) obtained in group A (negative control) when compared with group E (positive control) values (AST: 10.15 ± 0.21, ALT: 10.01 ± 0.13 and ALP: 33.0 ± 32.9 mg/dl). There were no significant differences in the level of AST and ALT when compared with seven (7) days of treatment. From this work, it can be suggested that supplementation of avocado pear seeds and fluted pumpkin leaves in individuals on first-line anti-TB drugs may be beneficial as both plants proved to be hepatoprotective.

Keywords: *Perseaamericana, Telfairiaoccidentalis,* Tuberculosis, Liver enzymes

ED042

Effect of MS-7 Antioxidant-rich Supplement on Oxidative Stress in Lead-intoxicated Rats

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ABSTRACT

The present study aims to evaluate the protective and curative effect of MS-7 antioxidant-rich nutraceutical on lead-induced oxidative stress related toxicity in Wistar albino rats. Fifty animals were randomly divided into two groups of twenty five rats each (as protective and curative models). The animals in each of the model were further distributed into five groups containing five rats. Group 1 serves as the control and was

given distilled water throughout the study period. Group 2 served as the lead-induced group and was administered 60 mg/kg lead-acetate. Groups 3–4 were co-administered 60 mg/kg lead-acetate and 250 mg/kg and 500 mg/kg doses of the MS-7, respectively. Group 5 was administered 18.86 mg/kg standard drug in addition to 60 mg/kg lead-acetate. The study lasted for 28 days. Blood lead levels were determined using flame atomic absorption spectrophotometer. Activities of superoxide dismutase, catalase and glutathione levels were assayed using Cayman's commercial kits. The results showed that oral administration of MS-7 antioxidant-rich supplement at high doses significantly ($p < 0.05$) reduced blood lead levels, increased the activity of antioxidant enzymes, GSH levels and boosted the levels of minerals (Fe, Zn, Cu, and Se) and vitamins (A, C and E). Furthermore, MDA levels were reduced and consequently reduced lead-induced oxidative stress. The supplement could, therefore, be considered as having both protective and curative effects on lead-induced toxicity in Wistar albino rats

Key words: Lead, Nutraceuticals, Superoxide Dismutase, Catalase, Minerals

ED043

In-vitro and *In-vivo* Antidiabetic Activity of *Sterculia setigera* Methanol Stem Bark Extract in Alloxan-Induced Diabetic Rats

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ABSTRACT

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia, resulting from defects in insulin secretion, insulin action, or both. *Sterculia setigera* is a medicinal plant used traditionally to treat various diseases including diabetes.The present study is aimed at investigating the antidiabetic activity of the methanol stem bark extract of *Sterculia. setigera*. Phytochemical analysis and LD_{50} were determined using standard methods. *In vitro* studies were carried out using α-amylase and haemoglobin glycosylation inhibition assay. The sub-chronic effect of *Sterculia setigera* methanol stem bark extract on body weight, antidiabetic,antioxidant, lipid profile, and histopathology were evaluated in Alloxan-induced diabetic rats, respectively. The results of phytochemical screening detected the presence of flavonoids, tannins, steroids, saponins, cardiac glycosides, terpenoids, and phenols and acute toxicity study of *Sterculia setigera* extract did not show mortality in the animals at the limit dose of 5000 mg/kg during the 14 days observation period. In the *invitro* study, *Sterculia setigera* exhibited a dose-dependent increase in percentage inhibition of α-amylase and haemoglobin glycosylation, respectively. In the *in vivo* study, alloxan was capable of inducing diabetic conditions as there was a significant increase ($P<0.05$) in the FBS of the entire induced groups compared to normal control. Groups treated with crude extract of *Sterculia setigera* (100-400mg/kg) and the standard drug (glibenclamide) showed a significant decrease ($P>0.05$) in FBS compared to diabetics control. There were significant reductions ($p<0.05$) in serum TC, TG, VLDL, LDL,CAT, SOD, GPx, Vitamin E, Vitamin A, and MDA against diabetic control. On the other hand, significant increments ($p<0.05$) in body weight and HDL were observed in the treated groups compared to diabetic control diabetic. Histopathological examination showed improvement in the regeneration of pancreatic β-cells islets. In conclusion, *Sterculia setigera* stem bark extract exhibit hypoglycaemic, hypolipidemic, and antioxidant effects justifying its ethnomedicinal use for the treatment of diabetes.

Keywords: Antidiabetic,*Sterculia setigera*, Hypolipidemic, Antioxidant, Glibenclamide, α-Amylase

ED044

Hypoglycemic, Hypolipidemic and Antioxidant Activities of Methanol Leaf Extract of *Annona squamosa* in Alloxan-Induced Diabetic Rats

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ABSTRACT

Annona squamosa is a medicinal plant that has been traditional used in the management of many diseases including diabetes mellitus. The aim of this research was to evaluate the hypoglycemic, hypolipidemic and antioxidant potentials of methanol leaf extract of A*nnona squamosa* in alloxan-induced diabetic rats. The phytochemical screening was carried out using standard procedures. The extract (100, 200 and 400 mg/kg body weight) was administered orally to alloxan-induced diabetic rats for 21 days. Hypoglycemic effects, change in body weight, lipid profile and antioxidant activities of diabetic rats treated with the extract were assessed and compared with normal, diabetic control and standard drug treated rats. Histological examination of the pancreas during 21 days of treatment was also carried out.The extract produced a significant reduction in fasting blood glucose level in alloxan-induced diabetic rats. Significant differences were also observed in body weights, serum lipid profile and levels of antioxidant vitamins and enzymes of diabetic rats treated with the extract when compared with the control rats. Histopathological studies of the pancreas showed comparable regeneration of the cells by extract which were earlier necrosed by alloxan. Methanol leaf extract of *Annona squamosa* exhibit significant hypoglycemic, hypolipidemic and antioxidant activities in alloxan-induced diabetes in rats. The extract could be further processed towards the management of diabetes mellitus

Keywords: Alloxan, Intraperitoneal, Methanol, Diabetes mellitus, Antioxidants, *Annona squamosa*

ED045

Isolation and Characterization of an Antifertility Agent from *Dalbergia saxatilis* Methanol Leaves Extract

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ABSTRACT

Contraception is the deliberate use of artificial methods or other techniques to prevent pregnancy as a consequence of sexual intercourse. Modern contraceptive methods have been shown to possess side effects and as such the search for antifertility agents devoid of side effects is necessary. This research was aimed at evaluating the contraceptive effect and characterisation of *Dalbergia saxatilis* methanol leaves extract in female albino rats. Phytoconstituents screening was carried out using standard laboratory methods. The contraceptive effect was evaluated via anti-ovulation, anti-implantation and hormonal assay, respectively in female albino rats. Isolation of phytoestrogen and polyphenols was done using standard procedures and the residue obtained was subjected to HPLC and GCMS analysis, respectively. The results revealed the presence of alkaloids, flavonoids, saponin, saponin glycoside, glycoside, cardiac glycoside, tannins and steroids. Balsams, anthraquinone and terpenoid were not detected. Subchronic (21 days) administration of *Dalbergia saxatilis* methanol leaves extract exhibited reduction in serum progesterone and oestrogen levels significantly ($p<0.05$) at 300 mg/kg bw and 600 mg/kg bw when compared with normal control. The standard drug exhibited significant reduction ($p<0.05$) in serum hormone levels than the extract-treated groups. The antiovulation effect also showed a significant reduction ($p<0.05$) in the number of follicles in a dose-dependent manner while the implantation effect of the extract on the uterus showed that the endometrial thickness reduced significantly ($p<0.05$) in a dose-dependent manner. The HPLC chromatogram of the extract showed ten major peaks representing ten different isolated compounds with the highest retention time (RT) being 26.97 mins and the lowest being 13.82 mins. The identities of the compounds were hexadecanoic acid, methy-l-ester (270.3), 9,12-octadecadienoic acid (z,z)-methyl ester

(294.3), trans-13-octadecenoic acid, methyl ester (296.3), 11-octadecenoic acid, methyl ester (296.1), methyl stearate (354.9), dispiro[2.1.2.2]nonan-8-one (281.0), methyl 18-methylnonadecanoate (354.9), 1,4-benzenedicarboxylic acid mono (1-methylethyl) ester (503.1), docosanoic acid, methyl ester (354.5), fumaric acid, pent-4-en-2-yl tridecyl ester (504.3), which some of them were identified as phytoestrogen based on the available literature. Therefore, the use of *Dalbergia saxatilis* as an antifertility agent in traditional medicine has a pharmacological basis and this research validates the traditional claim.

Keywords: Antiovulation, Anti-implantation, Phytoestrogen, *Dalbergia saxatilis*

ED046

In Vitro Anti-Cancer Effect of *Senna alata* on HT-29 Cell Line

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ABSTRACT

Colorectal Cancer (CRC) is the third most common cancer worldwide in men and women, the second leading cause of deaths. The desire to produce more effective but less toxic drugs fuels the continuous search for new bioactive compounds from plants extracts that are abundant in nature, safer and easily accessible which can serve as an alternative for cancer management. The study investigates the anticancer effect of methanol extract of *Senna alata* and its fractions. The phytochemical composition, acute oral toxicity (LD_{50}) and the brine shrimp lethality (LC_{50}), the ethyl acetate and n-hexane fractions were determined at different concentrations. The cell cytotoxicity of the crude extract was determined using colorectal cancer cell line (HT-29) at doses of 50, 100, 250, 500 and 1000 µg/ml for 24 h and 48 h exposure. ATP assay was carried out to establish the number of cells that survived after treatment. Phytochemical analysis revealed the presence of phenols (397.70±1.01 mg/g), flavonoids (138.56±0.09 mg/g), tannins (43.12±0.29mg/g), alkaloids (185.07±0.33 mg/g) and saponins (282.50±1.59 mg/g. In the brine shrimp lethality tests, the ethyl acetate extract with an LC_{50} of 1.30 µg/ml, exhibited a significantly higher cytotoxicity activity ($p<0.05$) than methanol, n-hexane and aqueous fractions with an LC_{50} of 17.87 µg/ml, 6.17 µg/ml and 57.80 µg/ml, respectively. The crude methanol extract at 1000 µg/ml exhibited 87% cytotoxicity against HT-29 cell line when exposed for 24 h and 90% at 48 h of exposure. The ATP assay result showed a dose-dependent activity of the crude methanol extract with an IC_{50} of 85 µg/ml. It can be concluded from the result obtained that the ethyl acetate fraction of *Senna alata* significantly ($p<0.05$) reduced the proliferation of HT-29 cell lines and thus, could serve as a potential tool in developing drugs to manage CRC and its complications.

Keywords: Colorectal Cancer, Cytotoxicity, HT-29, Lethal dose, Lethal concentration

ED047

In Vitro Anti-Cancer Effect of *Commiphora kerstigii* on PC-3 Cell Line

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ABSTRACT

Prostate Cancer (PC) is the most commonly diagnosed solid tumor in men and the second leading cause of cancer-related deaths. Plant-based remedies are getting more utilized for the management and treatment of diseases including cancers especially in developing countries not only due to their fewer side effects but also due to their low cost compared to allopathic drugs. This study investigated the anticancer effect of methanol extract of *Commiphora kerstingii* and its fractions. The phytochemical composition, acute oral toxicity (LD_{50}) and the brine shrimp lethality (LC_{50}) of the crude methanol extract and the ethyl acetate and n-hexane fractions were determined at different concentrations. The cytotoxicity of the crude extract was determined using Prostate Carcinoma Cell line (PC-3) at doses of 50, 100, 250, 500 and 1000 µg/ml for 24h and 48h exposure. ATP assay was carried out to establish the number of cells that survived after treatment.

Phytochemical analysis revealed the presence of phenols (803.77±0.12 mg/g), saponins (357.03±0.02 mg/g), tannins (278.72±0.63 mg/g), flavonoids (121.84±0.11 mg/g) and alkaloids (40.47±0.15 mg/g). In the brine shrimp lethality tests, the crude methanol extract with an IC_{50} of 4.13 µg/ml exhibited a significantly higher cytotoxicity activity than ethyl acetate and aqueous fractions with an LC_{50} of 32.44 and 149 µg/ml, respectively ($P<0.05$). The crude methanol extract at 1000 µg/ml exhibited 80% cytotoxicity against PC-3 cell line when exposed for 24 h and 90% at 48 h of exposure. The ATP assay result showed a dose-dependent activity of the crude methanol extract with an $IC_{50}$of 113 µg/ml. It can be concluded from the result obtained that the crude methanol extract of *Commiphora kerstingii* significantly ($p<0.05$) reduced the proliferation of PC-3 cell lines.

Keywords: *Commiphora kerstingii,* PC-3, Brine shrimp lethality, Cytotoxic activity

ED048

Root Extract of *Mirabili jalapa* Stimulates Pancreatic Islet Cell Regeneration in Hyperglycemic Rats

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ABSTRACT

This study was designed to investigate the insulinotropic effect of root methanol extract of *Mirabilis jalapa* on alloxan-induced damaged islet cells. Experimental hyperglycaemicrats were treated daily with 200 and 400 mg/kgbw of the extract after initial fasting for 6 hours. Two hours postprandial glucose was monitored during treatment. After 21 days, the rats were sacrificed and blood collected was used for biochemical assessment of serum glucose levels using the glucose oxidase method and serum insulin levels using commercial ELISA kits. Histopathological examination of the harvested pancreas was also carried out. Result reveals a progressive drop in 2 hours postprandial glucose levels from 24.9±1.55 to 11.7±1.47 mmol/L for diabetic groups treated with the extracts when compared with the untreated diabetic group (26.9±4.33 to 28.2±3.5 mmol/L). An increase in insulin levels in diabetic ratstreated with the extract ranging between 8.4±0.4 to 9.2±0.6 mU/L was also observed. Histopathological examinations of the pancreas suggest regeneration of islet cells indicating the root methanol extract of *Mirabilis jalapa* has insulinotropic potential by revitalization of damaged islet cells thereby regulating postprandial hyperglycemia.

Keywords: *Mirabilis jalapa*, insulinotropic, Islet cells, Hyperglycemia, Postprandial glucose

ED049

Fertility Studies on Aqueous and Ethanol Root Bark Extracts of Feretia apodanthera Del in Streptozotocin-Induced Diabetic Male Wistar Albino Rats.

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ABSTRACT

Feretia apodanthera is locally use as food, medicine and cosmetics. Fertility studies on root bark extracts of *F. apodanthera* in streptozotocin induced Diabetic Male wistar Albino rats was investigated. Aqueous and ethanol extracts of root bark of *F. apodanthera* were phytochemically screened. Rats were randomized into seven groups and administered orally with extracts and standard Drugs (Sildenafil Citrate) for 21-days. Group I serve as a normal control, Group II serve as diabetic control, Group III and Group IVdiabetic rats treated with 100mg/kg b.w and 200 mg/kg b.w aqueous extract of *F. apodanthera*, respectively. Group V and Group VI, diabetic rats received 100mg/kg b.w and 200 mg/kg b.w of ethanol extract of *F. apodanthera*, respectively. Group VII diabetic rats received 5 mg/kg b.w of sildenafil citrate. After 21-days, Glucose, Urea, Creatinine, Lipid profiles and artherogenic risk predictors were determined. Testosterone, and sperm parameters (Count, motility and viability) were also determined. Phytochemical screening shows the

presence of saponin, tannins, cardiac glycosides, alkaloids, carbohydrate and triterpenes while anthraquinone was not detected in both aqueous and ethanol extracts. Fasting blood glucose, urea, creatinine, Total cholesterol and Triglycerides were significantly ($p<0.05$) higher while HDL (except for ethanol extracts) were significantly ($p<0.05$) lower in diabetic control when compared with the normal and treated groups. HDL was significantly ($p<0.05$) increased in treated groups except for ethanol extract when compared to Diabetic Control. The result of testosterone shows that diabetic control group were significantly ($p<0.05$) lower in the testosterone level when compared with normal control and treated groups. Sperm quality (count, motility and viability) were significantly ($p<0.05$) lower in diabetic control compared with the normal control and treated groups. The result suggest that root bark extracts of *Feretia apodanthera* possesses significant fertility properties among other therapeautic values justifying its use in folklore medicine.

Keywords; Streptozotocin, *Feretia apodanthera*, Diabetes, Rats, Root bark

ED050

Ameliorative effect of Phenolic Rich-Extract of *Terminalia catappa* Ripped Fruits on $CuSO_4$-Induced Neurotoxicity in *Drosophila melanogaster* Model

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ABSTRACT
Several environmental toxicants including Copper oxide contribute to the rise in oxidative stress cases that result in development of various neuropathological conditions. *Drosophila melanogaster* remains an effective model for biomedical researches and drug discovery worldwide. Thus, in this study, phenolic rich extract of *T. catappa* was used to protect $CuSO_4$ -induced oxidative damage and neuronal degeneration in *D. melanogaster.* Flies were pre-treated with the extract at different concentration for acute toxicity and survival studies respectively. The flies were also fed with the extract at 50 mg and 100 mg per 10 g diet for seven days (7) and exposed to $CuSO_4$ for seven days (7) thereafter to explore the extract effect on behavioral changes and biomarkers level in the flies. The result revealed that the extract is nontoxic to the flies even at the highest concentration and the $CuSO_4$ successfully induced neurotoxicity at 1mM concentration. Reduced locomotive activities, decrease in the activities of Catalase, Acetylcholinesterase, Glutathione-S-transferase (GST) and Superoxide Dismutase (SOD) as well as altered level of Total thiol, H_2O_2 and Nitric Oxide were observed in the flies fed with $CuSO_4$ prior to the extract administration. However, the phenolic-rich extract of protected the neuronal damage caused by $CuSO_4$ via enhancement of locomotor activity and improved survival rate of the flies. Activities of antioxidant enzymes in the flies were improved significantly when flies were fed with the extract after 7 days exposure to $CuSO_4$. Thus, , our findings showed that dietary feeding of phenolic-rich extract of *T. catappa* ripped fruit reversed the noxious effect of the environmental toxicant in the flies.

Keywords:*Drosophila melanogaster,* Neuroprotection; Neurotoxicity, *Terminalia catappa*

ED051

Ameliorative Effect of *Adansonia digitata* Fruit Pulp Methanolic Extract on $CuSO_4$-Induced Oxidative Damage in*Drosophila Melanogaster* Model

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ABSTRACT
Adansonia digitata known as Baobab which belongs to the family *Bombaceae* has popular ethno medicinal uses in the treatment of anti-inflammatory, Nervous system disorders. *A. digitata* possesses antioxidant, anti-inflammatory and anti-depressant-like properties. This study was designed to evaluate ameliorative

effect of *A.digitata* fruit pulp methanolic extract in Copper oxide-induced neurotoxicity in *Drosophila melanogaster*model (Fruit flies). Adult, wild type fruit flies were fed with *A. digitata* fruit pulp extract (40 and 50 mg/g of diet) for 7 days prior to exposure to 1Mm $CuSO_4$. The results indicated that $CuSO_4$fed flies had reduced survival rate compared to the control group. Copper toxicity was also associated with a marked decrease in survival rate, locomotive and cognitive function of the flies as evident in the negative geotaxic and emergence rate assays. Catalase andglutathione s-transferases (GST) activities as well as level of hydrogen peroxide (H_2O_2) in the flies were influenced by the extract. The normalcy in the biochemical parameters of the flies fed with noxious agent was restored after 7 days treatment with the extract. *A digitata*fruit pulp extract prevent oxidative damage in the flies as evidenced by the survival rates. Our findings thereforerevealed the robustness of*A. digitata* fruit pulp extract in ameliorating the neurotoxic effect of environmental toxicants in*D. melanogaster* which could be investigated further for more evidence.Thus, the pulp may be considered a promising agent for the prevention of the disorders where oxidative stress was implicated.

Keywords: *Adensonia digitata*, Ameliorative effect, Neurotoxicity

ED052

In Vitro Anti-Cancer Effect of *Prosopis africana* Stem Bark Extract on Breast Cancer Cell Line (MCF7)

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ABSTRACT

Breast cancer is the leading cause of cancer deaths among women globally. Current anticancer drugs and therapies cause certain side effects and have their limitations. These necessitate a search for more efficient anticancer agents from plant extracts that are abundant, accessible and cheaper compared to conventional treatments. This study was designed to evaluate the anticancer effect of stem bark extract of *Prosopisafricana* on MCF7. The Phytochemical compositions of the crude methanolicextract of *P.africana* revealed the presences of Phenols (848.78±0.29), Saponins (236.27±0.68), Tannins (560.23±0.77), Flavonoids (65.65±0.06) and Alkaloids (105.72±0.04). Acute oral toxicity (LD_{50}) of the crude methanolic extract was determined at a different concentration for 24hrs and 48hrs, with no toxicological evidence. Fractionation of the crude methanolic extract of *P. africana* was carried out using n-hexane, ethylacetate and water. Brine shrimp lethality test revealed that the aqueous fraction with an LC_{50} of 9.20 µg/ml exhibited significantly higher cytotoxic activity than the other fractions. The cytotoxicity effect of the aqueous fraction was determined using MCF7 at 50, 100, 250, 500 and 1000µg/ml concentrations for 24hrs, 48hrs consecutively. ATP assay was carried out to determine the number of surviving cells after treatment. The aqueous fraction at 1000µg/ml exhibited 88% cytotoxicity against MCF7at 24hrs and 91% after 48hrs. The ATP assay result shows a dose dependent activity against MCF7 ($P<0.05$), with aninhibitory concentration (IC_{50}) of 543µg/ml. In conclusion, the results revealed that the aqueous fraction of *P.africana* significantly reduced the proliferation of MCF7.

Keywords:*P. africana*, MCF7, Brine shrimp lethality, Cytotoxicity, ATP assay.

POSTER PRESENTATION

ED053

Bioactive and Cytotoxic Potentials of *Ficus asperifolia* and *Phyllantus amarus* Aqueous and Ethanolic Leaf Extracts using Brine Shrimp (*Artemia salina*) Model

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ABSTRACT

The bioactive and cytotoxicity studies of *Ficus asperifolia* and *Pyllanthus amarus* were investigated. Aqueous and ethanolic leaf extracts were used for phytochemical studies and cytotoxicity using brine

shrimps (artemiasalina) model, while the leaf powders were used for mineral determination using standard methods. The results showed presence of alkaloids, saponis, tannins, cardiac glycosides, anthocynins, terpenoids and triterpenes in aqueous extracts of both plants while phenolics, alkaloids, flavonoids, saponin, coumarins, phlobatannins, glycosides, terpenoids, triterpe and fixed oil are present in ethanolic extracts of the plants. Flavonoid, steroids and coumarins were not detected in aqueous extracts of both plant leaves. The findings further showed substantial amount of total phenolics, alkaloids, flavonoids, saponnins, tannins in aqueous extracts of both plant leavesand significant amount of coumarins, anthocynins, glycosides, steroids, terpenoids and triterpenes in aqueous and ethanolic extracts of both plant leaves. Both plant leaves had substantial amount of all selected major minerals (K, Na, Mg, Ca) and little amount of trace elements. Percentage lethality rate in ethanolic extract was more in aqueous extract in both extracts with increased hours of exposure to brine shrimps. The leaf extracts (AqFa, AqPa, EtFa, and EtPa with LC50 86.66, 44.51, 37.33 and 144.89 µg/ml, respectively, were relatively safe when compared with reference potassium dichromate of LC5030.30 µg/ml. This study therefore confirms and justifies the use of *Ficus asperifolia* and *Phyllanthus amarus* to cure physiological disorder amongst the people especially those in the rural communities.

Keywords: Bioctivity, Aqueous, Alcholic, Cytotoxicity, Lethality.

ED054

Phytopeptides as Antisnake Venom Agents: A Review

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ABSTRACT

About 5.4 million snakebites occur each year, resulting in 1.8 to 2.7 million cases of poisonous envenomation. Most of these occur in Africa, Asia and Latin America. The use of medicinal plants with antisnake venom activities might be useful in treating victims of snakebites; especially in rural areas where antivenins are not readily available. However, antivenins also have some disadvantages, thus limiting their efficient use. Therefore, alternative therapeutics needs to be investigated, with plants being considered as major source. Interest in bioactive peptides has considerably increased in the last decade. Apart from the better characterized glycoproteins from snakes and mammals which exhibit inhibitory properties against snake venom toxins, there are newly reported peptides isolated from some medicinal plants that are active against snake venom. This review focused on some isolated, purified and characterized phytopeptides with antisnake venom properties. These peptides include RW-12, WSG, β-Tumerin, Tumerin, BGS-Haridrin, Snakin-Z and MP-4, among others. It is important to note that the presence of these peptides and other compounds in plants gives a possible alternative for natural inhibitors of snake venom and could replace the conventional antivenins.

Keywords: Polypeptides, Antisnake venom, Medicinal plant, Snakebite

ED055

Traditional Medicine Practice Associated With Achieving Healthy Condition During Prenatal And Postpartum in Edo State.

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ABSTRACT

For centuries there have been proliferating interests in the role of traditional medicines, herbal remedies and herbal therapies by the World Health Organization (WHO) and health service authorities of developing and developed countries. In some developing and under developing countries, a sizable number of the population depends solely on herbal therapy for their primary healthcare needs, and would invariably use

these herbal products for the management of complications associated with pregnancy. The affordability of medicinal plants and therapy cannot be ascertained. This study is targeted at encouraging the use of traditional herbal therapy and the preservation of traditional knowledge through data compilation of herbs and challenges faced by practitioners. Oral interviews were conducted on ten (10) pregnant women, ten (10) mothers who used herbal medicine and therapies during and after childbirth and fifteen (15) traditional medicine practitioners (TMPs) in seven (7) towns within four (4) local government areas of Edo state. Results from this study showed that six (6) out of the ten (10) pregnant women use herbal medicine for the management of health-related issues associated with pregnancy. Some herbs used were: Billy goat weeds, Stool wood, Christmas rose, wire weeds, Bush candle tree and Christmas bush are used during prenatal. While plants like Bitter gourd, Boundary tree, Scent leaf and African fan palm amongst others are commonly used in postpartum. These were administered by all TMPs with good results. The need to create and archive information on the use of medicinal plants during and after pregnancy in form of a database for safe keeping should be encouraged by both the governmental and research institutions within Nigeria. There is a need to preserve the essential of traditional knowledge with the view of conserving their Traditional Knowledge in Edo state.

Keywords: Traditional Medicine, Traditional knowledge, Prenatal, Postpartum, Traditional Herbal therapy.

ED056

Effect of Ethanolic Leaf Extract of *Jatropha tanjorensis* on Serum Electrolytes Levels in Normal Albino Wistar Rats

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ABSTRACT

This study was aimed at investigating the effect of *Jatropha tanjorensis* the serum electrolyte levels in male albino wistar rats subjected to administration with coke drink. *Jatropha tajonrensis* is a popular medicinal plant that is reported to cure a wide spectrum of diseases. Twenty five male rats weighing between 109.5-126.2g were randomly divided into five groups of 5 rats in each group. Group I served as normal control and were sustained on normal rat chow and distilled water *ad* libitum. Group II was the negative control and was sustained with normal rat chow, distilled water and 1ml of coke only. Group III, IV and V were the treated groups and were given the same treatment as group II plus 250mg/kg body weight (b.w), 350mg/kg b.w and 450mg/kg b.w ethanolic leaf extract of *Jatropha tanjoorensis,* respectively for 30 days, after which the rats were sacrificed and blood samples collected. Serum analysis revealed a non-significant increase ($p>0.05$) in sodium and calcium levels in all the groups while potassium levels were non-significantly decreased ($p>0.05$) when compared to the normal. Bicarbonate level recorded a significant increase ($P< 0.05$) in all the groups when compared to the normal. Chlorides (Cl) in all the groups were not significantly affected compared to the normal. The negative control, showed a non-significant ($P> 0.05$) effect in all the test groups in all the parameters assayed. These results suggest that Coca cola has no significant effect on the serum electrolytes at the dose administered and that *Jatropha tajonrensis* may be effective at boosting blood bicarbonate levels.

Keywords: Electrolytes, *Jatropha tanjoorensis,* Coca cola, Albino Rats

ED057

Effect of Aqueous Leaf Extract of *Telfaria occidentitalis* on some Haematological Parameters in Aspartame Intoxicated Albino Wistar rats

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ABSTRACT

The effect of *Telfaria occidentalis,* a popular green leafy vegetable consumed widely for rich nutrient density and medicinal properties on male Albino wistar rats given aspartame, a non-sugar sweetener on some haematological parameters was investigates using 25 albino Wistar rats with body weight ranging from 94.0g – 114.2g.The rats were randomly assigned to 5 groups of 5 rats each. Group 1 was the normal control and was sustained on normal feed and distilled water only. Group 2 served as the test control and was given 50 mg/kg body weight (b.w) of aspartame, normal feed and distilled water. Group 3 was given 100 mg/kg b.w of *Telfaria occidentalis* extract. Group 4 and 5 were given 200mg/kg b.w and 300 mg/kg b.w of *Telfaria occidentalis* extract, normal feed, 50 mg/kg b.w of aspartame and distilled water respectively. At the end of 21 days, the rats were sacrificed and blood sample collected for haematological assay. The resultrevealed anon significant effect in all the parameters assayed when compared to the test control. There was a significant increase ($P < 0.05$) in packed cell volume in groups 3, 4 and 5 and a significant increase in haemoglobin levels in groups 4 and 5 only when compared to the normal control. Groups 3, 4 and 5 showed a non significant effect ($P > 0.05$) in the red blood cells (RBC) platelets, white blood cells (WBC), basophils, eosinophils, neutrophils, monocytes and lymphocytes when compared with the normal control. The results therefore suggests that aspartame and *Telfaria occidentitalis* at the doses administered did not have any significant effect on the haematological parameters but *Telfaria occidentitalis* may be able to boost red blood cell counts if administered at higher doses

Keywords: *Telfaria occidentitalis*, Albino rats, Haematological parameters, Aqueous extract.

ED058

Qualitative and Quantitative Phytochemical Contents of Spearmint (*Mentha spicata*) Grown in Kano State –Nigeria

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ABSTRACT

*Mentha spicata*is, a member of Lamiaceae that spreads mainly in the temperate and sub-temperate zones of the worldis believed to possess different medicinal effects including hypolipidemic, antioxidant and antimicrobial among others. This research was carried out to qualitatively and quantitatively determine the phytochemicals contents of spearmint leaves grown in Kano. Sample of *Mentha spicata* leaves were collected from the farms of Aminu Kano College of Islamic and Legal Studies, Kano. The sample was shed dried for a period of two weeks and then ground in to fine powder. The phytochemicals content were determined using the standard procedure. The results of qualitative analysis revealed the presence of alkaloids, phenols, flavonoids, tannins, saponin, cardiac glycosides, terpenoids and anthraquinones. The results of quantitative analysis indicated that alkaloids have the highest concentration of 32.13±0.61mg/g followed by flavonoids 8.17±0.15mg/g, phenols 7.93±0.03 mg/g, cardiac glycosides 2.58±0.79 mg/g, tannins 2.29±0.03 mg/g while saponin has the lowest concentration of 1.99±0.04 mg/g. The phytocontituents of mint leaves (*Mentha spicata*) could be responsible for its medicinal properties.

Keywords: Antioxidant,*Mentha spicata*is, Phytochemical, Medicinal plant

ED059

Effect of Methanolic Leaf Extract of Dacryodes edulis on Lipid Profile of Albino Rats

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ABSTRACT

Hyperlipidemia is a condition in which there is a presence of raised or abnormal levels of lipids majorly cholesterol, triglyceride and lipoproteins. They are regarded as highly modifiable risk factors for cardiovascular disease. Medicinal plants contain substances that may be used for therapeutic purpose. This work evaluated phytochemicals and the effect of methanolic extract of D. edulis on serum lipid profile of albino rats. The animals with an average weight of 136-200 g were grouped into control, induced, induced and treated groups. Induction was done using Triton WR1339. They were treated at a dose of 100mg/kg body weight for a period two weeks. Lipid profile was assayed using kits (Teco diagnostics) according manufacturer's instruction. The result showed that D. edulis is rich in the following phytochemicals: total phenols, flavonoids, saponins, cardiac glycoside, tannins, alkaloids, with significant lowering effect on lipid profile parameters as shown in mean standard deviation: total cholestesrol (150.8±*0.01*-90.56±*0.05* mg/dL), triglycerides (175.01±*0.01*-135.82±*0.02* mg/dL), low density lipoprotein (85.17±*0.01*-55.61±*0.01* mg/dL) and high density lipoprotein (40.16±*0.02*-50.86±*0.03*mg/dL). The results from this study suggest that the methanol extract of Dacryodes edulis might have ameliorative effect on Triton WR1339 induced hyperlipidemia in albino rats.

Keywords: *Dacryodes edulis, Lipid profile, Phytochemical, Methanol extract*

ED060

Phytochemical Constituents and Ameliorative Effects of Methanolic Leave Extract of *Parinari curatellifolia* on Body Weight of Wistar Rats Induced with Lead

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ABSTRACT

Researches had shown that *exposure* to lead has adverse effects on human and animal health in urban and rural communities. *Parinari curatellifolia* has shown to have promising effect on ameliorating tissue damage in experimentally induced carbon tetrachloride toxicity in wistar rats (*Rathus norvegicus)*. A study was conducted on the phytochemical determination and the effects of methanoic leaf extract of *P. curatellifolia* on body weight of lead induced *Rathus norvegicus*. Fresh leaves of *P. curatellifolia* was collected from karau along Birnin-Gwari area of Kaduna State. Powdered samples were extracted using soxhlet extractor machine with the aid of methanolic solvent according to the Gerna method. The following phytochemicals were tested: alkanoids, carbohydrates, steroids, Triterpenes, desoxy sugar, tannine, anthraquinones, cardiac glycosides, Flavonoids and Saponins. Forty-eight 8-10 week old healthy *R. norvegicus* averagely 160 grams of weight were used. They were randomly divided into six groups and control (group I-VI). The experiment was monitored for twenty – eight (28) days using Acculat® USA, Model-Vic-303 electronic analytical weighing balance. Data collected was analysed using one-way analysis of variance at $P<0.05$ level of significance.All the phytochemical parameters measured were present. There was increase in the mean body weight of *R. norvegicus* in group I, II, and IV, while those in group III and VI had low growth rate. Administration of methanolic leaf extract of *P. curatellifolia* after exposing *R. norvegicus* to lead solution had the best mean weight gain. It is recommended to use other method of extraction on *P. curatellifolia* to check for ameriolative effect.

Keywords: Body weight, *Parinari curatellifolia,* Phytochemical, Medicinal plant, Lead

ED061

Antibacterial Efficacy of *Mitracarpus villosus* Plant Extract on some Multidrug Resistance Clinical Isolates

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ABSTRACT

Antibiotic resistance has been increasing in prevalence, thus becoming a major medical challenge worldwide and posing a big threat to human society. Therefore, it becomes essential to search for newer drugs with lesser rate of resistance development and lesser toxicity. The aim of this study is to determine the antibacterial efficacy of *Mitracarpus villosus* plant extract on some multidrug resistance clinical isolate. A Sensitivity test was conducted on the test organisms using some selected antibiotics to select a control. The phytochemical analysis of the plant extract (*Mitracarpus villosus*) shows the presents of saponins, tannins, alkaloids, terpenoids, steroids, anthraquinones, flavonoids and phenols. The Antibacterial activities of *Mitracarpusvillosus* plant extract were determined at concentrations of 120 mg/mL, 100 mg/mL and 75mg/mL.The result reveals maximum antibacterial activity at concentration of 120 mg/mL with zones of inhibition of 5.89mm±0.38 (*S. aureus*), 5.22 mm±0.19 (*S. pneumoniae*), 6.89 mm±0.70 (*K. pneumoniae*) and 6.11mm±0.70 (*Salmonella typhi*). At 75 mg/mL the activities reduces significantly with zones of inhibitions of 3.89mm±0.70 (*S. aureus*), 2.44mm±0.84 (*S. pneumoniae*), 4.11 mm±1.26 (*K. pneumoniae*) and 3.11 mm±0.84 (*Salmonella typhi*). The above result implies that, the higher the concentration of the plant extract the higher the activity and at low concentration the activity reduces significantly. *M. Villosus* shows good antibacterial activity against all the tested organisms which was attributed by the presence of some of the phytochemicals in the plant extract.

Keywords:*Mitracarpus villosus*, Antibacterial, Multidrug Resistance, Clinical Isolates.

ED062

Respiratory and Hepatotoxic Effects of Port Harcourt Black Soot on Albino Rats

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ABSTRACT

Industrial activities in Port Harcourt city, in spite of the attendant gains have brought negative health implications to humans and the environment. This study evaluated the effects of soot on the liver biomarkers and lungs of male Albino rats. About 15 male Albino rats weighing 150-250grams were used and randomly placed into 3 groups of 5 animals each. Group 1 (control) were rats not exposed to the soot particulates, while groups 2 and 3 were rats exposed to the soot particulates at a concentration/dosage of 2g and 4g respectively. Administration of the soot particulates were carried out using an improvised inhalation chamber for 4 hours per day within a period of two weeks. At the end, the rats were sacrificed and samples collected for biochemical and histopathology analyses. The biochemical analyses on the parameters below showed the following results for groups 1, 2 and 3, respectively. Protein (62.65±6.86, 61.4±3.57, 52.48±4.40), bilirubin (65.19±29.20, 55.60±18.85, 41.33±32.48), ALT (31.33±13.65, 31.33±6.51, 23.00±6.25), AST (43.00±18.33, 34.00±13.89, 19.33±18.82),and ALP (29.43±16.20, 79.37±45.58, 132.50±38.94). Furthermore, the histopathology investigation of the lungs showed a normal epithelial lining for the animals in groups 1 and 2, while an erosion and ulceration of the epithelial lining was observed in the lungs of animals in group 3. The negative effects observed in the liver and lungs of the animals upon exposure to the particulates could be attributed to its contents of toxic metals such as lead, arsenic, and cadmium. The result justifies the claim of previous researchers linking soot particulates as a causative of agent of respiratory diseases (Asthma, Bronchitis and COPDs), and hepatic disorders such as cirrhosis.

Keywords: Soot, Concentration, Inhalation, Industries, Diseases

ED063

Anti-Hyperglycemic and Hypolipidemic Effects of Fruit and Seed Extracts of *Calotropis procera* in Alloxan-Induced Diabetic Rats

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ABSTRACT

Diabetes mellitus is a major growing health problem in most countries. The present study was carried out to evaluate the anti-hyperglycemic and hypolipidemic activities of the aqueous and ethanolic fruit and seed extracts of *Calotropis procera* in alloxan-induced diabetic rats. Diabetes was confirmed after 3 days of single intraperitoneal injection of alloxan (140 mg/kg) in Wistar albino rats. The aqueous and ethanolic extracts (100 and 200mg/kg) of *C. procera* and glibenclamide (10 mg/kg) were orally administered daily for 21 days. At the end of the experiment the rats were sacrificed after an overnight fast, and blood samples were collected and centrifuged to obtain the serum for biochemical analyses. Data were analyzed using SPSS software and expressed as mean±standard deviation. The aqueous and ethanolic extracts exhibited a significant reduction in the blood glucose levels in the normal and diabetic rats. Similarly, the extract significantly decreased serum total cholesterol, triglyceride, and LDL-Cholesterol and also increased HDL-Cholesterol. Based on the experimental results, it was concluded that the extracts of *C. procera* may possess antidiabetic and antihyperlipidemic activities.

Keywords: Diabetes mellitus, Anti-hyperglycemic, Hypolipidemic, Alloxan-induced diabetes

ED064

Phytochemical Screening and *In Vitro*Antioxidant Activity of the Chloroform Leaf Extract of *Guiera senegalensis* (Combretaceae)

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ABSTRACT

Guiera senegalensis is one of the most widely used medicinal herbs in Africa due to its high importance to nursing mothers. It is used traditionally to treat breast cancer, and breast related diseases and lesions such as mastitis. The aim of this study was to carry out phytochemical and *in vitro* antioxidant activity screening of the chloroform leaf extract of *Guiera senegalensis*. Accordingly, the chloroform leaf extract obtained by maceration was screened and evaluated for active ingredients such as phytochemicals and antioxidants. It showed various phytochemical compositions and revealed the presence of saponins, reducing sugars, flavonoids, anthraquinones, tannins, carbohydrates and alkaloids. The result revealed the presence of antioxidants which were qualitatively measured using Thin layer Chromatography (TLC). The TLC plate revealed the appearance of four (4) spots of the extract. The appearance of a yellow colour within the purple colored DPPH (2, 2 –diphenyl-1-picryl hydroxyl) confirmed the presence of antioxidants and the Rf values after spraying with 10% H_2S0_4 (isolation) were found to be: (**1)**0.2 (**2)** 4.0(**3)** 5.1 and**(4)** 5.7. Similarly, after spraying the DPPH, the retention factor values of the spots were calculated to be: (**1)**0.18, **(2)**0.66**, (3)** 0.83, and **(4)** 0.95.To the best of our knowledge, this is the first report on the Antioxidant activity of the chloroform leaf extract of *Gueira senegalensis*.

Keywords: *Guieria senegalensis*, Phytochemical Screening, Antioxidant, Extract

ED065

Inhibitory Effects of Leaves Extract of *Calostropis procera* on α–Glucosidase

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ABSTRACT

The gastrointestinal side effect associated with the used of synthetic antidiabetic drugs makes it imperative to search for alternative drugs from medicinal plant. Therefore, this study was aimed at evaluating α-glucosidase inhibitory effect of *Calostropis procera* leaf extract. Aqueous and ethanolic extracts of *C.procera* were subjected to standard α-glucosidase inhibitory assay. *In vitro* activity of aqueous extract of *C.procera*leaf possessed the best inhibition of α-glucosidase (IC_{50} 22.39 mg/mL) respectively. It is speculated that α-glucosidase inhibitory properties of leaf extracts of *C. procera* is due to the photochemical presence such as flavonoids, tannins, terpenoids, saponins, in the plant extract. It can be concluded from this study that *C.procera* leaf have potential for the development of α-glucosidase inhibitors class of antidiabetic drugs.

Keywords: *Calostropis procera*, α–Glucosidase, Inhibitory activity, Phytochemical

ED066

Phytochemical Screening and Antibacterial Properties of the Leaves Extract of *Tridax procumbens Linn* against Human Pathogens

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ABSTRACT

Traditional medicines are an essential source of potentially useful new compounds for the development of chemotherapeutic agents. The important values and uses of some plants have been worked out and reported, but many of them remain unexplored till date. Therefore, this study was carried out to examine the phytochemical properties of the ethanoic leaves extract of *Tridaxprocumbens* against human pathogenssuch as *E. coli, Klebsilla pneumonia,Staphylococcus aureus, Pseudomonas species*, and *Salmonella typhii* towards providing based line information on the phytomedical potentials of the plant. Phytochemical screening of the leaves extract revealed the presence of flavanoids, tannins, steroids, phlobatannis, terpanoid and cardiac-glycosides. The extract had displayed tremendous antibacterial effects 42neumon*.coli* (12 mm), *P. Species* (8 mm) *S. Aureus* (18mm), *K. 42neumonia* (17 mm), *S.typhii* (14mm) at 280-500 mm concentration, comparable to the control drug Gentamicin. The minimum inhibitory concentration (MIC) mean valves of the extract were determinined by disc and agar well diffusion method ranged from 100-200mg/ml with that of *E. Coil, pseudomonas species* and *Salmonella typhii* being the most susceptible. This shows that, the leaves of *T. Procumbens* have great potentials to be as antimicrobial agents and hence, it has provide a source of inspiration for novel drug compound medicines in the treatment of human tissues-related pathogens.

Keywords; Antibacterial, Ethanoic, Leaves extract, Pathogens, Phytochemical

ED067

In vitro Antiproliferative Activity of Methanolic Extract of *Vernonia glaberrima* Leaves Against Colon Cancer Cell Line

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ABSTRACT

Vernonia glaberrima is an indigenous medicinal plant that is used in the traditional treatment of cancer and skin diseases. The aim of this study was to investigate the antiproliferative activity of organic solvent extracts of *V. glaberrima* leaves against colon cancer cell line. Crude methanolic extract of *V. glabeerima* (120 g) was suspended in water and transferred into 500 ml separating funnel. It was then sequentially extracted with hexane, chloroform, ethyl acetate and n-butanol to give the respective fractions. The extracts were subjected to MTT cytotoxic screening against human caucasian colon adenocarcinoma (HT-29)cell line.The crude extract, hexane and chloroform extracts displayed significant cytotoxic effect on HT-29 cell line with IC_{50} of 61.73, 38.11 and17.2 µg/mL respectively while the butanol fraction did not showed any appreciable activity.The findingsof this study have revealed the therapeutic potential of *V. glaberrima* against colorectal carcinoma and further support its traditional uses in the treatment of cancer.

Keywords: *Vernonia glaberrima*, HT-29 cell line, Crude extract, MTT

ED068

Effect of Aqueous Fruit Extract of *Cucumis sativus* on some Biochemical Parameters in Streptozotocin- Induced Diabetic Rats

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ABSTRACT

Diabetes mellitus is among the major global public health problems and its prevalence is currently increasing at an alarming rate. The research was carried out to evaluate the effect of aqueous fruit extract of *Cucumis sativus* on blood glucose, total protein, total bilirubin, cholesterol, triglycerides, low density lipoprotein (LDL), high density lipoprotein (HDL), urea, creatinine levels as well as aspartate aminotransferase (AST), alkaline phosphatase (ALP) and electrolytes (Na^+, Cl^- and HCO_3^-) levels on normal and streptozotocin- induced diabetic rats. Streptozotocin was administered intraperitoneal at a dose of 55 mg/kg per body weight. The aqueous fruit extract was administered orally at a dose of 400mg/kg body weight to both normal and streptozotocin induced-diabetic rats. Twenty adult male rats were divided into four groups of five rats each, two groups were made diabetic and the other two groups were non-diabetic. One of the diabetic groups was administered with the aqueous fruit extract and the second served as diabetic control. The administration of the aqueous fruit extract lasted for 28 days. Effect of aqueous fruit extract on blood glucose, total protein, total bilirubin, cholesterol, triglycerides, LDL, HDL, urea, creatinine, and electrolytes (Na^+, Cl^- and HCO_3^-) levels were analysed. The toxic effect of the aqueous fruit extract was determined using biochemical enzymes markers. The phytochemical screening of the aqueous fruit extract show the presence of alkaloids, balsam, cyanogenic glycosides, flavonoids, saponins, resins and carbohydrate. Administration of the fruit extract showed significant ($P<0.05$) reduction of the serum blood glucose level and other biochemical parameters analyzed. The extract possesses no toxic effect as indicated by lowered AST and ALP levels and may be used for the management of diabetes mellitus.

Keywords: *Cucumis sativus,* Phytochemicals, Diabetic Mellitus, Liver enzymes, Hypoglycemic activity

ED069

Effect of *Ageratum conyzoides* in Rats with Ethanol – Induced Liver Damage

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ABSTRACT

The consumption of alcohol has led to a range of medical aberrations in liver including hepatic fibrosis, steatosis, alcohol hepatitis which could normally lead to the growth of alcoholic cirrhosis; a dead-end liver disease that usually require liver transplantation. The probable effect of the crude methanol extract of *Ageratum conyzoides* (cMAC); a medicinal plant (known to be locally used for the treatment of mental and infectious diseases, fever, enteralgia, dyspnea and cold) in rat with alcohol-induced liver damage was the focus of this study. cMAC (200 and 400 mg/kg), ethanol (20% w/v, 5g/kg bw) and 50 mg/kg silymarin were administered for 28 days respectively. Biomarkers of liver impairment and oxidative stress were examined using standard procedures. Livers excised from experimental animals were forwarded for histopathology examination. Results show that rats challenged with 20% ethanol recorded significant increase in the values of aminotransferases (ALT and AST), ALP and GGT which were assuaged by both treatments with cMAC at both 200 and 400mg/kg cMAC significantly. Also, cMAC at both doses in both treatments prevented the elevation of MDA and GST. While rats challenged with 20% ethanol had significant increase the values of TG and bilirubin, there were significant reduction in the values of the antioxidants. Both Pre- and Post-treatment of cMAC were able to largely prevent the adverse effect 20% ethanol of the values examined and 400mg/kg of cMAC performed better than silymarin. These results suggest that cMAC exhibits a significant hepatoprotective activity against ethanol-induced toxicity in rats.

Keywords: Liver, Ethanol, Oxidative stress, Ageratum conyzoides, Hepatoprotective

ED070

In vitro Anti-inflammatory Activities of Methanol Extracts of *Musanga cercropioides* Leaves

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ABSTRACT

Medicinal plants have been exploited for the treatment of inflammatory related diseases since time immemorial. This is because they are readily available, affordable and confers little or no side effects as compared to the synthetic drugs. The aim of this study was to assess the *in vitro* anti-inflammatory activities of the methanol leaf extract of *Musanga cercropioides* leaves. Human erythrocyte membrane stabilization, albumin protein denaturation and anti-proteinase assay were used as standard procedures to assess the plant *in vitro* anti-inflammatory activity. Diclofenac Sodium served as standard drug. A dose dependent (100 to 600 µg/mL) inhibition of protein denaturation and proteinase activity was observed in plant extract. The IC_{50} for protein denaturation and proteinase activity was significantly higher ($p< 0.05$) in the extract as compared to the standard Diclofenac Sodium. Also, the extract was able to protect the human red blood cell (HRBC) membrane against haemolysis induced by heat and hypotonicity. These activities, however; were significantly lower ($p>0.05$) than that of the standard drug. The overall findings from this study suggest that *M. cercropioides* leaf may be useful in the management of inflammatory conditions resulting from oxidative stress.

Keywords: Anti-inflammation, *In vitro,* Methanol extract, *Musanga cercropioides*

ED071

In vitro Comparative Study on the Antioxidant and Inhibitory Activities of Aqueous Extracts of Sandpaper (Ficus spp) Leaves on ACE and Arginase Enzymes of Kidney in Rats

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ABSTRACT

There is an increasing incidence in the number of individuals faced with hypertension globally and in Sub-Saharan Africa. The use of folkloric medicinal plants serves as a promising therapeutic approach. This study investigated and compared the effects of aqueous extract of Ficus spp, sandpaper (*Ficus exasperata*, *Ficus asperifolia*, *Ficus mucuso* and *Ficus capensis*) leaves on Angiotensin1-Converting enzyme (ACE) and Arginase. The antioxidant effects of these aqueous extracts was studied using ferric reducing antioxidant property (FRAP), 2, 2 -azino-bis (3-ethylbenzthiazoline-6-sulphoric acid (ABTS), Fe^{2+}-induced lipid peroxidation ability and radicals [1,1-diphenyl-2 picrylhydrazyl (DPPH) assays. In addition, the extracts' phenolic and flavonoid contents were determined using spectrophotometry method. Aqueous extracts of *Ficusexasperata* had the strongest Fe^{2+} (IC_{50} = 6.34 µg/ml) induced lipid peroxidation scavenging ability. However, *Ficus capensis* had the highest phenolic contents. Interestingly, *Ficus mucoso* have the highest ACE (IC_{50} = 405.4 µg/ml) and arginase (IC_{50} = 19.39 µg/ml) inhibitory ability, highest DPPH radicals scavenging ability (IC_{50} = 22.77 µg/ml) and FRAP ability, strongest ABTS scavenging ability and largest flavonoid content amongst the variants. The strong inhibitory effects and anti-oxidative protective properties of these sandpaper leaves in rats kidney suggests them as promising natural folklore plants in the management of hypertension.

Keywords: Antioxidant, Arginase, Angiotensin1-Converting enzyme, Medicinal plant, Phytochemical

ED072

Antibacterial Activity of *Mitragyna inermis* Leaf Extract and it's Fractions

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ABSTRACT

Mitragyna inermis is an important medicinal plant used in traditional and flolklore medicine to treat diseases like an infectious disease, oxidant-related disease, and inflammation. Although antibiotics are still in use to treat infectious diseases, however, the emergence of widespread drug resistance, toxicity, and side effects has limited the potency of antibiotics and therefore necessitating the search for new antibacterial agents from plant extracts.The present study aimed at investigating the *in-vitro* antibacterial activity of *Mitragyna inermis*leaf extracts. The preliminary phytochemical and quantitative screening was conducted on crude extract and its fractions using standard methods while the antibacterial activity was investigated using the agar well diffusion method followed by MIC and MBC. The ethyl acetate (EA) fraction was the most active fraction with highest mean zone of inhibition (27±0.88mm) and MIC (30 mg/ml) on *Staphylococcus aureus*. Chromatographic fractions from the EA (F1 and F2) were the most active with mean zone of inhibition of 38±0.0 mm and 42±0.17 mm and with highest MIC values of 5 mg/ml on *Staphyloccocus aureus* and *Pseudomonas aeruginosa* and 10mg/ml against *Pseudomonas aeruginosa*, respectively. However, the MBC of the crude extract and its fractions were not detected. The result of the MBC shows that *M. inermis* is a bacteriostatic agent. This result herein supports the potential use of *M. inermis* leaf for bacterial treatment by local traditional medicine practitioners.

Keywords: *Mitragyna inermis*, Antibacterial activity, Phytochemicals, Extract, Zone of inhibition, Bacteriostatic

ED073

Antiglycation and Antioxidant Activity of the Leaves and Fruits of *Hyphaene thebaica* using Different Solvent System

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ABSTRACT

Non-enzymatic glycation of protein is the major cause of various diabetic complications. Medicinal plants having therapeutic potential against glycation are pivotal to treat diabetic complications. This research was carried out to determine the antioxidant and antiglycation activity of the leaves and fruit of *Hyphaene thebaica* using chloroform, methanol and ethylacetate. Qualitative phytochemical screening was carried out to determine the various phytochemicals present in the plant. Quantitative phytochemical screening was also carried by determining the total phenols, tannins, flavonoids, alkaloids and saponin content. DPPH free radical scavenging assay was used to evaluate antioxidant activity while *Invitro* antiglycation activity of extracts were examined by BSA-fluorescent assay. The results of this research showed that, both the fruits and leaves of *Hyphaene thebaica* contain phytochemicals such as saponins, flavonoids, tannins, alkaloids, steroids with the exception of anthraquinones. Generally, fruit (ethylacetate) extract has the highest antioxidant activity (55%) while the leave extract (chloroform) has the least (7%) activity. *Invitro* antiglycation results showed that, the fruit extract (ethylacetate) has the highest antiglycation activity (66%) while the chloroform extract has the lowest antiglycation activity (38%). However, the antiglycation results of the leaves showed that the chloroform extract has the highest activity (64%) whereas the methanol extract has the lowest activity. It can therefore be concluded that the leaves and fruit of *Hyphaene thebaica* has an appreciable antiglycation activity as well as antioxidant activity, which can serve as a potential therapeutic agent against glycation related diabetes complication.

Keywords: Antioxidant, Antiglycation, *Hyphaene thebaica*, Phytochemical, Medicinal plant,

ED074

Anti-Toxicity Potential of Aqueous Extract of Watermelon (*Citrullus lonatus*) Seeds on Carbon Tetrachloride-Induced Liver Toxicity in Rats

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ABSTRACT

The study was conducted to check the anti-toxicity potential of aqueous extract of *Citrullus lanatus* (water melon) seeds on the liver of carbon tetrachloride treated adult rats. Twenty Five rats were grouped, 1, 2, 3, 4 and 5 respectively each comprises of five rats. Group 1 and 2 (Negative Control group and Positive control group respectively) received 2ml/kg body weight of distilled water for eight days and 20ml/kg body weight of 50% carbon tetrachloride on day eight, respectively. Group 3 and 4 received the extract 200mg/kg and 400mg/kg body weight for seven days, followed by 20 ml/kg body weight of 50% carbon tetrachloride on day eight. Group 5 received 50% carbon tetrachloridefor one day, followed by 400mg/kg bodyweight for seven days. All administration was once daily by oral gavage. Blood samples were collected for alanine aminotransferase (ALT), aspartate aminotransferase (AST), and Alkaline phoaphatate (ALP) activity determination... Results obtained showed that *C.lanatus* seed extract did not affect weight gain or hepatic index, although the carbon tetrachloride treated group showed decrease in weight gain and an increase in hepatic index. Treatment with *C.lanatus* seed extract decreased AST, ALT, ALP serum levels, which was increased due to carbon tetrachloride ingestion.Thus the study demonstrates that aqueous extract of *C. lanatus* seed possess hepatoprotective effect against carbon tetrachloride-induced hepatotoxicity.

Keywords: Anti-toxicity, *Citrullus lanatus*, AST, ALT, ALP

ED075

Toxicity Evaluation of Crude Methanolic Leaf Extract of *Mitragyna inermis*

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ABSTRACT

Mitragyna inermis has been used by traditional medicine practitioners since the medieval agesfor the treatment of diseases. This study was aimed at evaluating the acute and sub-chronic oral toxicity of its methanolicleaf extract. The acute toxicity test was conducted with femaleWistarrats using OECD guideline 423. The methanolic extract of *Mitragyna inermis* leaf was administered in a single dose of 3000 mg/kg body weight via oral gavage; and the animals were observed for any behavioral changes or mortality.In the sub-chronic toxicity study, the rats received control (10ml/kg b. wt. distilled water) and three doses of the extract (250, 500 and 1000 mg/kg b. wt.) for 28 days via oral gavage. During these 28 days of treatment, the rats were observed weekly for toxicity symptoms. Following the 28-day treatment, the rats were sacrificed for hematological, biochemical and histopathology studies. In the acute toxicity study,*Mitragynainermis*did not produce any hazardous symptoms or death in the acute toxicity test, showing a LD_{50} higher than 3000 mg/kg. Sub-chronic treatment with *Mitragyna inermis* failed to change bodyweight gain, food and water consumption and hematological and biochemical profiles. In addition, no changes in macroscopical and microscopical aspect of organs were observed in the animals. The study thereforeshowed that acute or sub-chronic administration of*Mitragynainermis*is not toxic in female Wistar rats, suggesting a safety use by humans.

Keywords: Acute, *Mitragyna inermis,* Sub-acute, Toxicity, Herb, Extract.

ED076

Ameliorative and Antioxidant Effects of Ethyl Acetate Extract of *Andrographis paniculata* Leaf against Acetaminophen-Induced Hepatic Damage in Mice

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ABSTRACT

Acetaminophen (APAP) commonly referred to as paracetamol is an analgesic and antipyretic drug available as over the counter medications. Its use as meat tenderizer has been reported to contribute to liver damage. This can impair liver functions such as metabolism of biomolecules and regulation of homeostasis. This study aimed at determining the ameliorative and antioxidant effects of *A. paniculata*leaf in acetaminophen-induced hepatic damage in mice. Fifty mice were randomly divided into 5 groups of ten (10) mice each. Group I (control), received 1% Dimethyl sulfur oxide (DMSO), Group II received 300 mg/kg b.wt of APAP and DMSO, Group III and IV received APAP followed by 100 and 200 mg/kg b.wt of ethyl acetate extract of *A. Paniculata* leaf, respectively and Group V received APAP andSilymarinfor 14 days. Administration of APAP caused a significant ($p<0.05$) decrease in the activities of AST, ALP, ALT, GGT, total protein and albumin concentration and significant ($p<0.05$) increase in bilirubin concentration. Treatment of mice with 100 and 200 mg/kg b.wt of the extract reversed ($p<0.05$) the APAP-induced alterations in enzymes and parameters measured. Also a significant ($p<0.05$) increase in the activities of superoxide dismutase, catalase and glutathione concentrations were observed in mice administered with the extract and silymarin when compared withthe mice treated with 300 mg/kg b. wt of APAP and DMSO. Ethylacetate extract of *A. Paniculata* leaf ameliorated acetaminophen-induced hepatic damage and reverse antioxidant parameters in mice probably due to the secondary metabolites in the extract.

Keywords: Acetaminophen, *Andrographis paniculata,* Ethyl acetate, Hepatoprotective

ED077

Toxicological Investigation of Aqueous Leaf Extract of *Ziziphus mauritiana* on Wistar Rat

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ABSTRACT

Plant parts have been useful for food and remedies to various disease conditions for man but few have been studied for their toxicological effects. This study was aimed at evaluating the phytochemical constituents of theaaqueousleaf extract of *Ziziphus mauritiana*and its toxicological effects on Wistar rat. All major phytochemicals were screened qualitatively while alkaloids, saponin, tannin phenol and flavonoids were evaluatedquantitatively. Thereafter, acute and subchronic toxicological evaluations were carried-out in wistar rats. Qualitative phytoconsituents screening revealed the presence of all major phytochemicals except anthraquinones while the quantitative screen showed phenol having highest concentration while alkaloids had the lowest concentration. The acute toxicity screening revealed that the extract was non-toxic with LD50 above 5000mg/kg B. W. while the subchronic toxicological evaluation revealed no significant adverse effect on all heamatological parameters except WBC. Similarly, Liver Function Test parameters revealed an increase in serum GGT concentration at 400 mg/kg B. W while kidney Function Test parameters showed alterations in serum creatinine, Sodium, Potassium and biocarbonate concentrations. Significant effects on liver/body weight ratio at 400 and 1000 mg/kg B. W. and histoarchitectural alteration in the liver and kidney were also observed.The results suggest that prolonged administration of this extract may led to severe adverse effects on the kidney and liver.

Keywords: Hepatotoxicity, Ziziphus mauritiana, Phytoconstituents, Renal-toxicity, Histopathological

ED078

Hepatoprotective Effects of Camel Milk and Urine on Alloxan-Induced Diabetic Rats

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ABSTRACT

Camel milk and urine have been used for medicinal purposes and anecdotally proclaimed as a cure for a wide range of diseases. Present study aimed to determine the effect of camel milk and urine on some liver indices in alloxan-induced diabetic rats. Twenty-five adult male albino rats weighing between 80-100g were used for this study. The animals were acclimatized for 2 weeks prior to induction of diabetes and subsequently, divided into five groups of five animals each; group 1 served as Nondiabetic control (NDC), group 2 as Diabetic control (DC), group 3, 4 and 5 are diabetic treated with fresh camel milk (DCM), camel urine (DCU) and metformin (DM) respectively. Treatment was for twenty-one days. Protective role of camel milk and urine in the diabetic rats was evaluated based on their ability to restore elevated liver enzymes to normal in diabetic rats. The results indicate a significant increase (P<0.05) in serum activity of ALP, AST, TP in DC compared to NDC. However, treatment of diabetic rats with camel milk, camel urine or metformin significantly (P<0.05) decreases the levels of ALP, AST, TP when compared to DC. This result indicates that feeding diabetic rats with camel milk and urine has some hepatoprotective effect and has the potentiality of delaying diabetes complications.

Keywords: Diabetes complications, Camel milk, Camel urine; Liver function biomarkers; Alloxan

ED079

. Antidiabetic Effect of Extracts of *Ziziphus mucronata on* Alloxan-Induced Diabetic Rats

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ABSTRACT

Ziziphus mucronata is an important multi-purpose plant species that has been used in African traditional medicine for ages in the treatment of various devastating human infections including diabetes. The current study was designed to investigate the *in vitro* antidiabetic activity and *in-vivo* evaluation of antidiabetic effect in diabetic animal model. Sequential extraction of *Ziziphus mucronata* using n-hexane, acetone, methanol and water were respectively used to access the *in-vitro* antidiabetic effect on α-amylase and haemoglobin glycosylation inhibitions. Standard laboratory methods were used to screen for phytochemicals while acute oral toxicity (LD_{50}) was estimated using up and down procedure. *In-vivo* antidiabetic activity was investigated using alloxan-induced animal model. The results reveal that methanol, acetone and aqueous extracts exhibited dose-dependent increase in percentage inhibition. Phytochemicals detected in *Zizphus mucronata* leaf acetone extract include alkaloids, anthraquinone, glycosides, flavonoids, phenols, saponins, tannins and terpinoids. $LD_{50}$of acetone leaf extract was estimated to be greater than 5000mg/kg as no mortality was recorded after 14 days. Sub-chronic (21 days) administration of *Zizphus mucronata* acetone leaf extract exhibited significant reduction ($p<0.05$) in fasting blood glucose at 400 mg/kg body weight compared with normal control.In conclusion, the present findings suggest that the most potent extract (acetone) exhibited blood glucose lowering activity. This validates the traditional claim of *Z. mucronata* in the treatment of diabetes.

Keywords: Phytochemicals, *Ziziphus mucronatam Dabetes, Glucose*

ED080

In vitro Antidiabetic Activity of Crude Ethanol Extracts of Selected Medicinal Plants

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ABSTRACT

The incidence of diabetes mellitus has increased globally in the last two decades and there is no cure for it yet. However, several plants have been reported to be used locally for its management. This study was aimed at evaluating the *in vitro* anti-diabetic activity of the crude ethanol extracts of fourteen (14) medicinal plants used locally for diabetes therapy. This was carried out using non-enzymatic methods (*in vitro* haemoglobin glycosylation inhibitory assay and *in vitro* assay of glucose uptake by yeast cells). The highest percentage inhibition of haemoglobin glycosylation (96.68±0.34 %) was observed for crude ethanol extract of *Calotropis procera* at concentration 20 mg/mL, with no significant difference ($p > 0.05$) when compared to *Anogeissus leiocarpus* (95.02±0.22 %), *Khaya senegalensis* (92.55±1.60 %), *Senna occidentalis* (92.12±2.48 %), *D. microcarpum* (91.11±0.38 %) and the standard drug, Acarbose (90.15±0.30 %). The crude ethanol extracts of *Balanites aegyptiaca* (*B. aegyptiaca*), *Khaya senegalensis*, *Mangifera indica*, *Senna podocarpa* and the standard drug (metronidazole) had percentage glucose uptake by yeast cells of up to 70 % at the lowest concentration used (0.625 mg/mL) for all the concentrations of glucose tested. However, the highest percentage glucose uptake was observed for ethanol extract of *B. aegyptiaca* (91.76±0.88 %) at concentration 20 mg/mL, for 20 mM glucose concentration. It could be concluded that ethanol extracts of all the plants used in this study contain active compounds responsible for inhibiting

haemoglobin glycosylation, as well as enhancing the uptake of glucose in yeast cells. As such, some of them with remarkable activity could be standardised and used as herbal remedies for the treatment of diabetes mellitus.

Keywords: Diabetes mellitus, Inhibition, Haemoglobin, Glycosylation, Yeast cells

ED081

Gastroprotective Activity of Ethanolic Extract of *Raphia mambillensis* Seed on Indomethacin-induced Ulcerated Rats

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ABSTRACT

Raphia mambillensis seed is applied traditionally as a treatment to different ailments including gastrointestinal related disorders by the rural dwellers in Nigeria. The aim of this study is to evaluate the antiulcer activity of ethanol extract of *Raphia mambillensis* seed in ulcerated rats. Animals were pre-treated orally with different doses of ethanolic seed extract of *Raphia mambillensis* and reference drug (ranitidine).The effect of ethanolic extract of *Raphia mambillensis* (EERM) on ulcer index, stomach acidity and volume of gastric contents was evaluated in ethanol-induced ulcerated rat models using indomethacin (10mg/kg body weight).Standard phytochemical methods were used to screen the presence of its phytoconstituents. The result showed that EERM significantly ($P < 0.05$) decreased the severity of gastric mucosal damage caused by indomethacin indicative by a reduction in ulcer index, gastric acidity and gastric volume of treated groups when compared with untreated group and. may be attributed to its phytochemical constituents such tannin, saponins, alkaloid, cardiac glycoside and anthraquinone. *Raphia mambillensis* leaves possess anti-ulcer effect and could be a potential source of anti-ulcer agent for future research.

Keywords:*Raphia mambillensis*, Ranitidine, Mucosal damage, Ulcer index, Indomethacin.

ED082

Phytochemicals and *In vitro* Antioxidant Analysis of Ethylacetate Leaf Extract of *Corchoris olitorius*

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ABSTRACT

Phytochemicals are biologically active chemical compounds founds in plants, which provide health benefits for humans as medicinal ingredients and nutrients. Antioxidants have been found to play a significant role in the body defense against reactive oxygen species. *Corchurus olitorius* leaves are used in traditional medicine for cystitis, dysuria, fever and gonorrhea. The research work investigates phytochemicals and *in vitro* antioxidant activity of ethylacetate extract of *Corchorus olitorus* leaves. The phytochemical analysis, DPPH radical scavenging assay, Reducing power assay, Hydroxyl radical scavenging activity, Hydrogen peroxide assay, total antioxidant activity were carried out by standard methods. The results of the phytochemical screening indicated the presence of flavoniods, terpeniods, tannins, saponins and cardiac glycosides. The antioxidant activities of *C. olitorius* extract (1000 ug/mL) recorded were total antioxidant activity (DPPH) 82.88±0.005%, reducing power assay 2.070+0.0030 Absorbance, Hydroxyl radical scavenging assay 94.66±0.046%, hydrogen peroxide scavenging assay 82.44±0.07% and Total antioxidant Capacity 5.505+ 1.188 ug/mL.The research revealed that the ethylacetate leaves extract of *C. olitorius* possess good *in vitro* radical scavenging activities with presence of important phytochemicals of high therapeutic values and high antioxidant activity.

Keywords: Phytochemicals, Antioxidants, Corchoris olitorius, Oxidative stress, Reactive oxygen species

ED083

Hypoglycaemic Properties and Effects on Serum Enzymes of *Casuarina Equisetifolia* Leaf Extracts in Alloxan -Induced Diabetic Rats

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ABSTRACT

Diabetes is a chronic metabolic disorder which is currently recognized as a major contributor to global disease burden in both developed and developing nations. Phytochemical screening of *Casuarina equisetifolia* leaf was carried out using standard methods. 100 mg/kg bodyweight of alloxan monohydrate was administered intraperitoneally to rats in groups A-E, and rats with blood glucose above 120 mg/dl were considered diabetic.150 mg/kg bodyweight of extracts were orally administered to rats in the respective groups for a period of 9 days, and 15 mg/kg standard drug (metformin) was administered to rats in the positive control group. Serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT)and alkaline phosphatase (ALP) were assayed by standard laboratory techniques at the end of the treatment. Blood glucose of rats in the treated groups decreased significantly ($p<0.05$) in descending order during the period of treatments with the ethanol extract having the most significant reduction of 64.00±3.46 mg/dl when compared to diabetic control (206.00±4.45mg/dl). The most significant differences were observed for ALP (52.60±2.80 IU/L), SGOT (33.18±3.48 IU/L) in the aqueous extract and SGPT (4.90±0.91 IU/L) in the methanol extract when compared to the diabetic control group having 84.82±4.69 IU/L, 41.80±3.20 IU/L and 20.05±2.13IU/L respectively. Tannin, flavonoid, phenol and reducing sugar were present in all the extracts. Alkaline phosphatase level was significantly high ($p<0.05$) in group treated with methanol extract. The extracts though, have hypoglycaemic property, may be hepatotoxic, which will limit or perclude its use.

Keywords: Hypoglyceamia, Phytochemicals, Blood Glucose, Alloxan

ED084

In vitro Antimalarial and Antibacterial Activities of *Boswellia dalzielii* Stem Bark and *Hibiscus cannabinus* Leaves Extract

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ABSTRACT

Plasmodium falciparum parasite and pathogenic bacteria contribute to globally significant diseases in human. The search for new remedies from medicinal plant species used as an alternative choice for the treatment of malaria and bacterial infections depends on the accurate and specific pharmacological information obtained from researchers. This research investigated the anti-malarial and antibacterial activities of methanol extract of *Boswellia dalzielii* and *Hibiscus cannabinus* on *Plasmodium falciparum* parasite and against five clinically significant bacteria. The *in vitro* antimalarial activity test was conducted by determining the parasitemia for each sample concentration by manual counting on thin Giemsa smears after 24-hour incubation with the extracts in order to determine the IC_{50} values. The antibacterial study was done using a modified agar well diffusion technique. The result revealed that methanol stem bark extract of *Boswellia dalzielii* and *Hibiscus cannabinus* exhibited good and potent (very good) antimalarial activities against *P. falciparum* with IC50 values of 1.25 µg/mL and 0.16 µg/mL, respectively. They also show good inhibitory activities against *E.coli* but slight inhibitory activities against the other pathogens tested (*S. aureus, P. aeuroginosa S typhi and S. dysentery*). The current study indicates that extracts of these plants exhibited anti-malarial and antibacterial activities and may serve as useful sources of drugs for treatment of malaria caused by *P. falciparum parasite* as well as bacterial infections caused by the tested bacteria.

Keywords: Antimalaria, *Boswellia dalzielii*, *Hibiscus cannabinus*, *P. falciparum,* E. coli, IC_{50}

ED085

Analgesic Activity of the Methanol Leaves Extract of *Hannoa klaineana* in Wistar Rats

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ABSTRACT

Pain remains major concern medical problem and difficult to relief. *Hannoa klaineana* Pierre & Engl. is an African native medicinal plant used for the treatment of many diseases including pain disorders.This study aims at evaluating analgesic activity of methanol leaves extract of *Hannoa klaineana*. The analgesic activity of methanol leaves extract of *Hannoa klaineana* (200, 400 and 600 mg/kg b.wt) was evaluated using acetic acid-induced writhing and tail immersion models. In acetic acid-induced writhing test, the extract (200, 400 and 600 mg/kg) demonstrated significant (p<0.05) decrease in number of writhes with maximum percentage inhibition (70.85%) at 600 mg/kg. While tail immersion method, the extract (200, 400 and 600 mg/kg b.wt) exhibited significant (p<0.05) increase in the reaction time. This study suggested that methanol leaves extract of *Hannoa klaineana* posess peripheral and central analgesic activity, thus validating the use of the plant in the local areas for treatment of pain.

***Keywords*:** Acetic acid, Analgesic activity, *Hannoa klaineana*, Diclofenac, Pain, Tail-flick

ED086

Effect of *Moringa oleifera* Leaves Extract on some Liver Function Parameters in Phenylhydrazine Induced Anaemic Rats

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ABSTRACT

Moringa oleifera is a widely cultivated tree considered as a multi-purpose plant. It is used in medicinal purposed around the world due to empiric observation.Phenyl-hydrazine (PHZ) is a toxic nitrogen-based compound experimentally used for induction of anaemia in animals. This research was conducted to study the effect of *Moringaoleifera*leaves aqueous extract on some liver function parameters (AST, ALT and ALP) in phenyl hydrazine induced anaemic rats.Liver enzyme (AST, ALT and ALP) were determined using standard method. Twenty-five apparently healthy rats were used. They were divided into five group of four animals each. Group A (positive control), Group B (negative control), Group C (received 200mg/kg daily of extract only), Group D (anemia treated with extract low dose 300mg/kg daily) Group E (anemia treated with extract high dose 600mg/kg daily) where treated through oral administration for two weeks. The result showed significant difference (P<0.05) in the parameters when compared group C9.75 ±0.629, 7.75 ±0.629, 92.5.0±0.629, group D10.25± 0.851, 93.75±0.080 and group E11 ± 0.816, 8.5 ± 0.816, 94.25±0.913 with negative control (group B)13.75±0.479, 13.5±0.645, 95.5±0.646 for AST, ALT and ALP respectively. Therefore, the extract of this plant showed anti anaemic activity and they could restore the activity of the liver enzyme.

Keywords: *Moringa olifera*, Anemia, AST, ALT, ALP.

ED087

In-vitro Antioxidant Activities of Gum-Resin Exudates of *Acacia senegal* L. and *Mangifera indica L.* from Northern Nigeria

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ABSTRACT

Gum-resin exudate of plants is used in traditional medicines for treatment of various diseases in Nigeria. This study evaluated the antioxidant potentials of gum-resin exudate of *Acacia sieberiana L.* and *Mangifera indica L. in-vitro.* The ascorbic acid, total flavonoid and phenolic contents (Folin Ciocalteau index), radical scavenging activity (DPPH) and cupric reducing antioxidants capacity were measured spectrophotometrically by standard protocols. The ascorbic acid contents of gum-resin exudates of *A. sieberiana L.* and *M. indica L* are not significantly different ($p>0.05$). The total phenolic contents of the two studied plant gum exudates were significantly different ($p< 0.05$) and) for *A. sieberiana L* (39.36 ± 0.45 mg GAE/g)and *M.* (*indica L* 46.45 ± 0.47 mg GAE/g), respectively. The Total flavonoid contents were also significantly different ($P < 0.05$) with gums from *A. sieberiana L*. recording higher values (31.10 ± 0.10 mg QE/g) compared to *M. indica L.* (27.60 ± 1.54 mg QE/g). The radical scavenging activity (DPPH) of the studied gum-resin exudates were not significantly different ($p > 0.05$). Cupric reducing antioxidants capacity of the gum exudates of *A.sieberiana* L. (19.45 ± 0.46 mg TE/g) was significantly different ($P < 0.05$) from *M.indica* L. (15.22 ± 0.66 mg TE/g). This study has shown the potentials of gum resin exudates of *A. sieberiana L* and *M. indica L.*as agents that may be useful in oxidative stress related diseases.

Keywords: Antioxidant, Gum resin exudate, Medicinal plant, *Mangifera indica, Acacia sieberiana,*

ED088

Antiulcer and Antioxidant Effect of *Azadirachta indica* Methanol Leaves Extract on Ethanol-Induce Gastric Ulcer in Rats

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ABSTRACT

The research was designed to study the antiulcer and antioxidant effect of *Azadirachta indica* methanol leaves extract (AIMLE) of ethanol-induce gastric ulcer in rats. Thirty (30) adult albino rats of both sexes weighing between 97g-120g were used for the study. The animals were randomly divided into five (5) groups of six (6) animals each. Animal were treated according to the Method of described by OECD guidelines. Acute oral toxicity study (LD_{50}), antiulcer studies and evaluation of antioxidant enzyme activities were done according to the standard method. The LD_{50} was found to be less than 5000mg/kg. The antiulcer activity of AIMLE showed a significant reduction *($P<0.05$)* in the ulcer index and an increase percentage protection in all the treated groups when compared to the negative control group. The extract showed a dose-dependent antiulcer activity with the highest concentration (600mg/kg) having 43.41% protection. This was lower than omeprazole treated group (58.42%) which was however not significantly different *($P>0.05$)* when compared. In this study, a marked increase of MDA level and decrease of SOD, GSH, and CAT levels were observed in rats after ethanol exposure. However, there was a significant *($p<0.05$)* increase of CAT, SOD, and GSH activities in the extract and drug treated groups than the ethanol control group. The results suggests that *A. indica* leaf extract demonstrated anti-ulcer activity, which may be related to the reduction of ROS and associated with the increase in the activities of enzymatic antioxidants.

Keywords: *Azadirachta indica,* Antiulcer activity, Antioxidant activity, Acute oral toxicity

ED089

Comparative Antibacterial Activity of Organic Solvent Extracts of Whole Plant of *Centaurea perrottetii* D.C. against some Selected Bacteria Strains

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ABSTRACT

The continuous search for new antibiotics is of a great necessity due to the increasing concern of resistance of most available antibiotics This study was aimed at evaluating the antibacterial activity of the methanol, n-hexane and ethyl acetate extracts of whole plant of *Centaurea perrotteti* D. C. against some selected bacteria strains, with a view to identify the most active fraction from the plant and to justify its traditional use for the treatment of bacterial infections. The antibacterial activity of the fractions of *Centaurea perrotteti* against four (4) selected bacterial strains Bacillus subtilis, Staphylococcus aureus; ,Escherichia coli and Pseudomonas aeruginosa, were investigated using the agar well diffusion method. The ethyl acetate extract of the plant exhibited moderate antibacterial activity against the Gram positive bacteria *S. aureus* and *B. subtilis* at all the tested concentrations with zone of inhibition in the range of 4-12mm with no inhibitory effect on the Gram negative bacteria (*E. coli* and *P. aeruginosa*). The crude methanol extract has antibacterial activity against *P. aeruginosa* only at concentrations between 25 and 30mg/ml with zones of inhibitions of 5.0 and 6.4mm, while the n-hexane fraction did not show any growth inhibition on all the tested organisms.The Minimum Bacteriostatic (MIC) and the Minimum Bactericidal Concentration (MBC) recorded for the ethyl acetate extract on *S. aureus* were 15mg/ml and 7.5mg/ml and on *B. subtilis* were 30 and 7.5mg/ml respectively. The Minimum Bacteriostatic (MIC) and the Minimum Bactericidal Concentration (MBC) recorded for the crude methanol extract on *P. aeruginosa* were 30 and 15mg/ml respectively. The methanol extract possessed the most significant antibacterial activity among the extracts and tested.

Keywords: Antibacterial, Whole plant, *Centaurea perrottetii*, Methanol extract

ED090

Microbial Profile of Raw Urine of some Female Camels (*Camelus dromedarius*) in Sokoto, Nigeria

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ABSTRACT

Prelude to further studies that will investigate therapeutic role of raw urine against a given induced disease condition in albino rat setting; some samples of urine were obtained from some apparently healthy domesticated female camels (*Camelus dromedarius*) at Kwalkwalawa village of Sokoto, Sokoto State, Nigeria and were analyzed for microbial quality using standard methods. The urine samples (U1-U5) were obtained in April 2020 from the set racked five female camels (*Camelus dromedarius*) and was collected overnight whenever those camels were urinating with the aid of skilled camel attendants. The result of microbial analyses showed *E coli* sub spp 0157:H7 found in (U1) sample while U2 had presence of *Citrobacter pneurelli* only. No any microbial presence was detected in samples U3, U4 and U5. In conclusion, the studied urine had revealed microbial contamination possibly during collection or transportation and should, therefore, be used with caution.

Keywords: *Camelus dromedaries*, Microbes, Urine, Female

ED091

Therapeutic Effects of β-ionone against *T. congolense*-Induced Oxidative Stress

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ABSTRACT

Oxidative stress as a prominent feature of *T. congolense* infections results to the damage of vital organs and subsequent death of the host if not treated. In this study, the therapeutic potentials of β-ionone against *T. congolense*-induced oxidative damage in the liver, kidney as well as spleen of infected rats were investigated. Increased in TBARS in infected animals were significantly (P<0.05) ameliorated following treatment with 15 mg/kg and 30 mg/kg BW β-ionone, respectively across all the organs. Additionally, GSH level significantly (P<0.05) increased in the organs (except in the liver) of infected animals treated with the compound. In conclusion, β-ionone could ameliorate oxidative damage induced by the parasite.

Keywords: β-ionone; Oxidative damage; *T. congolense*

ED092

Antibacterial and Antifungal Activities of Ethanol Extract of *Garcinia kola* (Seed)

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ABSTRACT

*Garcinia kola*is a medicinal tree belonging to the family *Guttiferae*. Several studies have reported the pharmacological uses of the seed in treating coughs, throat infections, bronchitis, hepatitis, and liver disorders. In this study, the antibacterial and antifungal activities of ethanol extract of *Garcinia kola* (seed) were determined using agar well diffusion method against some selected pathogenic micro-organisms(*Salmonella typhmuriumi, Pseudomonas aeruginosa, Escherichia coli, Aspergillus flavus, Aspergillus niger and Candida albicans*). Qualitative phytochemical screening, antibacterial, and antifungal activities of the extract were determined using standard methods. Phytochemical screening revealed the presence of alkaloids, saponins, cardiac glycosides, reducing sugars, steroids, terpenes, tannins, flavonoids, and phenols. The extract at concentrations of 100 mg/ml, 200 mg/ml and 300 mg/ml gave the following zones of inhibitions; *S. typhi* (18, 22.50, 28mm), *P. aeruginosa* (14.50, 16, 22 mm), and *E. coli* (25, 29, 35 mm), respectively. The result showed a significant difference (P<0.05) between the extract and the standard control (ampiclox) used. However, the extract at the above concentrations showed no inhibitory activity on the fungal isolates used. Minimum inhibitory concentration (MIC) of the extract at a serial dilutions of 40mg/ml, 8mg/ml, 1.6mg/ml, 0.32mg/ml, 0.064 mg/ml, 0.0128mg/ml and 0.00256mg/ml, showed *E. coli* been the most sensitive at a concentration of 0.0128mg/ml compared to the other test micro-organisms. The effectiveness of the extract on the bacterial isolates holds a promising potential as antibacterial agent if well exploited.

Keywords:*Garcinia kola*seed, Ethanol extract, Antibacterial activity, Antifungal activity, Pathogenic microorganisms.

ED093

Antioxidant Activity and Effect of Aqueous extract of *Cynodon dactylon* on Haematological Parameters of Wistar Rats

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ABSTRACT

Cynodon dactylon is one of the acclaimed safe medicinal plants used in traditional medicine. The antioxidant activity using DPPH and FRAP; and effects of aqueous extract of *Cynodon dactylon*on haematological parameters of Wistar rats was investigated. Sixteen male Wistar rats were randomly divided into four groups

of four (4) rats each. The first group was the control and received normal rat chow and water only. The other groups (2, 3 and 4) were administered with various doses of aqueous extract of *C. dactylon* (100, 200 and 400) mg/kg respectively for 21 days. The antioxidant activity of *C. dactylon* was low ($p<0.05$) compared to that of the ascorbic acid. White blood cell, red blood cell, haemoglobin, lymphocyte, platelet, monocyte, eosinophil, basophil, mean corpuscular volume and mean corpuscular haemoglobin levels were not significantly different ($p>0.05$) from the control. The observed antioxidant activity of the plant could be as a result of certain antioxidant compounds like flavonoids and phenols that are previously known to be present in the plant. The result suggests that the plant extract was relatively safe at the doses administered.

Keywords: Antioxidant activity, *Cynodon dactylon,* Haematological parameters, Medicinal plant

ED094

Comparative Phytochemical Constituents of Aqueous and Ethylacetate Extracts of some Nigerian Medicinal Plants: Implications for Biomedical Applications

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ABSTRACT

Nymphaea lotus and *Pistia stratiotes* are aquatic plants that are used for various ethnomedicinal purposes such as diabetes treatment in some parts of Nigeria. The aim of the present research is to conduct a comparative study on their phytochemical constituents. Preliminary phytochemical screening of aqueous and ethylacetate extracts of both *N. lotus* and *P. stratiotes* leaves was carried out using standard methods and the phytochemicals present were further analyzed quantitatively. The percentage yield of *N. lotus* and *P. stratiotes* leaves using water (17.24% and 14.68%) was higher compared to using ethylacetate (3.44% and 2.72%) respectively. The results of phytochemical screening revealed the presence of unsaturated steroids and triterpenes, cardiac glycosides, tannins, flavonoids, alkaloids and saponins in both aqueous and ethylacetate extracts of *N. lotus*. However, anthraquinones were present in aqueous but not ethylacetate extract. Of the phytochemicals screened, anthraquinones and flavonoids were absent in both aqueous and ethylacetate extracts of *P. stratiotes* leaves, while cardiac glycosides and saponins were found to be present in ethylacetate extract only. The quantitative phytochemical analysis revealed high content of alkaloids (88.0 ± 14.14 and 64.0 ± 8.49 for aqueous and ethylacetate extracts of *N. lotus*) as well as foraqueous (102.0 ± 5.65) and ethylacetate (92.0 ± 14.14) extracts of *P. stratiotes,* respectively. There were also high content of phenols and saponins in *N. lotus* aqueous and ethylacetate extracts. The pharmacological activity of the plants could be linked to high content of some phytochemicals such as alkaloids and flavonoids observed in the present study.

Keywords: Medicinal plants, Ethnobotanical uses, Phytochemicals, Biomedical applications

ED095

Effects of Crude Ethanol Extract of Cola Nuts (*Cola nitida*) on the Liver Function Enzymes and Mucosa Epithelia Lining of Albino Rats

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ABSTRACT

Cola nuts (*Cola nitida*) are widely consumed for pleasure, and for medicinal use due to its vast secondary metabolites. This study investigates the effects of sub-chronic administration of crude ethanol extract of *Cola nitida* on liver function enzymes and histology of mucosa epithelia lining of albino rats. Twenty (20) albino rats were randomly divided into five (5) groups of A, B, C, D and E of four rats each (*n=4*), and were fed with equal volume of crude extract of *Cola nitida* of 600, 1200, 1800 and 2400 mg/kg body weight of the rats by oral intubation for 28 days. The result of the sub-chronic toxicity on liver function parameters showed

significant increase in serum aspartate transaminase (AST) and alanine transaminase (ALT) activity ($p<0.05$) in rats fed with 1200, 1800 and 2400 mg/kg. The serum alkaline phosphatase (ALP) showed a non-significant increase as compared to the control. Serum level of total and direct bilirubin showed significant increase ($p<0.01$ & 0.05) in animal groups fed with 600 and 2400 mg/kg, respectively. Histological studies on the mucosa epithelial lining showed an eroded epithelium and vacuolations at dose above 1200 mg/kg as compared to the control group. In conclusion, this study was able to establish that crude ethanol extract of *Cola nitida* have some deleterious effects on liver and mucosa epithelia lining and could further suggest more studies on other essential organs and its stimulatory effect on the central nervous system.

Keywords: Liver enzymes, Mucosal epithelia, Sub-chronic, *Cola nitida*, Albino rats

ED096

N-Butanol Fraction of Methanolic Leaf Extract of *Olax manni* Suppresses *Trypanosoma congolense* Motility*In Vitro*

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ABSTRACT

Olaxmanni Oliv. (Olacaceae) is commonly used in Nigeria for the traditional treatment of inflammation and fever, which are important features of parasitic infestations. On this basis, the *in vitro* anti-*Trypanosoma congolense* activities of the fractions of methanolic leaf extract of *O. manni* were evaluated. *T. congolense*-infected blood was treated with the fractions at a concentration of 10 mg/ml, respectively and the antitrypanosomal effects of the fractions were assessed by observing the time of cessation of *T. congolense* motility over the period of 1 hour using a 96-well microtiter plate technique. GC-MS analysis of the n-butanol fraction reveals the presence of 4-propionic acid (16.32%), 1, 3-cyclopentadiene (24.07%) and heptadecanoic acid (13.33%). The n-butanol fraction was observed to suppress motility of *T. congolense* relative to the control. Data from this study suggests n-butanol fraction of the methanolic leaf extract of *O. manni* has suppressive effects on *T. congolense* motility *in vitro*.

Keywords: *Olax manni*; Methanol Extract; n-Butanol fraction; *Trypanosoma congolense*.

ED097

Phytol Suppresses Parasitemia and Ameliorates Anaemia and Oxidative Brain Damage in Mice Infected with *Plasmodium berghei*

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ABSTRACT

The quest for the development of a novel drug against malarial infection informed the decision to subject phytol to *in vivo* trials following a demonstration of therapeutic potential against chloroquine sensitive strain of *Plasmodium falciparum* under *in vitro* condition. Sequel to this, the *in vivo* anti-*Plasmodium berghei* activity of phytol as well as the ameliorative effects of the compound on *P. berghei*-associated anaemia and organ damage were evaluated. Mice were infected with chloroquine-sensitive strain of *P. berghei* and were treated with phytol at a dose of 10 and 20 mg/kg body weight (BW) for four days. The levels of parasitemia, packed cell volume and redox sensitive biomarkers of liver, brain and spleen tissues were determined. The results of the study showed that phytol significantly ($p < 0.05$) suppressed the multiplication of *P. berghei* in a dose-dependent manner. Furthermore, the phytol significantly ($p < 0.05$) ameliorated the *P. berghei*-induced anaemia and brain damage. Evidence from the present study suggests phytol possibly has suppressive effects on *P. berghei* and could ameliorate some *P. berghei*-induced pathological changes.

Keywords: Phytol, Anaemia, Oxidative stress, *Plasmodium berghei*, Parasitaemia

ED098

Hepatocurative Effect of Oral Administration of Aqueous Leaf Extract of *Senna occidentalis* in CCl_4 Induced Hepatotoxic Rats

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ABSTRACT

Awareness of the utilization of medicinal plants to curtail diseases is on the increase. This study is to evaluate the phytochemical contents and effect of aqueous leaf extract of *Senna occidentalis* on liver function indices in CCl_4 induced hepatotoxic rats. A total of 32 male albino rats were used for this study. They were divided into six groups of 5 rats each. Group II-VI were induced with CCl_4at the dose of 150mg/kg for hepatotoxicity. Aqueous extract of *S. occidentalis* was orally administered to animals in groups III, IV and V at doses of 500mg/kg, 250 mg/kg and 166mg/kg for four weeks, respectively. Animals in group I were used as normal control, while those in group II were CCl_4 induced hepatotoxic control. Group VI were orally administered with livolin at a dose of 100mg/kg for four weeks. At the end of the fourth week, the animals were sacrificed and their serumactivities of aspartate aminotransferase (AST), alkaline phosphatase (ALP) and alanine aminotransferase (ALT) as well as serum levels of total bilirubin, direct bilirubin, total protein (TP) and Albumin (Alb) were determined.Results of phytochemical screening revealed the presence of tannins, saponins, cardiac glycosides, resins and flavonoids. The results showed a significant ($p<0.05$) increase in mean serum activities of AST, ALP, and ALT, serum total bilirubin and direct bilirubin levels, and a decrease in mean serum TP and albumin levels in group II when compared with group I. Results of the effect of oral administration of aqueous leaf extract of *S. occidentalis*at the doses of 500mg/kg, 250mg/kg and 166mg/kg for four weeks showed a significant ($p<0.05$) decrease in the serum AST, ALP, ALT, total bilirubin, direct bilirubin, and significant increase ($p<0.05$) in TP and albumin when compared with group II. Thus, it could be suggested that theaqueous leaf extract of *S. occidentalis* could have a hepatocurative effect against CCl_4 toxicity.

Keywords: Liver function, *Senna occidentalis*, Rats, Phytochemical

ED099

In-Vitro Antioxidant and *In-Vivo* Antiplasmodial Activities of *Acacia nilotica* Extracts

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ABSTRACT

Acacia nilotica is commonly used in Northern Nigeria for the treatment of malaria, cough and diabetes. This study was conducted to determine the i*n vitro* antioxidant and *in vivo* antiplasmodial activities of n-hexane, ethyl acetate, ethanol, methanol and aqueous extracts of *Acacia nilotica* in mice. Phytochemical constituents (quantitative and qualitative) of the plant extracts were done using standard methods. The antioxidant activities of the plant extracts were estimated using the DPPH radical scavenging assay. The inhibitory effects of the extracts on lipid peroxidation were determined via thiobarbituric acid reactive substances (TBARS) assay. Acute toxicity of the extract was studied using Lorkes method. The in vivo antiplasmodial activity of the extracts was tested against chloroquine-sensitive *Plasmodium berghei* in mice following the four-day suppressive standard method. Thirty nine animals of three mice each in a group were used. Group 1, 2 and 3 served as the positive, negative and normal control, respectively. Group 4 -13 animals were administered orally 200 and 400 mg/kg b.w of ethanol, ethyl acetate, n-haxane, methanol and aqueous extract, respectively. Changes in body weight and packed cell volume (PCV) were also recorded. Phytochemical screening revealed that tannin and glycoside were present (3.045 mg/100g). The ethanol, methanol, n-hexane and ethyl acetate extract showed significant (86.27 µg/ml) antioxidant activity. The LD 50 of all the extracts was greater than 5000 mg/kg b.w. All doses of the extract produced significant, dose-dependent, chemo suppressive activity against the parasite and are comparable to the group treated with chloroquine. The extract also prolonged the mean survival time of treated mice compared to the untreated

group. These fractions were able to ameliorate malaria-induced anemia by improving PCV in treated mice. The results of this study showed that the aqueous root extract of *Acacia nilotica* is safe and has antiplasmodial activity.

Keywords: *Acacia nilotica,*Phytochemical screening, *Plasmodium berghei*

ED100

Effect of Folic Acid and Vitamin-C Administration on Paraoxonase and Arylesterase-1 Activities in Sub-Chronic Lead Intoxicated Rats

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ABSTRACT

Lead is a harmful heavy metal that poses public health threats to both plants and animals. Raw material for food industries contaminated by lead from soil and water for irrigation is a potential risk for exposure. Hence the need for safe chelating agents for detoxification of lead contaminated food materials becomes imperative. Paraoxonase and aryl-esterase-1 (PON-1) in serum of lead-intoxicated rats administered Folic acid and Vitamin-C was investigated in forty male albino rats (160-190g) randomly divided into 2 groups of 20 rats each namely: Lead acetate (60mg/kg) and normal saline was administered to each group for 6 weeks followed by 4 weeks oral administration of 500µg/kg folic acid and 60mg/kg Vitamin-C. Blood samples were obtained at the end from each sacrificed rat for lipid profile and status of oxidative stress. Results obtained showed significant ($p<0.05$) decrease in activities of PON-1, catalase, superoxide dismutase, and high density lipoprotein cholesterol level, while increased level of low density lipoprotein cholesterol, triacylglycerol, total cholesterol, and malonyldialdehyde was noticed in the non-supplemented lead-intoxicated rats compared to the level observed in the folic acid and Vitamin-C supplemented groups. In conclusion, administration of folic acid and Vitamin-C to sub-chronic lead-intoxicated rats improves the catalytic activity of PON-1. This may mitigate lead induced toxicity.

Keywords: Lead, Folic acid, Vitamin C, Paraoxonase/aryl-esterase-1, PON-1, Lipid profile

ED101

Assessment of Toxicity and Antitrypanosomal Activity of Toad Venom in Rat Models

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ABSTRACT

African trypanosomiasis affects millions of humans and animals alike globally. It is considered one of the neglected diseases leading to the death of thousands of people. Although there are several commercially available anti-trypanosomal drugs used in treating the disease, the case of drug resistance, high cost, scarcity coupled with associated side effects warrant an urgent alternative. In this study, acute toxicity, prophylactic and suppressive anti-trypanosomal activities of toad venom in rats were determined with standard methods to produce alternative drug. In the acute toxicity test, a total of nine (9) Wistar rats were distributed into three groups and administered 10, 100 and 1000 mg/kg body weight (bw.) of the venom, respectively. Doses of 5, 10 and 20 mg/kg bw. of the venom and 5 mg/kg bw. of chloroquine phosphate were administered to the rats in their respective groups. Then, 2 mL of normal saline was also administered to the naive control and negative control groups in the prophylactic and suppressive anti-trypanosomal activities of the venom. The LD_{50} of the venom was 30 mg/kg bw. No significant difference ($p>0.05$) was

observed between the percentage trypanosomes suppression in prophylactic and suppressive anti-trypanosomal activities of chloroquine (99.12 and 97.25%) and activities of the venom at 5 mg/kg bw. (98.23 and 96.70%) and 10 mg/kg bw. (98.23 and 96.70%), respectively. The venom at a dose of 20 mg/kg bw. caused a significant reduction in packed cell volume (PCV) while doses of 5 and 10 mg/kg bw. as well as 5 mg/kg bw. of chloroquine phosphate caused a significant increment of the PCV. A significant increase ($p<0.05$) in the levels of ALT, AST, ALP, creatinine, urea and uric acid was observed at a dose of 20 mg/kg bw. of the venom, while doses of 5 and 10 mg/kg body weight showed no significant difference ($p>0.05$) to the naïve control group. It is shown from this study that toad venom exhibits suppressive and prophylactic anti-trypanosomal activities at all tested doses. Therefore, it can be explored further for the production of drugs that can be used for the management and/or treatment of trypanosomiasis. Although more toxicity test will be required along with the exploration of the venom during the drug development to ensure its safety in both human and animals.

Keywords: Toad venom, Acute toxicity, Prophylactic, Suppressive, Anti-trypanosomal activities

ED102

Analgesic Activity of n-Hexane Seed Extract of *Ricinus Communis* (Castor Plant) in Albino Rats

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ABSTRACT

Pain is the most common reason people seek medical attention, the side effect of most synthetic analgesic; such as liver damage, kidney damage, nausea and vomiting, constipation and diarrhoea, coupled with the inability to obtain this analgesic at a cheaper rate remains a major challenge. Medicinal plants have the potentials to be explored as a therapeutic strategy for various diseases. This study investigated the quantitative phytochemical analysis and analgesic activity of *Ricinus communis* in albino rats. Formalin was used to induce pain and thereafter animals were treated with n-hexan extract of *Ricinus communis.* The phytochemical analysis revealed 2.6 g% of *c*ardiac glycoside and 2.3 g% of saponins. The extract of *Ricinus communis* at the concentrations of 150, 200 and 400 mg revealed 12.7 %, 22.4% and 32.1% inhibition of licking and biting while 200 mg of a standard drug, paracetamol revealed 55.1% inhibition of licking and biting. The n-hexane extract of castor seed possesses a potent analgesic effect at a higher concentration; however, the effect was lower than that of the standard drug. The effect observed may be related to the inhibition of prostaglandins synthesis.

Keywords:*Ricinus communis*, n-Hexane, Analgesic activity, Inhibition, Paracetamol, Formalin

MOLECULAR MEDICINE AND HUMAN HEALTH (MH)

ORAL PRESENTATION

MH001

Risk Perception and Self-Reported Cases of HBV and HCV Infections among Health Care Professionals in Sokoto, North-Western Nigeria

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ABSTRACT
The viral infections Hepatitis B (HBV) and C (HCV) are important causes of chronic liver diseases world-wide. About 2 million and one million health care professionals get occupational exposure to HBV and HCV infections respectively. World-wide and needle-prick injury is the most frequent route through which health care professionals get infected with these viruses. The risk perception of these infections by health care professionals is vital to ensuring their safety and controlling Hepatitis B and C viral infections. The study was cross-sectional conducted at Specialist Hospital, Sokoto, from October 2015 to March 2016. The study participants were students and workers of health care profession, comprising nurses, nursing interns, midwives, midwifery interns, doctors, medical laboratory scientists, medical laboratory scientist interns, laboratory technicians and laboratory technician interns. SPSS Version 20 was used for the data analysis. Results are presented in frequencies and percentages. There were 174 health care professionals of different cadres comprising 56 (32 %) and 118 (68 %) males and females respectively. Their mean age was 28 ± 7 (Mean ± SD). About 157 (90.2 %) of the study participants believed they were at risk of acquiring HBV and HCV due to their profession. About 60 (34.5 %) said to have had previous needle prick injuries while delivering health care services to the patients. However, only 20 (33.3 %) reported the incidence. The reported positive sero-status of HBV and HCV infections in the study participants was 20 (12.1 %) and 14 (8.0 %) respectively. There was poor habit of self-reporting of needle prick injury, even though majority perceived to be at risk of contracting Hepatitis B and C viral infections. Substantial number of the health care professionals report being positive for HBV and HCV infections.

Keywords: HBV/HCV Infection, Risk Perception, Sero-status, Health Care Professionals

MH002

Effects of Antioxidant Supplementation on the Expression of Nuclear Factor kappa B (NFκB), Activator Protein-1 (AP-1) and Peroxisome Proliferator Activated Receptor Gamma (PPARγ) Genes in Acute Ischaemic Stroke Subjects

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ABSTRACT
Acute ischaemic stroke (AIS) is characterized by elevated levels of oxidative stress indices, reduced antioxidant defenses and dyslipidaemia, which are often contributory to theto the development and progression of the disease. The current work studied the effects of antioxidant vitamin and mineral supplementation at 150% RDA on the expression of NFκB, AP-1, and PPARγ genes in AIS subjects. Ten (10) ischaemic stroke subjects presenting within 72 hrs of symptom onset were treated and supplemented with daily doses of 15 mg vitamin E, 90 mg of vitamin C, 315 mg of vitamin A, 4.5 mg of copper, 22.5 mg of

zinc, 7.5 mg of manganese, 0.3 mg of chromium and 0.3 mg of selenium for 6 weeks. Blood samples were collected on days 0, 21 and 42 post-intervention and analyses for the expression of NFκB, AP-1, and PPARγ genes were carried out using quantitative RT-PCR (Rotor gene PCR). A 2-fold cut-off was considered significantly expressed. The results suggested that supplementation significantly ($P<0.05$) up-regulated NFκB and AP-1 genes and down-regulated PPARγ gene expression. It is concluded that supplementation with combined antioxidant vitamins and minerals at 150% RDA may reduce the risk of oxidative stress and dyslipidaemia associated with AIS through the up-regulation of NFκB and AP-1 and the down regulation of PPARγ.

Keywords: Oxidative Stress; NFκB; AP-1; PPARγ

MH003

Assessment of Dietary and Nutrient Patterns of People Living with HIV/AIDS Attending Voluntary and Counseling Test Units in Port Harcourt Metropolis.

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ABSTRACT

This study assessed the dietary pattern and nutrient intake of people living with HIV/AIDS (PLWHIV) attending some voluntary and counseling test units in Port Harcourt Metropolis. The data for the study was obtained from three randomly selected centers and consisted of 310 patients infected with HIV between the ages of 15 to 65 years. A semi structured questionnaire was used to obtain information on the socio economic and demographic characteristics as well as the dietary patterns of the respondent. Obtained data after analysis indicated that 30.6% of the respondent were of adolescent age between 15-24 years and the rest were adults ages 25 years and above. The anthropometry measurement of the respondents showed that 1.6 % of the respondents were under weight, 17.0 % were overweight while 56.4 % had normal weight. Also the CD4 counts of the respondents showed that 66.4 % were normal while 33.6% were low without any positive record of a high valve. The hypotheses were analyzed using students T- test statistics which showed that there was a significant relationship in the dietary patterns of PLWHIV attending voluntary and counseling test unit. Also good dietary diversity was observed among the HIV patients as their dietary pattern showed regular intake of energy and other food groups which may explain why most of them had satisfactory BMI against the usually observed incidence of weight loss and wasting among PLWHIV. It is therefore recommended that the PLWHIV should be encouraged to maintain dietary diversification with adequate consumption of the major food groups as well as social and financial support to maintain a healthy living.

Keywords: AID,Dietary pattern, HIV, BMI

MH004

Functional Role of Tyr12 in the Catalytic Activity of Novel Zeta-Like Glutathione *s*-transferase from *Acidovorax* sp. KKS102

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ABSTRACT

Glutathione S-transferases (GSTs) are a family of enzymes that function in the detoxification of a variety of electrophilic substrates. In the present work, we report a novel zeta-like GST (designated as KKSG9) from the biphenyl/polychlorobiphenyl-degrading organism *Acidovorax* sp. KKS102. KKSG9 possessed low sequence similarity but similar biochemical properties to zeta class GSTs. Functional analyses showed that the enzyme exhibits wider substrate specificity compared to most zeta class GSTs by reacting with 1-chloro-2,4-dinitrobenzene (CDNB), *p*-nitrobenzyl chloride (NBC), ethacrynic acid (EA), hydrogen peroxide, and

cumene hydroperoxide. The enzyme also displayed dehalogenation function against dichloroacetate, permethrin, and dieldrin. The functional role of Tyr12 was also investigated by site-directed mutagenesis. The mutant (Y12C) displayed low catalytic activity and dehalogenation function against all the substrates when compared with the wild type. Kinetic analyses using NBC and GSH as substrates showed that the mutant (Y12C) displayed a higher affinity for NBC when compared with the wild type, however, no significant change in GSH affinity was observed. These findings suggest that the presence of tyrosine residue in the motif might represent an evolutionary trend toward improving the catalytic activity of the enzyme. The enzyme as well could be useful in the bioremediation of various types of organochlorine pollutants.

Keywords: Glutathione S-transferase, *Acidovorax* sp. KKS102, Site-Directed Mutagenesis, Zeta, Dehalogenation

MH005

Evaluation of Efficacy and Impact of Active Fraction of *Ficus sycomorus* Sub-lethal Exposure on Expression of *GSTe2* in Delta methrin-Resistant *Anopheles coluzzii* from Kano, Nigeria

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ABSTRACT

Glutathione-S-Transferase (*GSTe2)* has been reported to be over expressed from larval to adult stages in resistant mosquitos' species, the vector of malaria. The *GSTe2* has been highly associated with resistance to pyrethroids and DDT in *Anopheles gambiae* complex and *Anopheles funestus* from West Africa. In this study, efficacy of *Ficus sycomorus* active fraction (AFFS) and its impact on *GSTe2* gene expression was investigated in the adult *Anopheles coluzzii* (F0), a major malarial vector in northern Nigeria. Quantitative reverse transcriptase PCR (qRT-PCR) was carried out to measure/validate the levels of expression of resistance gene (*GSTe2)* mRNA, in AFFS exposed and unexposed control *Anopheles coluzzii*, using Glyceraldehyde 3-phosphate dehydrogenase (GADH) as a house-keeping gene and a cDNA from the fully susceptible laboratory colony *Ngousso*. The average percentage mortalities for deltamethrin exposure against *Anophelescoluzzii* population was 31.00±3.01% while sub-lethal concentration of AFFS had 42.00±4.02% mortality after 24h. The intensity of deltamethrin resistance was strongly backed by high Knockdown rates (KD_{50}) of 212 minutes. The *GSTe2* gene was slightly over-expressed in AFFS exposed mosquitoes (0.35 fold) compared to susceptible *Ngousso* colony. The gene expression was significantly ($p<0.05$) reduced after AFFS exposure compared to unexposed control population (6.06 fold). This study preliminarily indicated the pyrethroids resistance modifying efficacy of AFFS sub-lethal concentration by reducing the expression levels *GSTe2* implicated in pyrethroids metabolism in resistant malarial vectors.

Keywords:*Ficus sycomorus,* Glutathione-S-Transferase, Mosquito, *Anopheles coluzzii*

MH006

Diagnostic Accuracy of the FINDRISC Tool in Predicting Future Diabetes Risk in Young Adult Nigerian Populations

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ABSTRACT

The identification of high risk individuals is necessary in stemming the tide of increasing diabetes prevalence. This paper summarizes findings among young adult Nigerian population assessed for diagnostic accuracy using the Finnish Diabetes Risk Scoring (FINDRISC) tool in predicting future diabetes risk. A prospective cross sectional study was conducted amongst 400 young adults comprising 47.0 % males and

53.0 % females aged between 15 to 35 years without a prior diagnosis of diabetes in urban and rural locations in Delta State, Nigeria. Participants filled the FINDRISC questionnaire prior to a fasting blood glucose test while anthropometric measurements were done following standard protocol. Results show the AUC value with 95% confidence interval (CI) for diagnosing prediabetes was 0.69 (0.52 – 0.86) in males; 0.66 (0.54–0.77) in females and 0.69 (0.60–0.79) in the overall study population. The corresponding optimal cut point for prediabetes was 5.5 for males (sensitivity = 60.0 %; specificity = 76.4 %), 6.5 for females (sensitivity = 63.6 %; specificity = 60.5 %) and 5.5 for the overall study population (sensitivity = 71.9 %; specificity = 59.2 %). FINDRISC demonstrated a fairly good discriminative ability in the prediction of future diabetes risk in the studied population.

Keywords: FINDRISC; Diabetes Risk, Diagnostic Accuracy, Young Adult

MH007

Interaction of *SARS-CoV-2* Spike Protein with Angiotensin Converting Enzyme Inhibitors and Selected Compounds from the Chemical Entities of Biological Interest.

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ABSTRACT

The recent COVID-19 outbreak has prompted the search of novel therapeutic agents for managing the disease. The initial step of the infection involves the binding of the virus through the viral spike protein with the host angiotensin converting enzyme 2 (ACE2). Herein, the interaction of ACE/ACE 2 inhibitors and their analogues as well as selected compounds with the viral spike protein as a strategy to hinder viral-ACE2 interaction were investigated. *SARS-CoV-2* spike protein and the ligands were retrieved from the protein databank and the ChEBI database respectively. The molecules were prepared before initiating the virtual screening using PyRx software. Discovery studio was used to visualize the binding interactions between the compounds and the protein. The ACE inhibitors and their analogues fosinopril (1-), fosinopril, moexipril and novacine had the best binding affinity to the protein with binding energies > -7.0 kcal/mol while the non-flavonoid stilben-4-ol binds with free binding energy of -7.1 kcal/mol. Other compounds belonging to either the flavonoids, terpenes or alkaloid classes had binding energies ≥ -7.0 Kcal/mol respectively. Such higher binding energies were enhanced via hydrogen bond (H-bond) interactions in addition to other observed interactions. The ACE inhibitors, their analogues and the selected compounds could serve as inhibitors of the spike protein and may pave way for drug discovery against the *SARS-CoV-2* virus.

Keywords: *SARS-CoV-2*, Spike Protein, Angiotensin Converting Enzyme, Flavonoids

MH008

Production and Characterization of Extracellular Fibrinolytic Enzyme from Soil *Streptomyces*

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ABSTRACT

Thrombotic diseases are accountable for an increasing mortality each year. Enzyme treatments are gaining more popularity in the field of medicine. This study aimed to produce and characterize extracellular fibrinolytic enzyme from soil *Streptomyces* obtained from abattoir compost of Yeldu, town in Arewa Local Government Area of Kebbi State, Nigeria. *Streptomyces* were isolated using Starch Casein Agar. The potent isolates were identified and selected for extracellular enzyme production. Fibrinolytic enzyme was produced by response surface methodology and the interactive effects of different carbon and nitrogen sources, incubation time, temperature, pH biomass on enzyme production were studied. Fibrinolytic enzyme produced was partially purified by ammonium sulphate precipitation method. Thrombolytic and fibrinogenolytic activities of the partially purified extracellular enzyme were assayed. The results showed the optimum pH and temperature for production of fibrinolytic enzyme were 7.5 and 35^{o}C respectively. The best

nitrogen and carbon source for fibrinolytic enzyme production were tyrosine and sucrose respectively. Optimum incubation time was 48 hours. The isolated *Streptomyces* produced extracellular fibrinolytic enzyme that exhibited both fibrinolytic and fibrinogenolytic activities similar to the standard Clexane injection the observed fibrinogenolytic activity of this enzyme suggests it can serve as an anticoagulant agent.. Therefore, this microbial enzyme presents a promising potential as therapeutic agent in combating various thrombolytic disorders.

Keywords: *Streptomyces*, Fibrinolytic enzyme, Clot lysis, Fibrinogenolytic activity.

MH009

TPS Complex-Mediated Regulation of Trehalose 6-Phosphate Homeostasis is Critical for Development and Pathogenesis of *Magnaporthe oryzae.*

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ABSTRACT

Trehalose biosynthesis pathway is a potential target for antifungal drugs development, and trehalose 6-phospahte (T6P) accumulation is widely known to have toxic effects to cells. However, how organisms maintain a safe T6P level and cope with its cytotoxicity effects when accumulated have not been reported. Herein, we unveil the mechanism by which the rice blast fungus, *Magnaporthe oryzae,* avoids T6P accumulation, and the genetic and physiological adjustments it undergoes to self-adjust the metabolite level when it is unavoidably accumulated. Specific effects of T6P accumulation have also been analyzed in the fungus. T6P accumulation leads to defects in the fungal development and pathogenicity. The accumulated T6P impairs cell wall assembly by disrupting actin organization. The dis-organization of actin impairs the distribution of chitin synthases thereby disrupting cell wall polymers distribution. In addition, the accumulated T6P was shown to perturb energy metabolism through GC-MS analysis. *M. oryzae* was able to overcome T6P cytotoxicity after accumulation through self-mutation. Seven mutation sites were found in *MoTPS3*. We further showed that MoTps3 physically interacts with MoTps1 and mutation in MoTps3 further suppresses MoTps1 activity to reduce the intracellular level of T6P. Both deletions of *MoTPS1* and *MoTPS3* down-regulate T6P synthesis and partially rescue Δ*Motps2* defects. Overall, our results provide insights into the effects of T6P accumulation and uncover a self-regulation mechanism to rebalance the T6P in *M. oryzae*.

Keywords: Cell wall integrity, Fungal development, *Magnaporthe oryzae*, Trehalose 6-phosphate, Spontaneous mutation, TPS complex

MH010

Kolaviron Ameliorates 7, 12-Dimethylbenzanthracene - Induced Mammary Damage in Female Wistar Rats

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ABSTRACT

Kolaviron (KV) is a flavonoid rich portion obtained from *Garcinia kola* seeds with a number of reported pharmacological effects. However, its ameliorative effects on 7,12-Dimethylbenzanthracene (DMBA)-induced mammary damage has not been fully investigated, thus the need for this research. Forty-nine female Wistar rats were randomly assigned into seven groups. DMBA was administered orally to rats in five of the groups as a single dose of 80 mg/kg body wt while the remaining two groups received the vehicle (1% DMSO). The rats were palpated weekly for 3 months to monitor tumor formation. After 3 months of DMBA

administration, estrogen receptor- α (ER-α) level was assayed for and the rats were assigned into these treatment groups: Group 1 (DMSO), Group 2 (DMBA), Group 3 (DMBA + 50mg/kg KV), Group 4 (DMBA + 100mg/kg KV), Group 5 (DMBA + 200mg/kg KV), Group 6 (10mg/kg Tamoxifen) and Group 7 (200mg/kg KV). KV was given (orally) for 2 weeks. Sialic acids, sialidase, sialyltransferase levels were assayed for in blood and mammary tissues followed by histopathological examinations. Significantly higher levels of ER-α, lobular neoplastic cells, epithelial hyperplasia, lymphocyte infiltration and increased sialylation were detected in the DMBA-induced rats. Treatment with KV resulted in a significant ($p<0.05$) decrease in ER-α level, and lower free serum sialic acid (21.1%), total sialic acid level of the mammary tissue (21.57%), sialyltransferase activity (30.83%) as well as mRNA level of the sialyltransferase gene (ST3Gal1). The findings suggest that KV could be further explored in targeting DMBA-induced mammary damage.

Keywords: 7,12-Dimethylbenzanthracene, Mammary neoplasia, Hypersialylation, Kolaviron, Chemoprevention

MH011

Analysis of hsa_circ_0001879 Regulatory Network in Metabolic Syndrome

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ABSTRACT

The frequency of metabolic syndrome is rapidly increasing in developing countries. It affects up to 18 % of the sub-Saharan African population. The roles of non-coding RNAs in the onset and progression of many infectious and metabolic diseases has been established. However, competing endogenous RNAs (ceRNAs) regulatory mechanism associated with diseases is under-studied. This work was designed to computationally evaluate the circRNA/miRNA/mRNA regulatory network in the pathophysiology of metabolic syndrome. Raw data for gene expression profiling was obtained from the GEO dataset and analysed in GEO2R. Relevant circular RNAs (circRNAs) data was extracted from intensive literature searches, and experimentally supported databases. CircInteractome web tool was used to find the circRNAs target miRNAs. Target mRNAs (genes) of each miRNA were obtained from miRDB. Functional enrichment analysis, pathways analysis and miRNAs/mRNA homology studies were performed. The constructed circRNA/miRNA/mRNA regulatory network consisting of one circRNAs, five miRNAs and their putative differentially expressed target genes plays pivotal role in the regulation of metabolic syndrome associated signalling pathways. The most important pathways were PI3K-Akt, MAPK, Apelin and JAK/STAT signalling pathways. It is predicted that hsa_circ_0001879 is implicated in the pathophysiology of metabolic syndrome via its sponging properties on hsa-miR-548c-3p, hsa-miR-7-5p and has-miR-1299. The present finding paves the way for designing molecular approaches for the treatment of metabolic syndrome.

Keywords: Metabolic Syndrome, circRNA, miRNA, Target Genes, Signalling Pathways

MH012

.The Impact of Histone Deacetylase Inhibitors (HDACis) on Epithelial-Mesenchymal Transition (EMT) in Triple Negative Breast Cancer (TNBC) Cells.

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ABSTRACT

Epithelial-mesenchymal transition (EMT) has been shown to play a role in cancer cell motility and invasiveness, and hence, a critical regulator of therapeutic resistance, development and metastasis. During pathological EMT, cells acquire either an epithelial or a mesenchymal state characterized by altered histone modifications. Consequently, HDAC inhibitors (HDACis) are currently being evaluated as anti-EMT agents against TNBC, however, how they regulate EMT is not clear. This study evaluated the potential effect of two

HDACis: vorinostat and entinostaton EMT to gain an insight into their molecular mechanisms of action in three TNBC cell lines (MDA-MB-231, MDA-MB-157, MX-1). The inhibitory efficacy of vorinostat and entinostat on TNBC proliferation, motility and invasion was determined by Ki67 assay; wound healing and transwell assays, respectively. Immunofluorescence staining and RT-PCR were used for cellular and molecular characterization of EMT markers, EMT Transcription Factors (EMT-TFs) and their targets. Results from this study show that entinostat(1 μM) and vorinostat (2.5 μM) significantly ($P<0.05$) inhibited migration and invasion in all three TNBC cell lines; while proliferation was reduced significantly ($P<0.05$) only in MX-1 cells, compared to control cells. Entinostat increased the expression of *SNAIL1* and *Fibronectin* (in MDA-MB-231cells), *SNAIL1* and *SNAIL2* (in MDA-MB-157cells) and *ZEB2* (MX-1cells). Vorinostat on the other hand increased the expression of *Fibronectin* (in MDA-MB-231 and MX-1cells) and *SNAIL2* (in MDA-MB-157 cells). We observe that the treatment of TNBC cells with entinostat and vorinostat induces EMT, at least partially through the upregulation of *SNAIL1*. However, more work needs to be carried out to fully understand the effect of these drugs on TNBC cells and their potential use as antimetastatic drugs.

Keywords: Triple negative breast cancer, Histone deacetylase inhibitors, Epithelial-mesenchymal transition

MH013

Cloning of a Rift Valley Fever fusion gene in a Plant virus Derived Replicon Vector

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ABSTRACT
Rift Valley fever (RVF) disease is an emerging viral zoonotic disease caused by the RVF virus (RVFV). There are no therapeutics or licensed vaccines for human use in the case of an eventual outbreak. There is the need to clone RVFV genes in cloning vectors for use in the production of antigens in cells or tested as DNA vaccines. A RVFV fusion gene designed by joining dominant and subdominant epitopes of Gn and Gc segments from the RVFV strain ZH548 with linkers was amplified by PCR. This synthesized RVFV fusion gene was cloned in a bean yellow dwarf virus derived replicon vector. The cloned PBYR2e3K2Mc-RVFV fusion gene was confirmed by PCR, restriction digestion and DNA sequencing. This cloned RVFV fusion gene in plant virus vector can be used for subsequent protein expression in plant cells or used directly as DNA vaccine in future studies.

Keywords: DNA cloning, RVFV fusion gene, Bean yellow dwarf derived vector

MH014

Hyponatraemia and Hypokalaemia Might not be Related to Alterations of Glucose, Cholesterol and Total Protein Levels during Human Infection with *Plasmodium falciparum*: a Hospital Based Cross-Sectional Study

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ABSTRACT
Electrolytes, particularly sodium and potassium, are paramount for the uptake of nutrients that are required for the proliferation, differentiation and survival of *Plasmodium falciparum* in its host. Sequel to this essential role, information on the interplay between electrolytes and nutrients would add to the current understanding of the malarial infection pathophysiology. A hospital based cross-sectional study was carried out to estimate the serum levels of sodium, potassium, glucose, cholesterol and total protein in both *P. falciparum*-infected patients and apparently healthy participants. Results obtained showed that the levels of sodium, potassium, glucose, cholesterol and total protein were significantly ($p < 0.05$) reduced compared to their respective

control groups. In addition, glucose, cholesterol and total protein had a non-significant ($p > 0.05$) association with sodium and potassium, respectively, in *P. falciparum*-infected patients. Evidence from the present study demonstrated that *P. falciparum*-induced depletion in sodium and potassium did not seem to play a significant role in the alterations of glucose, cholesterol and total protein during *P. falciparum* infection.

Keywords: *Plasmodium falciparum,* Malaria, Electrolytes, Glucose**,** Cholesterol**,** Total protein.

MH015

Distribution of Bifidobacteria in Saliva of Infants Attending Postnatal Clinic in Three Public Health Facilities in Kaduna Metropolis, Kaduna State, Nigeria

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ABSTRACT

To determine the distribution of *Bifidobacterium* species in infants, saliva samples were randomly collected by oral swabs method from 96 male and female infants during postnatal clinic visits at 3 public health facilities in Kaduna metropolis, Kaduna State, Nigeria. Demographic information on each infant was obtained through questionnaire completed by the mother. Initial identification of Bifidobacteria was carried out by biochemical tests (Catalase, indole and fructose-6-phosphate phosphoketolase). Using genus specific primers for Bifidobacterium, molecular characterization was carried out on 12 of the isolates out of which five were confirmed to be Bifidobacterium. Sequence analysis enabled identification of the species as *Bifidobacterium longum*. All the five isolates of *B. longum* were from male infants aged between 1 – 6 months. In conclusion, *Bifidobacterium longum* appears to be confined to male infants in the age group 1 – 6 months.

Keywords: Bifidobacteria, Isolates, Infant, Saliva.

MH016

Interleukin-1β Increases Matrix Metalloproteinase-13 and Interleukin-6 Levels and Protects Chondrocytes Apoptosis

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ABSTRACT

Interleukin-1 (IL-1), an inflammatory cytokine has been implicated in cartilage degradation and appears to be a therapeutic target for the treatment of osteoarthritis (OA). This study aimed to investigate the effect of IL-1β on osteoarthritic chondrocytes. Chondrocytes were stimulated with IL-β for 24, 48 and 72 h, respectively. After stimulation, the levels of matrix metalloproteinase -13 (MMP-13) and interleukin -6 (IL-6) were assessed using ELISA, whereas apoptosis was investigated using flow cytometry. The results showed that IL-1β significantly increased ($p<0.05$) the level of IL-6 at three time points being assessed when compared with non-stimulated chondrocytes. The increase in the level of MMP-13 was significantly higher compared to non-stimulated chondrocytes at 24 and 48 h treatment, respectively. Furthermore, the percentage of apoptotic cells in stimulated chondrocytes was not significantly different when compared with non-stimulated cells; however, the cellular morphology appeared round but retracted and shrank, resulting in loss of cell contact in the stimulated chondrocytes. Similarly, the result indicated that IL-1β did not affect chondrocyte viability as evidenced by the result of the viability assay. IL-1β induced inflammatory response and increased the level of matrix-degrading protein, MMP-13 but protected chondrocytes viability and apoptosis, suggesting IL-1β could promote cartilage degradation in OA without apoptosis.

Keywords: Chondrocytes, Interleukin-1β, Inflammation, Osteoarthritis, Apoptosis

MH017

Moonlighting Enzymes: A Review

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ABSTRACT

Moonlighting enzymes are special class of multifunctional proteins in which a single protein performs multiple autonomous and often unrelated functions. Apart from their catalytic nature, they also perform structural and regulatory functions. They include the housekeeping enzymes like hexokinase, glyceraldehyde-3-phosphate dehydrogenase, enolase, phosphoglycerate kinase, δ-aminolevulinic acid dehydratase, aldolase and many others. Some of the mechanisms in which these enzymes moonlight include: differences in localization, binding sites, oligomerization, complex formation and substrate concentrations. One of the major significances of moonlighting enzymes phenomena is it reduces the overall protein-coding genes. It also allows switch between different pathways and also serve as a mean of coordinating cellular activities. Like any other process, moonlighting enzymes have been implicated in a number of diseases including: breast cancer, leukaemia, diabetes retinopathy and haemolytic anaemia. The paper will review the evolution, mechanism, benefits and health implications associated with moonlighting enzymes.

Keywords: Moonlighting enzymes, Proteins, Diseases, Substrate

MH018

Retron-Based Library Recombineering: A New Frontier in Genetics Engineering

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ABSTRACT

Genetic engineering is the process of using recombinant DNA (rDNA) technology to alter the genetic makeup of an organism. Creating and characterizing individual genetic variants remains limited in scale, compare to the tremendous variation both existing in nature and envisioned by genome engineers, here a Retron Library Recombineering (RLR) a methodology for high- through put functional screens that surpass the scale specificity of CRISPR-cas methods. Recently, a breakthrough has occurred in genetics engineering with the advents of Retron Library Recombineering (RLR). It is a newly genetic engineering system that works without altering DNA and is quickly applied to huge population of cells when compared to CRISPR that's like a pair of genetic scissors, able to cut and make precise paste edits to the genome of the living cells. There are however potentials problems of cutting DNA which could resulted to unintended side effects and concern has been raised that CRISPR can make edits in many sections of genome. The new gene editing technique attempts to solve this issue. RLRs main difference is that it doesn't cut the DNA all, rather it introduces the new DNA segment while a cell replicates it genomes before dividing. It does so using retrons, a bacteria segment of DNA that produce pieces of single stranded DNA (ssDNA). Retrons gives the ability to produce ssDNA within the cells of choice for editing rather than forcing trying to force them into the cells from the outside, and without damaging the native DNA, which are both very compelling qualities.

Keywords: Genetic engineering, Functional Genomics, Retron, ssDNA, Anti biotic Resistant,

MH019

Effect of Co-administration of Guava(*Psidium guajavaL.*) Leaf Extracts and Captopril on Marker Enzymes in Cyclosporine-A Induced Hypertensive Rats

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ABSTRACT

Management of hypertension with drugs has been reported to come with various side effects, while the efficacy of plant extracts for the management of hypertension has raised controversy in different quarters. This study was conducted to evaluate the effects of co-administration of extracts of guava leaf from different varieties with captopril on cyclosporine-A-induced hypertension in rats. The aqueous extracts were prepared from leaves of different varieties of guava (*Psidium guajava* L) [white, red, and pink], 500 mg/Kg of the extracts with 10 mg/Kg of captopril was co-administered to male Wistar albino rats grouped differently, after being induced with 25 mg/Kg of cyclosporine-A. The activities of angiotensin-1-converting enzyme (ACE), arginase, superoxide dismutase (SOD), and catalase (CAT) were assessed on the heart tissue with the peroxidation value in malondialdehyde (MDA) equivalent, as well as the nitric oxide content of both the heart and plasma. The results showed a significant ($p<0.05$) increase in ACE, arginase activity, and MDA content in heart of hypertensive (untreated) rats compared to the control group, however, reduced activity was observed in co-administered groups when compared with the untreated group. The enzymatic antioxidant enzymes (SOD and CAT) were significantly ($p>0.05$) reduced in the untreated groups but elevated in treated groups, with a significant increase in plasma and heart nitric oxide content when compared with the hypertensive group. This study showed that co-administration of guava leaf extract with captopril could produce an additive effect in the treatment/management of hypertension.

Keywords: Hypertension, Guava Leaf, Captopril, Co-administration, Management

MH020

Hepato-Renal Effects of '*Covicure* Herbal Tea', an Acclaimed COVID-19 Therapeutic Agent on Albino Rats

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ABSTRACT

This study evaluated the effects of '*Covicure* herbal tea', an acclaimed COVID-19 therapeutic agent, on selected hepatic and renal parameters of adult albino rats. A total of 28 rats were divided into four groups A, B, C and D of seven rats each and treated with 0, 20, 40 and 80 mg/kg body weight of the tea respectively for 14 days. Administration of herbal tea mixture significantly ($p<0.05$) increased the activities of liver, kidney and serum catalase. Similarly, kidney and serum alkaline phosphatase, alanine aminotransferase, reduced glutathione, and malondialdehyde levels were significantly ($p<0.05$) elevated, as were the serum protein, direct bilirubin and electrolytes. However, levels of albumin, bilirubin, urea and creatinine were found to have reduced significantly ($p<0.05$) at 40 and 80 mg/kg body weight. Liver-and kidney-body weight ratios were not significantly ($p>0.05$) changed at different concentrations. Liver and kidney histology were also normal. In conclusion, the results of this study showed that the herbal mixture at the various concentrations tested had caused alterations in the parameters analyzed with significant changes observed in biochemical parameters but no histological changes.

Keywords: Herbal mixture tea, Hepatocytes, Renal function, Histology, Malondialdehyde, Catalase.

MH021

Detection of Mutation in *gyrA* Gene of Clinical Isolates of Ciprofloxacin Resistant *Salmonella enterica serovar typhi*

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ABSTRACT

The following study was designed to screen for the presence of wild type *Salmonella enterica serovar typhi* resistant to the frequently prescribed ciprofloxacin antibiotic among patients diagnosed with typhoid fever in Sokoto. Stool samples were incubated using selenite F broth for enrichment and then streaked on *Salmonella - Shigella* Agar (SSA) broth at 37 ºC for 24 hours. Suspected *Salmonella* colonies were then characterized biochemically and microscopically. Isolated *Salmonella* cells were afterwards subjected to antibacterial susceptibility screening using. Genomic DNA was isolated from resistant *Salmonella* strains using standard isolation kits after which forward and reverse primers were used to amplify the 2333556-2333823 region of the *gyrA* gene and subsequent amplicon sequence analysis for identification of possible mutation was done. Microscopically, the colonies were rod-shaped, gram negative, flagellated motile cells which were also positive to KOH, citrate, catalase but negative to urease biochemical tests. The zones of inhibition of resistant *Salmonella*cells ranged between5.5 ± 0.71 mm – 10.50 ± 1.12.All point mutations identified were silent except at position 133 where glycine is substituted with glutamic acid (Gly133Glu) and this point lies streospecifically in the ciprofloxacin protein binding region.Superimposition of 3D ribbon structure of CT18 strainwith sequenced amplicon revealed incomplete alignment which further suggests change in protein conformation could impact on ciprofloxacin binding. Findings of this study suggest the coexistence of wild typed ciprofloxacin susceptible and resistant strains of *Salmonella enterica serovar typhi*among the local populace in Sokoto state.

Keywords: Mutation, *Salmonella enterica serovar typhi,* Ciprofloxacin resistant, Clinical isolates

MH022

Effects of Gum-Resin Exudates of *Acacia senegal* L. on Behavioral and Biochemical Markers of Toxicity/Stress in *Drosophila melanogaster*

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ABSTRACT

Acacia gum also known as gum Arabic is an edible biopolymer obtained as plant exudates from Acacia species growing in the Sahel region. Its emulsifying, stabilizing, thickening and binding properties make it a suitable raw material for pharmaceutical and herbal medicine, and cosmeceutical. This study investigated the effects of gum resin exudates of *Acacia senegal* L. on behavioral and biochemical markers of toxicity/stress in *Drosophila melanogaster*. The crude gum-resin exudate of *Acacia senegal* L. (1 – 100mg/g) was incorporated in *Drosophila melanogaster* diet. Adult flies (Harwich strain) of both sexes were exposed to the gum Arabic – incorporated diet for 7 days. End point assays (mortality/survival and eclosion) were assessed by standard protocols. Negative geotaxis assay was used to evaluate locomotor activity. Biochemical markers of toxicity/stress (superoxide dismutase1, catalase and glutathione-S-transferase) were analyzed by UV/Vis spectrophotometry using standard protocols. There was no significant difference ($p > 0.05$) in mortality between the treatment and control groups. An observed LC_{50}> 100mg/g was recorded after mortality/survival assay. Significant differences ($p < 0.05$) in eclosion in the gum resin exudate – exposed flies at concentrations of 2, 4 and 5mg/g were observed when compared to the control. Findings from the negative geotaxis assays revealed significant impairment of locomotor activities ($p<0.05$) (in phase

II) at concentrations of 10 – 100mg/g. However, there were no significant differences ($p > 0.05$) in biochemical markers of toxicity/stress (SOD1, catalase and GST) between the test and control groups. Similarly, the gum resin exudate increased emergence of new flies, with no significant differences in locomotor activities at lower concentrations (1 – 5mg/g diet) in the exposed flies. This study has shown that the gum-resin exudate of *Acacia senegal* L. is not lethal to adult *Drosophila melanogaster*. Lower doses are safe and may be used as additives in foods or drugs, however usage at higher doses requires caution.

Keywords: Acacia, Exudate, *Drosophila melanogaster*, Mortality, Toxicity

MH023

Involvement of miR-17-5p and its Target Genes in the Pathogenesis Metabolic Syndrome.

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ABSTRACT

Non-coding RNAs (ncRNAs) play a vital role in the regulation of gene expression. Aberrant expression of ncRNA has been associated with many diseases such as obesity, diabetes mellitus, and many cancer types. Inadequate information about the molecular basis of metabolic syndrome is one of the reasons for the increasing prevalence of the disease worldwide. This study aimed to investigate the involvement of miR-17-5p in the pathogenesis of metabolic syndrome. The target genes for miR-17-5p were obtained from the miRNA database (miRDB) and compared with the metabolic syndrome differentially expressed genes (DEGs) obtained from the NCBI website. Functional enrichment analysis of miR-17-5p predicted target DEGs was performed to obtain the affected biological processes and molecular function and signaling pathways. Furthermore, the miRNA/mRNA homology study was performed on miR-17-5p versus dysregulated genes in JAK/STAT signaling pathway. A strong association between miRNA-17-5p and pathogenesis of metabolic syndrome was predicted. miR-17-5p involves in the pathogenesis of the disease via the regulation of its target genes linked to the inflammatory process, fatty acids transport, protein phosphorylation, kinase and GTPase activator activities, as well as some signaling pathways including JAK/STAT, AMPK, FoxO, and mTOR. The hybrid of miR-17-5p and *STAT3* was perfect and stable with the minimum free energy of -30.9 kcal/mol. It is therefore suggested that miR-17-5p could be a potential candidate for the management of the metabolic syndrome.

Keywords: Non-coding RNAs, miR_17-5p, Genes, Metabolic syndrome, Signaling pathways

MH024

1, 25(OH)2d3 Modulates T-Bet, IL-6, FOXP3, and IFN- γ in Inflammatory Bowel Disease Patients

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ABSTRACT

Inflammatory bowel diseases (IBD) is a disorder that is mediated by immune dysfunction in a genetically susceptible host. Crohn's diseases (CD) and ulcerative colitis (UC) are serotypes of IBD, both are important cause of gastrointestinal diseases. Patients with IBD are predisposed to colon cancer. This sub-clinical inflammation also propagates systemically, which can increase cardiovascular disease risk. This research aimed to assess the effects and efficacy of 1,25(OH)2D3 on the expressions of T-bet, IL-6, FOXP3, and IFN-γ in patients with IBD. Fifteen (15)ml of whole blood was aseptically collected into an EDTA container, from 20 IBD patients and 20 healthy controls. Peripheral blood mononuclear cells were isolated and stimulated with 1µg/ml of LPS in a cell culture plate and incubated for 4 hours. The cells were later treated with 10-10 and 10-8M of 1α,25(OH)2D3 and incubated at 37^0C under 5% CO_2 and 100% humidity. The RNA

extractions, cDNA synthesis, ELISA, primer design and qRT-PCR was later carried out. The findings from this research indicated a significant up-regulation of Foxp3 and down-regulations of T-bet, IL-6 and IFN-γ expressions. These findings indicated that 1, 25(OH)2D3 possess immunoregulatory, anti-inflammatory, and immunomodulatory effects on transcription of genes that are essentially significant in IBD pathogenesis. It may be used in the management of IBD patient.

Keywords: 1, 25(OH)2D3, IBD, Ulcerative colitis, Crohn's disease, Immunomodulation

MH025

Immunoregulatory Effects of*Mangifera Indica* on Serum IL-33 and IL-10 in Breast Tumor-induced Albino Rats

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ABSTRACT

Breast cancer is the most common form of malignancy and the leading cause of cancer-associated morbidity and mortality among women all over the world. Despite the considerable cost in the production of anti-cancer drugs, most of the drugs have not given the desired result. So natural products, such as Mangifera indica (M. indica) remain an important source of new drugs. They offer a great opportunity to develop, effective and affordable classes of new anti-cancer agents. This present research aimed to investigate the effects and efficacy of Mangifera indica on IL-33 and IL-10 in breast cancer-induced albino rats. : Twenty-four female albino rats were used for the study and they were grouped into six (6) of four (4) animals each. Group, I (negative control) was given normal routine feed. Groups II to VI were inducted with 65 mg/kg b.w. of DMBA to induce tumour. Group II served as a positive control and so was untreated; Group III was treated with a daily intraperitoneal injection of ascorbic acid (12mg/kg/day) for 14 days. Groups IV-VI were treated with 500, 1000 and 1500 mg/kg b.w. methanol extract of M. indica stems bark respectively. The rats were sacrificed, 24hrs after the last treatment. The level of IL-33 was significantly reduced in group III-VI, when compared with group II (Cancerous control)($P \leq 0.05$), while IL-10 was significantly upregulated in III-VI ($p \leq 0.05$). M. indica may possess immunosuppressive and immunomodulatory potentials and may be of benefit in the management of breast cancer.

Keywords: Mangifera indica, IL-33, IL-10, Breast ancer, DMBA**,**

MH026

Endothelial Nitric Oxide Synthase Derived Nitric Oxide, Clotting Profile and Histological Analysis in Non-Alcoholic Fatty Liver Disease Wistar Rats Treated with *Spirulina platensis* and Atorvastatin

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ABSTRACT

In this study, the efficacy of atorvastatin treatment and graded doses of *S. platensis* on the non-alcoholic fatty liver disease **(**NAFLD) Wistar rats were assessed. Forty-six (46) male Wistar rats were randomly grouped into 2 groups comprising of 8 rats as controls and 38 rats as test group. Controls received only basal diet and water while the test group received high fat diet (HFD) and carbon tetrachloride (CCL_4) intragastric twice a week for 8 weeks. Thereafter, 2 rats were sacrificed from each group and hepatic histological examination carried out to establish the occurrence of NAFLD. The negative control and test group were regrouped into six groups of 6 rats each. Positive control (NAFLD), received HFD and CCL_4 intragastric,group 3 received 10 mg/kg b.w. of atorvastatin and groups 4, 5, 6 and 7 received (200 mg, 400 mg, 600 mg and 800 mg/kg b.w respectively) of *S. platensis* extract intragastric for 4 weeks. Serum nitric oxide (NO), endothelial nitric oxide synthase activity (eNOS), clotting profile and histologic analysis were performed

using standard techniques.After treatment, there were significantly*(p<0.05)* increased eNOS activity and levels of NO while clotting profile parameters significantly*(p<0.05)* decreased. The histopathological architecture was also improved.Administration of atorvastatin and high doses of *S. platensis* exerted potent effects against necrosis of the hepatocytes, steatohepatitis and clotting disorder in NAFLD rats.

Keywords: NAFLD, eNOS, NO, *S. platensis,* Atorvastatin, Clotting profile

MH027

Association between Endothelial Nitric Oxide Synthase, Nitric Oxide, and Lipid Profile in Non-Alcoholic Fatty Liver Disease in Wistar Rats Treated with *Spirulina platensis* and Atorvastatin

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ABSTRACT

We investigated the possible association between endothelial nitric oxide synthase (eNOS) activity, nitric oxide (NO) and lipid profile in non-alcoholic fatty liver disease (NAFLD) in Wistar rats treated with *Spirulina platensis* and atorvastatin. Forty-six (46) Wistar rats were randomly grouped into 2 groups of 8 rats as a control and 38 rats as test group. Control group was feed with only basal diet and water while the test group was feed with high fat diet (HFD) and carbon tetrachloride (CCL_4) intragastric twice a week for 8 weeks. Subsequently, 2 rats were sacrificed from each group and hepatic histological examination carried out to establish the incident of non-alcoholic liver disease. Negative control and test group were regrouped into six groups of 6 rats each. Positive control (NAFLD), received HFD and CCL_4 intragastric,group 3 received 10 mg/kg b.w. of atorvastatin and groups 4, 5, 6 and 7 received (200 mg, 400 mg, 600 mg and 800 mg/kg b.w. respectively) of *S. platensis* extract intragastric for 4 weeks. Serum eNOS, NO level and lipid profile were performed using standard procedures.Treatment of NAFLD rats indicated that eNOS activity significantly *(p<0.05)* and positively correlated with NO and high density lipoprotein (HDL) while significant*(p<0.05)* negative correlation was established with serum total cholesterol, triglyceride, low density lipoprotein(LDL) and very low density lipoprotein(VLDL). Increased serum eNOS activity was accompanied with increased in serum level of NO and HDL, while it decreases the serum total cholesterol, triglyceride, LDL and VLDL in NAFLD rats.

Keywords: NAFLD, eNOS, NO, *S. platensis,* Atorvastatin, HFD, Lipid profile

MH028

Molecular Detection of *Schistosoma haematobium* among Primary School Pupils usingLate PCR Agarose Gel Electrophoresis

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ABSTRACT

Schistosomiasis is considered the most common and widespread parasitic infection with significant socio-economic and public health concern worldwide and continues to be a significant cause of morbidity and mortality in developing and underdeveloped countries, including Nigeria. This study aimed to evaluate Linear-After-The-Exponential-Polymerase Chain Reaction (LATE-PCR) for the detection of *Schistosomahaematobium*in urine samples. Participants were selected based on simple random sampling. The study involved development of LATE-PCR method to establish and enhance accurate diagnosis of *S. haematobium*. Primers and probes targeting for *S. haematobium*, were designed for the Schistosoma species specific amplification. The LATE-PCR parameters were optimized and detection of PCR products

was performed on 2% agarose gel electrophoresis. The LATE-PCR detected schistosoma DNA as low as 1 fg/µl of parasite DNA in urine. The amplification reaction appears to be specific without across reaction with DNA from other micro-organisms. LATE-PCR dipstick developed in this study provides a valuable alternative for the detection of *S. haematobium*in the study area to speed up diagnosis in addition to the conventional method currently used.

Keywords: *Schistosoma haematobium,* PCR, Pupils, Agarose gel electrophoresis

MH029

Comparative Study on the Detection of HCV Using RDT and PCR among Blood Donors and Drug Addicts in Jos, North Central, Nigeria

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ABSTRACT

Hepatitis C virus infection is a global health problem associated with high morbidity and mortality. Prompt diagnosis of HCV is important for early detection, treatment and management of this disease. This study evaluated RDT and PCR-based detection methods of HCV among blood donors and drugs addicts in Jos, Nigeria. A total of 100 venous blood samples were examined from August 2018 to December 2018. Of the overall blood samples, 15(30.0%) tested positive by PCR and 7(14.0%) by RDT (P=1.000) which is insignificant. Nine with primary school education, 2(22.2%) and seventeen with tertiary education 1(5.8%) tested positive by RDT (P= 0.368) which is insignificant as compared with 4(44.4%) and 2(11.7%) by PCR,(P=0.074) which makes it insignificant. RDT recorded 7% positive samples among drug addicts and zero percent among blood donors while PCR recorded 15% among drug addicts and also zero percent among blood donors.PCR achieved 65.2% sensitivity with 65.2% Negative Predictive Value (NPV) while RDT had 47.0% Sensitivity with 47.0% NPV. The Chi-Square test shows hepatitis C virus infection is more associated with drug addicts than blood donors. The findings from this study concluded that, HCV is very prevalent among drug addicts in Jos and the PCR method is recommended as a gold standard for effective detection of HCV infection in Jos, Plateau state, Nigeria.

Keywords: HCV, PCR, Drug addicts, Blood, Jos

MH030

Neuroprotective Role of Ripped Fruit Aqueous Extract of*Terminalia catappa* on $CuSO_4$-Induced Neurotoxicity in *Drosophila Melanogaster* Model.

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ABSTRACT

Terminaliacatappa, commonly known as Indian almond has been used from time immemorial in traditional medicine for the treatment of many ailments, among which are diseases of the nervous system. Thus far, there is little evidence supporting the use of the plant for the treatment of neurodegenerative diseases. Therefore, the current study was carried out to determine the anti-oxidant and neuroprotective effect of the aqueous extract of *T.catappa* ripe fruits against $CuSO_4$-induced neurotoxicity in *Drosophila melanogaster*. The effect of the extract on the induced flies was monitored behaviourally and biochemically. The extract enhances the activities of Acetyl-cholinesterase, Catalase and Glutathione-S-Transferase in the CuSO4-exposed flies. The levels of Nitric Oxide, Hydrogen peroxide, and Total thiol in the tissues of exposed flies decreased significantly following treatment with *T. catappa* extracts. The mortality rate of the cu- exposed flies also decreased significantly *($p<0.05$)* with an increase in the dose of the plant extract. Similarly, the extract also enhanced the survival rate of the flies when fed before exposure to the environmental toxicant.

The finding credence to the use of the Ripped fruit *T. catappa* as an anti-oxidative and neuroprotective agent in traditional medicine.

Keywords: *Drosophila melanogaster,*Neuroprotective; Neurotoxicity, *Terminaliacatappa*

MH031

Antimalarial Drugs Interactions with Bovine Serum Albumin and Haemoglobin under Different Physiological Conditions

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ABSTRACT

Study of drug-protein interaction is significant for therapeutic purposes particularly the plasma proteins; albumin, and oxygen transporter; haemoglobin that are associated with drugs, which could provide valuable information on drug distribution, metabolism, and excretion. The work was aimed to evaluate the interaction of some antimalarial drugs; chloroquine (CQ), and amodiaquine (AMQ) on model protein transporters; haemoglobin (Hb) and bovine serum albumin (BSA) in aqueous solution under different physiological conditions. Changes in spectral shift and fluorescence emission were monitored using fluorescence spectroscopy. Effects of increase drug concentration, pH and temperature at constant Hb and BSA concentrations were studied using excitation at 350 nm and emission wavelength between 300 to 900 nm. The drugs were prepared in concentrations between 5 - 25μM. The BSA and Hb were prepared in TrisHCl buffer (pH 10.2) and 0.05M phosphate buffer (pH 7.2) respectively. The fluorescence of Hb and BSA was attributed to the presence of amino acid residues especially tryptophan (Trp). However, the results obtained showed positive interactions and possible structural shift and emission intensity after binding of antimalarial drugs to BSA and Hb (conformational change). The drugs showed non-quenching effects on the Hb and BSA by increasing their intrinsic fluorescence through a static mechanism, attributed to the effect of hydrogen bonding and Van der Waals forces, which further suggest being involved in the drug-proteins interaction. These changes may have a downstream implication in drug distribution, metabolism, and elimination. To explore more, other techniques such as FT-IR, and molecular docking could be suggested. In conclusion, a spectral comparison between CQ and AMQ may strongly indicates mechanistic differences in drugs interaction with both haemoglobin and BSA in an aqueous environment.

Keywords: Antimalarial drugs, Haemoglobin, Bovine serum albumin, Fluorescence intensity, Conformational change.

MH032

Rutin Downregulates HER4 through Inhibition of NRF2 Signalling Pathway Leading to Reduced Ovarian Cancer Proliferation

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ABSTRACT

Rutin is a bioflavonoid which has powerful antioxidant properties. It has been shown to inhibit cancer cell migration and invasion. Nuclear factor (NRF2) and HER family regulate the normal cellular proliferation and maintenance and their expressions have been implicated in resistance of numerous cancers to chemotherapeutic agents. 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% CO_2 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) or Rutin to a final concentration as required in the media.

Following this, Dual luciferase assay, cytotoxicity assay, ROS detection, Glutathione assay and immunoblotting were performed in this study. It demonstrated that rutin inhibited the NRF2 activity, which led to downregulation of HER4 protein expression and decreased cell growth of OVCAR3 and OVCAR4 cells. Additional investigation revealed that rutin could lead to transcriptional inhibition of HER4 promoter activity by inhibiting the NRF2 activity in the HER4 promoter region. 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 rutin may inhibit the cell growth of ovarian cancer cells through NRF2-mediated downregulation of HER4 expression and could be a novel avenue rutin induced NRF2 inhibition, which lead to inhibition of cancer cell growth.

Keywords: Rutin, NRF2, HER4, Glutathione, ROS, Cytotoxicity

MH033

Association of the *KLHL10* rs116420871 (A>C) Polymorphisms with Male Infertility

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ABSTRACT
Male infertility is a hetero-pathological condition affecting over 90 million men within reproductive ages. It is associated with many pathological factors, including but not limited to genetic alteration as a result of single nucleotide polymorphism (SNP), in essential genes involved in spermatogenesis and sperm delivery. *KLHL10* is an adopted of a CUL3-based E3 ubiquitin-protein ligase complex, which is known to be involved in spermatogenesis, fertilization, morphogenesis and male gonad development. The present study aimed to investigate the association of *KLHL10*gene rs116420871 (A>C) polymorphismswithmale infertility in Nigerian population. The 120 adults, including 50 infertile and 70 fertile men are recruited from Zamfara State. The genotyping was performed using amplification refractory mutation system-polymerase chain reaction (ARMS-PCR). In the overall analysis, it was found that 22%, 72% and 6%, of the infertile men, were heterozygous (AC) and homozygous A and C, while 5.71%, 91.43% and 2.86 of the fertile were heterozygous and homozygous A and C. Furthermore, the C allele (odd ratio [OR] = 0.296, 95% confidence interval [CI] =0.128–0.687, p = 0.005) is associated with male infertility. Similarly, a significant association (OR = 4.148, CI = 1.495–11.73, p = 0.0049) was observed in the dominant model.It is concluded that KLHL10 gene rs116420871 (A>C) polymorphisms might be genetic risk factors for male infertility.

Keywords: Male infertility, KLHL10 gene, genetic polymorphism, ARMS-PCR

POSTER PRESENTATION

MH034

Comparative Incidence Assessment of Two Different Asyptomatic Clinical Forms of Human Tuberculosis Infection in Some Selected Hospitals of Katsina Metropolis

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ABSTRACT
Tuberculosis is a human infectious disease caused by the bacterium *Mycobacterium tuberculosis* that affects the lungs and other associated parts of the body. Human tuberculosis infection starts as asymptomatic (latent tuberculosis) but can progress to become symptomatic (meningeal and pulmonary tuberculosis). A comparative incidence assessment was carried out to find the incidence rate of meningeal and pulmonary tuberculosis infections among *M. tuberculosis* infected patients in some selected hospitals of Katsina metropolis The triangulation method was used for the conduct of this assessment and data was collected from the patients and associated health personnel in some selected hospitals within the metropolis

based on the incidence rate of the infections from 2019 to 2020. The meningeal form of tuberculosis from the comparative study was found to have low incidence rates while the pulmonary form was found to be highest among all patients. The comparative assessment indicated that majority of the infected patients do not seek for medical help until the disease is at advanced stage. It was recommended therefore that the government and other relevant stakeholders should sensitize the general public on different aspects of the disease including modes of transmission different clinical forms and its management.

Keywords: *Mycobacterium tuberculosis*, Comparative Incidence Assessment, Meningeal and Pulmonary tuberculosis, Human Tuberculosis Infection

MH035

Safety Evaluation of Time-Restricted Fasting for Geriatric Diabetics

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ABSTRACT
Diabetes mellitus type 2 (T2DM) remains a growing epidemic among the elderly. The incidence of T2DM has been proven to increase with the advancement of age. Over the years, several interventions such as intermittent fasting (IF) has been developed and studied for the management of T2DM. Time-restricted fasting (TRF) is a type of intermittent fasting has been reported to possess therapeutic potentials in the management of obesity and T2DM in animal and clinical studies. The aim of this study was to evaluate the safety of TRF in the management of T2DM amongst the elderly with a focus on their overall health. Word combinations of 'geriatric diabetes', 'intermittent fasting', 'diabetes mellitus type 2' and 'Time-restricted fasting' were used to intensively search for randomized control trials, clinical trials, systematic surveys, and meta-analysis published from all-time in Pubmed, Google Scholar, Medline, Cochrane library and Clinicaltrials.gov. Inclusion criteria included studies with diabetic subjects of age ≥50 years. Four (4) studies were eligible and selected out of 1,124 search results. Three (3) studies reported improved glycemic response and no significant changes in weight and muscle function. Improved lifestyle and tolerability of TRF by subjects were documented in all the four (4) studies. The studies reviewed were not sufficient to draw conclusions on the safety of TRF for geriatric diabetics. Hence, more studies should be conducted to provide sufficient evidence of the efficacy of this intervention in the management of T2DM in seniors.

Keywords: Diabetes mellitus, Time-restricted fasting. Geriatric diabetic, Randomized control trial

MH036

Effect of β-Sitosterol on *Trypanosoma congolense* Associated Oxidative Stress

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ABSTRACT
*Trypanosoma congolens*e is known to induce oxidative stress leading to cellular injuries that affect vital tissues and organs in infected animals. In respect to this, the antioxidant capacity of β-sitosterol on *T. congolense* induced oxidative damage in the liver, kidney and spleen of infected rats were investigated by measuring the levels of Thiobarbituric acid reactive substances (TBARS), index of lipid peroxidation and reduced glutathione (GSH) concentrations. TBARS levels was significantly ($p < 0.05$) decreased across all the organs of infected rats treated with 15 mg/kg and 30 mg/kg bwβ-sitosterol. An increased ($p > 0.05$)GSH was observed in the liver with concomitant increase ($p > 0.05$)in the kidney and spleen levels of GSH of the treated animals. Hence, we conclude that β-sitosterol might prevent parasite-induced lipid peroxidation in the organs of infected rats.

Keywords: Oxidative stress, *Trypanosoma congolens*e, β-Sitosterol, Lipid peroxidation

MH037

A Comparative Incidence Assessment of Two Different Symptomatic Clinical Forms of Human Tuberculosis Infection in some Selected Hospitals of Katsina Metropolis

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ABSTRACT

Tuberculosis is a human infectious disease caused by a member from pathogenic bacteria group known as *Mycobacterium tuberculosis* which affects lungs and other associated parts of the body. Human tuberculosis infection started asymptomatic (latent tuberculosis) but when this infection spread in the system, it became symptomatic (meningeal and pulmonary tuberculosis).This comparative incidence assessmentis aimed at finding incidence rate of meningeal and pulmonary tuberculosis infections among the diagnosed tuberculosis infected patients in some selected hospitals of Katsina metropolis and to compare and also determine which among the two different clinical forms of this infection have the highest incidence rate among the patients. The triangulation method was used for the conduct of this assessment and the data was collected from the patients and associated health personnel's in some selected hospitals within metropolis based on the incidence rate of the infections from 2019 to 2020. The meningeal clinical form of tuberculosis infection was found to have low incidence rates with calculated p-value (0.06) while pulmonary clinical form of tuberculosis infection was found to have the highest incidence rate with calculated p-value (0.03) among the patients studied, the lower the p-value, the significant of the assessment. The comparative assessment indicated that people became infected with tuberculosis do not go to the Hospital at the early stage of infection unless when it becomes severe. It is recommended that the government, non-governmental organization and should regularly organize workshops and seminars on tuberculosis infection and used all the communication channels to educate general public on how to take measures to prevent the infection. Also the general public should be actively involved in environmental sanitation as well as attending hospital as soon as they started feeling signs and symptoms of the tuberculosis infection for the detection and control.

Keywords: *Mycobacterium tuberculosis,* Bacteria, Infection, Incifence

MH038

NUJGA-100 and NUJHA-100 as Novel Agents for the Management of Oxidative Stress in Sickle Cell Anaemia

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ABSTRACT

Sickle Cell Anaemia (SCA) is characterized by a pro-oxidant environment due to high amount of reactive oxygen species (ROS), that leads to production of MDA, a byproduct of lipid peroxidation. Improved antioxidants status increases the defense mechanism of the body system with resultant attenuation of disease severity. This study evaluated the antioxidative effect of two NUJGA-100 and NUJHA-100. Forty-five (45) patients were recruited, and divided into five groups comprising of group I (100ml placebo), group II (50ml NUJGA-100), group III (50ml NUJHA-100), group IV (100ml NUJGA-100) and group V (100ml NUJHA-100). Level of antioxidant vitamins (A, C, E) and malondialdehyde (MDA) were measured by spectrophotometric methods before treatment and after 12 weeks. The groups which were treated with 50ml, 100ml NUJGA-100 and NUJHA-100 had a significant increase ($P<0.05$) in the level of the antioxidant vitamins (A, C, E) and also a decrease in MDA levels was observed. This study reveals that the intake of the NUJGA-100 and NUJHA-100 has a beneficial effect on SCA patients and helps in maintaining an adequate antioxidant defense status and consequently contribute to the management of SCA.

Keywords: Sickle cell anaemia, Antioxidant vitamins, Malondialdehyde, Oxidative stress

MH039

Identification of Blood Grouping and Genotyping of Malaria Infected Patients Attending Gwadabawa Hospital, Sokoto

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ABSTRACT

Malaria is a major protozoan disease affecting the human population. Erythrocyte polymorphisms; mainly in blood groups and genotypes influence the susceptibility to severe malaria. This study investigates the prevalence of malaria in relatation to human blood group types and genotypes. The susceptibility, resistance, and severity of malaria to these factors were also assessed. The prevalence of malaria with blood groups and genotypes were determined in 60 subjects attending Gwadabawa hospital in Sokoto State, Nigeria. The blood group of malaria patients was determined using the agglutination method with anti-sera, while genotyping of malaria-infected patients was examined using electrophoresis. About 8 (11.6%) of the 60 samples collected in this study were having blood group O. While 22 (36.66%), 17 (28.3%), and 14 (23.33%) are of the blood group A, B, and AB respectively. Only 10 (12.63%) of the sample population are of the genotype SS, 18 (30%) are having AS genotype, whereas 32 (53.3%) of the 60 participants are of the genotype AA. The result indicates that blood group O individuals are least susceptible to malaria infection than the other blood group types. Individuals with blood group A or B are at increased risk of malaria infection in comparison to those of blood group AB. The result also indicates that participants with genotype AA were more susceptible to malaria than the sickle cell carriers (AS). In contrast, sickle cell disease (SS) participants were less susceptible to the plasmodial parasite. This work provides insights into the relationship between malaria, blood grouping, and genotype.

Keywords: Blood Grouping, Malaria, Genotype

MH040

Rolling Cycle Amplification and Restriction Fragment Length Polymorphism Reveals the Genetic Diversity of Cassava Mosaic begomoviruses in Northern Nigeria.

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ABSTRACT

Nigeria is the world largest cassava producer, and more than 30% of its total production comes from the northern region. However, the production of this important crop in Nigeria is affected by cassava mosaic disease (CMD) caused by cassava mosaic begomoviruses (CMBs). Although the incidence of CMD and CMBs were established, knowledge of genetic diversity amongst the causative agents of CMD in northern Nigeria is lacking. Characterization and diversity of CMBs present in cassava farms are critical for the development of cassava varieties that are resistant to CMD. Cassava fields were surveyed in 13 states of northwest and north-eastern Nigeria. Analysis of more than 300 cassava leaf samples by multiplex PCR found *African cassava mosaic virus* (ACMV) in 53.3%, *East African cassava mosaic virus* (EACMCV), 7.0% and mixed infection of ACMV+EACMCV in 23.0%. Rolling cycle amplification (RCA) was used to obtain the full-length component of ACMV and EACMCV genomes for RFLP analysis. RCA-RFLP analysis revealed a greater diversity of restriction patterns of EACMCV isolates. The findings from this study provide important information for strategies to control CMD. DNA sequencing of the identified restriction patterns will further provide more understanding of species diversity or the existence of new strain of CMBs in Nigeria.

Keywords: Rolling cycle amplification, Restriction fragment length polymorphism, Polymerase chain reaction, Cassava mosaic disease, Cassava mosaic begomoviruses

MH041

Molecular Characterization of some Bacteria with Bioleaching Potentials from Agbaja Mines of Kogi State, Nigeria.

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ABSTRACT

Two moderately thermophilic acidophilic bacteria with bioleaching potentials were isolated from Agbaja Mines of Kogi State Nigeria to identify strains with bioleaching potentials. Iron ore in the range of 0.25µm and 0.75µm particle sizes were cultured in a modified 9k media to facilitate bacterial growth. Preliminary morphological and biochemical analysis suggests that some of the bacteria identified are members of *Acidithiobacillus,* and *Leptospirillum*species respectively. The degree of bioleaching as a function of the amount of iron leached into solution was observed to be higher in days two and three cultures. DNA isolation was done using zymo fungal/bacterial extraction mini prep kit and subsequently subjected to 1% agarose gel electrophoresis, while amplification was carried out using a pettier based thermocycler PCR machine. Bands corresponding to 1.5kbp were obtained using universal primers 27F (5[1]-GAGTTTGATCCTGGCTCAG-3[1]) and 1492R (5[1]-GGTTACCTTGTTACGACT-3[1]). Purity check (A260/A280) of both DNA gave a value of 1.78. Phylogenetic studies of the sequences showed that more than 97% of the test organisms are close relatives of *Acidithiobacillus ferroxidans* (ATCC 23270) and *Leptospirillum ferrovirans* (DSM 15468) family of bacteria. This work has implications for the future application of biomining as an alternative means of iron ore mining technology.

Keywords: Bioleaching, Iron ore, Mining, Molecular characterization

ENDOCRINOLOGY AND METABOLIC DISORDERS (EM)

ORAL PRESENTATION

EM001

Ameliorative Ability of *Gongronema latifolium* Benth. Leaf on Neuropathy via Inhibition of Cognitive, Oxidative Stress and Inflammatory Response in Alloxan-Induced Diabetic Rats

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ABSTRACT

Gongronema latifolium (*G. latifolium*) Benth leaf is traditionally used to treat diabetes mellitus (DM) and other diseases in Nigeria and West Africa. This study was performed to evaluate the neuroprotective effect of the aqueous leaf extract of *G. latifolium* against alloxan-induced diabetic rats. Antidiabetic activity of *G. latifolium* extract (6.36, 12.72 and 25.44 mg/kg) was determined in alloxan-induced (150 mg/kg, i.p.) diabetic rats. Fasting blood glucose level and the oxidative stress markers catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), malondialdehyde (MDA) and nitric oxide (NO) levels were measured in the homogenized brain tissues. The cognitive biomarkers acetylcholinesterase (AChE), butyrylcholinesterase (BChE), dopamine (DOPA), serotonin, epinephrine, norepinephrine and cyclooxygenase (COX-2) were also assayed as described. Administration of *G. latifolium* leaf extract to diabetic rats significantly restored the alterations in the levels of fasting blood glucose (FBG). MDA and NO levels were significantly reduced with an improvement in CAT, SOD and GPx activities in the kidneys and brains of diabetic rats treated with *G. latifolium*. Furthermore, *G. latifolium* significantly decreased the levels of AChE, BChE, DOPA, serotonin, epinephrine and nor-epinephrine levels in the serum of diabetic rat. *G. latifolium* effectively ameliorated the serum enzymatic COX-2 in diabetic rats. The result of this study showed that the leaf extract of *G. latifolium* improved antioxidant defense against oxidative stress, and displayed neuroprotective effect resulting in the modulation of brain neurotransmitters, which could be considered as a promising alternative treatment.

Keywords: *Gongronema latifolium.* Neuropathy, Oxidative stress, Inflammation, Alloxan

EM002

Poly-Phenol-Rich Bee Bread Improves Insulin – Glucagon Ratio, Pancreatic Histology and Some Diabetic Symptoms in Type 1 Diabetic Rats

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ABSTRACT

Type 1 diabetes mellitus (DM) is a disease associated with selective destruction of insulin-producing pancreatic β-cells. Bee Bread (BB) is a natural product rich in polyphenol with antioxidant properties. BB was collected from a farmer in Sokoto. Twenty four (24) females Sprague-Dawley rats (8-10 Weeks old) were obtained and allowed to acclimatize for one week. They were then grouped into: Non-DM, DM, DM + 200BB and DM + metformin groups. DM was induced using 75 mg of STZ per kg body weight intraperitonially. Rats in the non-DM group served as negative control, while the DM group was the positive control. The DM +200BB group was treated using 200mg/kg of BB while the DM + Metformin group was given 100mg/kg standard drug. Treatments lasted for 3 weeks. Animals were sacrificed and samples collected. Fasting blood glucose (FBG), Insulin, Glucagon, total antioxidant capacity (TAC) and malondialdehyde (MDA) were all analyzed, and pancreas tissue histology was studied. Results show that the DM group had higher FBG and

MDA with lower body weight compared to the DM+200BB group. BB improved TAC, plasma insulin and reduced glucagon levels in the DM+200BB group compared to the DM group, however, no significant differences were observed when the DM + 200BB group was compared with the DM + Metformin group. Histological Analysis showed that BB improved pancreatic tissue morphology. In conclusion BB reduced FBG, and improved body weight, TAC and insulin - glucagon ratio, and thus may be a potential candidate for the therapy of type 1 DM.

Keywords: Bee Bread, Insulin, Glucagon, Diabetes, Streptozotocin

EM003

Effect of Petroleum Ether Extract of Unripe *Carica Papaya* Seed on Liver Function of Streptozotocin-Induced Diabetic Rats

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ABSTRACT

This study evaluated the liver function of streptozotocin (STZ)-induced diabetic rats treated with petroleum ether extract (PET) of unripe *Carica papaya* (CP) seed for twenty-one (21) days. Four hundred grams (400g) of the powder of the unripe CP seed was extracted with 1.5 litres of petroleum ether in a soxhlet extractor for 72 hours at 60^{o}C. The extract was evaporated to dryness at 40 ^{o}C; the obtained extract had a chocolate consistency with an aromatic odour. Twenty-five (25) albino Wistar rats weighing 130 to 160 g were obtained and sub-divided into five (5) groups of five (5) rats each as follows: Group 1 (Normal Control, NC), Group 2 (Diabetic Control, DC),Group 3 (Diabetic and 200 mg Petroleum Ether Extract, DPET), Group 4 (Diabetic and standard Drug, DSTD), Group 5 (Normal Control and 200 mg Petroleum Ether Extract, NCPET). After the experimental period, the rats were sacrificed and blood was collected through cardiac puncture. The blood samples were centrifuged and the sera were used for the evaluation of serum total protein, albumin, direct bilirubin, total bilirubin and globulin. The result showed that there was a significant ($p<0.05$) increase in total protein, albumin, and globulin in groups 3 (DPET) and 4 (DSTD) when compared to group 2 (DC). However, there was a significant ($p < 0.05$) decrease in direct and total bilirubin in groups 3 (DPET) and 4 (DSTD) when compared to group 2 (DC). There was no difference ($p \geq 0.05$) difference in total protein, albumin, total bilirubin, direct bilirubin and globulin in group 5 (NCPET) when compared to group 1 (NC). The use of unripe *Carica papaya* seed extract may be effective in the treatment of diabetes as it does not have any damaging effect on the liver.

Keywords: *Carica papaya*, Diabetes Mellitus, Total Protein, Albumins, Bilirubin.

EM004

Rice Consumption and Metabolic Outcomes in Fruitfly (*Drosophila melanogaster*)

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ABSTRACT

Consumption of white rice (WR) varieties from several countries has been shown to predispose to metabolic disorders such as insulin resistance (IR). However, brown rice (BR), which has an intact bran layer is rich in bioactive compounds such as γ-oryzanol, GABA and phenolic compounds that possess anti-glycemic and antioxidant effects. In this study, five cultivars of paddy rice (*Akai maza hajji, Babu rashi, Ba'ingila, Dan kaushi and Jeep*) that are predominantly consumed in Northwestern Nigeria were analyzed for their nutritional composition and effects on metabolic outcomes in a fruit fly model. Accordingly, proximate and bioactive compound analyses were done after which adult fruit flies were fed on the different varieties of BR

and WR for 7days. The hemolymph of the fruit flies were finally harvested for glucose, trehalose, glycogen, triglyceride, superoxide dismutase (SOD), catalase (CAT) and malondialdehyde (MDA) measurements. Gene expression analyses were done on whole flies targeting *dACC,dPEPCK* and *dIRS.* The results indicated that the weight, triglyceride, glucose, trehalose and MDA levels were higher ($p<0.05$) while glycogen, SOD and CAT were lower ($p<0.05$) in the WR groups compared to the BR groups. Similarly, the expressions of *dACC* and *dPEPCK* were upregulated while that of *dIRS* was downregulated in the WR groups. Our findings are in keeping with the expected postprandial hyperglycemia following WR consumption, which promotes oxidative stress, IRS downregulation, IR and activation of both glycogenolysis and gluconeogenesis. BR prevented these metabolic changes possibly due to its richer nutritional composition.

Keywords: Brown rice, Fruit Fly, Insulin resistance, Oxidative stress, White rice.

EM005

RAGE Gene Polymorphisms and Microvascular Complications in Diabetes Mellitus: A Review

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ABSTRACT

Diabetes mellitus (DM) is a metabolic disorder of carbohydrate in which glucose is under-utilised leading to persistent hyperglycaemia due to insufficient amount of insulin or presence of factors that oppose insulin action. Complications of DM are acute metabolic and chronic systemic such as microvascular complications (which includes diabetic nephropathy, diabetic retinopathy, diabetic neuropathy and diabetic microangiopathy). Persistent hyperglycaemia observed in DM results in increased formation of advanced glycation end products (AGEs), which is linked to increased oxidative stress and inflammation and subsequently, the development of diabetic complications. AGEs exert biological activities via interaction with scavenger receptors, which remove and degrade AGEs, and Receptors for AGEs (RAGE). Increased expression of RAGE is observed in DM and insulin resistance and is shown to play a role in pathogenesis of diabetic complications. The gene coding for RAGE is located on chromosome 6p21.3 at major histocompatibility complex locus in class III region and composed of 11 exons as well as a 39 UTR. RAGE polymorphisms have been reported within exons, introns and gene regulatory regions. Specific RAGE gene single nucleotide polymorphisms (SNPs) have been implicated in the risk of diabetic complications, by altering the AGE-RAGE interaction. Approximately 30 polymorphisms in the RAGE gene have been identified among which, rs2070600, rs1800624, rs1800625, rs184003, and a 63 bp deletion are the most commonly reported. The rs2070600, rs1800625 and rs184003 were reported as being associated with microvascular complications in type 2 DM while the rs1800625 and a 63 bp deletion are associated with lower frequencies of microvascular complications in DM.

Keywords: Diabetes Mellitus, Microvascular Complications, AGEs, RAGE, SNPs

EM006

Effects of *Moringaoleifera*Supplementation on Diabetic-induced Cognitive Dysfunction in Rats Treated with Acarbose

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ABSTRACT

This study investigated the effect of Moringa leaf (MLSD) and seed (MSSD)supplemented diets on blood glucose, cognitive deficit, neuronal acetylcholinesterase (AChE) and adenosine deaminase (ADA)activities, reactive oxygen species (ROS) and total thiol (T-SH) levelsin the brain of diabetic rats treated with/without

acarbose (25 mg/kg bwt). Rats were made diabetic (≥250 mg/dl blood glucose) with a single dose of streptozotocin (STZ, 50 mg/kg bwt.*i.p.*) and grouped based on dietary regimes as follows: normal control (NC), STZ-induced diabetic control (DC), STZ + ACA, STZ + 2% MLSD, STZ + ACA + 2% MLSD, STZ + 4% MLSD, STZ + ACA + 4% MLSD, STZ + 2% MSSD, STZ + ACA + 2% MSSD, STZ + 4% MSSD and STZ + ACA + 4% MSSD. The NC, DC, and STZ + ACA rats were fed with basal diets (i.e. diets without test samples), while other groups received the corresponding test samplesfor 14 days, while on the last day of intervention, cognitive function was assessed using Morris water Maze and Y-maze tests, AChE, ADA, ROS, and T-SH levels weremeasured in the brain. The result showed altered cognition, increased ROS level, and elevated AChE, and ADA activities, coupled with decreased T-SH level in DC group compared with NC group. However, these were reversed in the diabetic rats fed with supplemented diets, and more so in those that received ACA co-treatment. The blood glucose level were normalized in the latter groups of rats. The findings suggest that MLSD/MSSDplus ACA could be explored to combat diabetes-induced cognitive dysfunction.

Keywords: Neurochemicals, Behavioural, Cognition, Diabetic encephalopathy, Brain, Moringa

EM007

Inhibition of JAK-STAT and NF-κB Signaling System Might be a Potent Therapeutic Target against Insulin Resistance in Type 2 Diabetic Rats.

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ABSTRACT

Chronic inflammation is associated with the production of high level of proinflammatory cytokines via the JAK-STAT and NF-κB signaling pathways which are known to be inhibited by tofacitinib and aspirin respectively. High level of these proinflammatory cytokines increase the synthesis of suppressors of cytokines signaling protein (SOCS), which at high level inhibit insulin signaling leading to insulin resistance. This present study was conducted to determine the effect of tofacitinib and aspirin on insulin resistance in type 2 diabetic rats. Rats were induced with type 2 diabetes and treated with 10 and 20 mg/kg bwtofacitinib (DT10, DT20), 100 and 200 mg/kg bw aspirin (DA100, DA200), combination of similar doses of tofacitinib with aspirin (DA1T1, DA2T2) and 850 mg/kg Metformin(DMET). The results obtained showed significant *(P<0.05)* decrease in TNF-α, IL-6 and serum amyloid A in DT10, DA100, DA1T1, DA2T2 and DMET groups when compared to diabetic control rats. However, only A1T1 group showed significant *(P<0.05)* decrease in the level of TNF-α, IL-6, SAA, HOMA-IR, blood glucose with significant*(P<0.05)* increase in the level of insulin and HOMA-β. This shows the effectiveness of inhibiting the two signaling pathways in lowering the level of inflammation and insulin resistance.

Keywords: Inhibition, Insulin resistance, JAK-STAT, NF-κB, Type 2 diabetes

EM008

Anti-inflammatory and Anti-Diabetic Properties of Indigenous Eggplant (*Solanum anguivi*)Fruit Extracts on Sucrose-Induced Diabetic-like Phenotype in *Drosophilia melanogaster*

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ABSTRACT

Type-2 diabetes mellitus (T2DM) affects 80% of the world's population with attendant complications such as inflammation. However side effects and cost of synthetic drugs necessitated the need to source for alternative multi-therapeutic agents from plant products. *Solanum anguivi* (SA) fruit locally called "IgbaYinrin" in South-west, Nigeria is eaten raw or in soups. This study sought to compare the anti-inflammatory and

anti-diabetic effects of ripe and unripe SA fruits using sucrose-induced diabetic *Drosophilia melanogaster* model. HPLC-UV was used to characterize the polyphenol compounds in the SA fruits while vitamins (A, C, E), carotenoids, and minerals (Na, K, Ca, Mg, Fe, P, and Zn) were analyzed using standard methods. *In-vitro* anti-inflammatory effects of the extracts were determined with lipooxygenases and cyclooxygenases enzymes, while diets supplemented with the eggplant samples (0.25 -1.0%) were fed to sucrose-induced diabetic *D. melanogaster*. The negative geotaxis and survival rate were monitored within 14 days after which the flies were sacrificed and the homogenate was used to determine the glucose oxidase (GO) level, activities of α-amylase and α-glucosidase, total thiols, and antioxidant enzymes [glutathione–S-transferase (GST), superoxide dismutase (SOD), catalase (CAT)]. Interestingly, the results revealed that the ripe fruit, which is usually discarded had significantly ($p>0.05$) higher total phenolic and flavonoid contents as well increased vitamins, carotenoids and minerals. It also exhibited higher inhibition of inflammatory enzymes, while the 0.5% SA-supplemented diet ameliorated the diabetic-like phenotype and increased the activities of the antioxidant enzymes better than other concentrations. Conclusively the ripe fruit could serve as a viable food ingredient with antioxidant properties

Keywords: Solanum fruits; Antioxidants; Polyphenols; Antioxidant enzymes; Carotenoid; Fruit fly

EM009

Diabeceutics A100 in the Management of Diabetes Mellitus

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ABSTRACT

Groundnut seed extract was found to possessed hypoglycemic effect. The current work investigated the effect of Diabeceutics A100, formulated from groundnut extract, on plasma glucose, serum glycated haemoglobin (HbA1c), lipid profile, antioxidant status and malondialdehyde of diabetic patients attending Usmanu Danfodiyo University Teaching Hospital and Specialist Hospital Sokoto. Diabeceutics A100 was supplemented at 50, 100 and 150 mg doses to diabetic patients for six weeks. Twenty-four hours after the last supplementation, blood samples were collected from the patients for the determination of fasting plasma glucose, and serum levels of glycated hemoglobin, lipid profile, antioxidant enzyme activities and malondialdehyde. There were non-significant ($p>0.05$) decreases in the levels of plasma glucose, HbA1c, triglyceride (TG), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C), and atherogenic index (AI). There was also non-significant ($p>0.05$) increase in high density lipoprotein cholesterol (HDL-C) in patients supplemented with the Diabeceutics A100. There was significant ($p<0.05$) decrease in the activity of superoxide dismutase in all the groups while the activity of glutathione peroxidase non-significantly ($p>0.05$) increased in all the groups supplemented with the DiabeceuticsA100. The malondialdehyde level decreased non-significantly ($p>0.05$) in the groups supplemented with Diabeceutics A100. The results did not corroborate the claims of previous studies that indicated significant hypoglycaemic effect of groundnut seeds extract. Those findings may have been influenced by the simultaneous use of conventional drugs. It is therefore worthwhile to study the effect of the DiabeceuticsA100 using subjects that are currently not on any conventional drugs.

Keywords: Hypoglycaemia, Groundnut seed extract, Diabeceutics A100, Diabetic patients.

EM010

5, 6-dehydrokawain Activates AMPK Target Genes Associated with Type 2 Diabetes in *Drosophila melanogaster*

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ABSTRACT

Type 2 diabetes mellitus is considered as one of the leading causes of high mortality and morbidity related diseases. The prevalence of diabetes has continued to increase worldwide and Nigeria, the most populous black nation is not an exception. AMP-activate protein kinase (AMPK) has been implicated in multiple pathways associated with obesity and diabetes. This research was designed to investigate the antidiabetic properties 5,6-dehydrokawain (56DHK) and its mechanism of action in high diet-induced insulin resistance T2DM using *Drosophila melanogaster*. High sucrose diet (30%) was used to induce diabetes in the flies.Hyperglycaemic flies were treated at increasing concentrations of 56DHK (50, 100, and 200 µg). Biochemical markers including glucose and triglycerides levels as well as oxidative stress markers catalase and Total antioxidant capacity (T-AOC) were measured spectrophotometrically. AMPK target genes involving insulin sensitivity, lipolysis and gluconeogenesiswere further investigated using qRT-PCR. Adults flies fed on high sucrose diet significantly ($p<0.05$) decreases the amount of circulating glucose and triglyceride concentration levels. T-AOC and catalase were found to significantly ($p<0.05$) increase at increasing concentration of 56DHK. A significant ($p<0.05$) increase in the transcription of AMPK and IRS were observed in 56DHKtreated diabetic flies. Additionally, expression levels of ACC and PEPCK were also noted to significantly ($p<0.05$) decrease at different concentration of 56DHK. Findings from this study showed that 56DHK ameliorates diabetes-induced hyperglycaemia by modulating AMPK signalling associated glycaemic control. The overall data suggest that 56DHK could serve as a promising lead for the development of an effective antidiabetic agent.

Keywords: 56DHK, Antidiabetic, Hyperglycaemia, AMPK, Drosophila

EM011

Effects of Metformin Treatment on Serum and Skeletal Muscle Glut 4 in Streptozotocin and Nicotinic Acid-Induced Diabetic Wister Rats

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ABSTRACT

Diabetes mellitus is a disorder of carbohydrate metabolism producing hyperglycaemia. Glucose transporter 4 (GLUT4) plays role in pathophysiology of type 2 diabetes. Current study investigates effect of metformin treatment onserum and muscle GLUT4 in streptozotocin and nicotinic acid induced diabetic rats. Thirty Wistar rats divided into 3 groups: non diabetics (ND), diabetic untreated control (DUC) and diabetic treated with metformin (DTM).No significant difference ($p>0.05$) between pre-test and post-test FPG (mmol/L) in NC (4.44 ± 1.92; 4.64 ± 1.92) and DUC (28.89 ± 1.92; 31.55 ± 1.92) butDTM (26.25 ± 1.92; 9.67 ± 1.92) has lower post-test compared to pre-test ($P< 0.0001$). There was significant increase ($P<0.05$) between pre-test and post-test body weight (g) in NC (190.60 ± 9.89; 214.90 ± 9.89) and DTM (148.30 ± 9.89; 161.30 ± 9.89) groups, however, decrease in post-test compared to pre-test in DUC (162.30 ± 9.89; 153.80 ± 9.89) but not significant ($P>0.05$). Serum GLUT 4 concentration in DTM group (3.96 ± 0.23) was significantly higher ($P<0.0001$) than DUC (2.80 ± 0.23) and NC (1.76 ± 0.23). No significant changes in muscle GLUT 4 (p =

0.845) in DTM (6.51 ± 0.19) compared with DUC (6.37 ± 0.19) and NC (6.41 ± 0.19). MDA concentrations in DUC (1.71 ± 0.09) was higher than DTM (1.17 ± 0.09) and NC (0.77 ± 0.09) (P<.0001). DTM has lower TC, LDL-C, VLDL, TG, and AIX levels compared to DUC (P<.0001). Metformin treatment affects serum GLUT4 with insignificant effect on skeletal muscle GLUT4 content.

Keywords: Diabetes Mellitus, GLUT 4, Metformin, Skeletal Muscle

EM012

Clavillia Plant Extract Ameliorates Oxidative Stress in Diabetic Rats

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ABSTRACT

A major symptom associated with diabetes mellitus is oxidative stress. The following study was designed to investigate the effects of methanol root extract of Clavillia (*Mirabilisjalapa*)onthe oxidative status of alloxan-induced hyperglycemic rats.Hyperglycemic rats were treated daily for 21 days with 200 and 400mg/kgb.w of the extract while monitoring postprandial glucose and body weight changes every two days.The rats weresacrificedafter 21 days and blood collected was usedtoassess lipid profile and markers of oxidative stress using commercial Randox ELISA kits. Results showdiabetic rats treated with extract doses described had a positive change in body weight while postprandial glucose levels dropped progressively with treatment from 24.9± 1.55 to 11.7± 1.47 mmol/L although no significant difference ($p<0.05$) in glucose levels was observed between doses administered but values compared favourably($p>0.05$) with glibenclamide treated group by day 14. The lipid profile markers-total cholesterol, triglycerides, and low density lipoprotein, remained elevated in untreated group while a significantdrop ($p<0.05$)was observed in groupstreated with 200 and 400 mg/kgb.wof the extract. Activities of the antioxidant enzymes catalase, superoxide dismutase and glutathione peroxidasediffer significantly ($p<0.05$) when compared with diabetic untreated group.Concentrations of malondialdehyde suggests increasing antioxidant:free radical ratio of treated animals. Findings fromthis study suggest the extract has anti-dyslipidemic effect which probably explains the observed improvement in the oxidative status of extract treated diabetic rats.

Keywords: Clavillia, Antioxidante enzymes, Lipid profile, Hyperglycemic Rats.

POSTER PRESENTATION

EM013

Haematological Parameters in Type 1 Diabetes Mellitus Patients Attending Sobi Specialists Hospital Ilorin, Kwara State, Nigeria

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ABSTRACT

Type 1 diabetes is a heterogeneous disorder associated with the destruction of pancreatic beta cells, with the resultant effect of absolute insulin deficiency. A wide range of haematology laboratory values change significantly in patients with diabetes. The aim of this study was to investigate changes in haematological parameters in patients with Type 1 Diabetes in Sobi Specialists Hospital, Ilorin, Kwara State, North-Central Nigeria and to compare the results with non-diabetics. The study was conducted for a period of 6 months, on 50 type 1 Diabetes Mellitus cases and 30 non- diabetic controls. Blood samples were collected for haematological parameters and autoantibody serum assay. There was significant reduction ($p<0.05$) in

haemoglobin levels, MCHC, and platelets among type 1 diabetes patients when compared to healthy controls**.** WBC count was found to be significantly elevated among type 1 diabetes compared to healthy controls. Anemia, thrombocytopenia and leucocytosis were associated haematological abnormalities among type 1 diabetes subjects.

Keywords: Anaemia, Leucocytosis, Thrombocytopenia, type 1 Diabetes Mellitus.

EM014

Prevalence of Dyslipidaemia and Risk of Cardiovascular Disease among Pregnant Women at First Antenatal Care Visit, Aminu Kano Teaching Hospital, Kano

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ABSTRACT

Maternal dyslipidaemia and atherogenic lipid-profile have undesirable effects on maternal and fetal well-being throughout gestation. Hence, this study determines the prevalence of dyslipidaemia and increasing risk of cardiovascular diseases among pregnant women at their first antenatal care visit to Aminu Kano Teaching Hospital (AKTH), Kano. A total of 112 pregnant women were recruited and demographic data as well as blood samples were collected for lipid profiling. The prevalence of dyslipidaemia and risk of cardiovascular disease among the pregnant women were determined according to National Cholesterol Education Programme guidelines and atherogenic index respectively. The results revealed that 49.1 % of the pregnant women were within the age of 19-28 years, 58.9 % have between 1 - 4 children while 58.0 % had tertiary education. Among the pregnant women, 38.4 % were within 19 - 22 weeks of gestation and 41.1 % each had experienced miscarriage/abortion and practiced birth spacing of > 24 months respectively. Serum lipid profile results showed that the prevalence of dyslipidaemia, hypercholesterolaemia, hypertriglyceridaemia, high LDL and low HDL among the pregnant women were 69.6 %, 19.6 %, 36.6 %, 18.8 % and 49.1 % respectively, whereas 81.0 % of the pregnant women showed high risk of developing cardiovascular disease. In conclusion, the prevalence of dyslipidaemia and risk for cardiovascular disease among the pregnant women was high and there is need for early intervention and preventive measures to combat the consequences of dyslipidaemia and cardiovascular diseases during pregnancy by the relevant authorities.

Keywords: Dyslipidaemia; Cardiovascular Disease; Pregnancy; Antenatal

EM015

Anti-diabetic and *Anti-Lipogenic E*ffects of 5, 6-Dehydrokawain in High Sucrose Diet-Induced Insulin Resistance Type 2 Diabetes using *Drosophila melanogaster*

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ABSTRACT

Type 2 diabetes (T2D) mellitus has reached epidemic proportions as a result of over-nutrition and increasingly sedentary lifestyles. Current therapies, although effective, are not without limitations.5,6-dehydrokawain (56DHK) is a phenolic molecule belonging to the class of stilbenes family.This research was designed to investigate the glucose and triglycerides lowering effects of 56DHKat different concentrations in high sucrose diet-induced insulin resistance T2D.High sucrose diet (30%) was used to induce diabetes in the adult flies. Flies were divided into six (6) different groups consisting the non-diabetic, non-treated

diabetic, and treated diabetic flies at increasing concentration of 56DHK (50□g/g, 100□g/g, and 200□g/g). Biochemical markers, including glucose, glycogen and triglycerides levels were investigated spectroscopically. Adults flies fed on high sucrose diet significantly ($p<0.05$) decreases the levels of circulating glucose and Triglyceride concentration. A significant ($p<0.05$) decrease in glycogen was also observed. Results from the present finding suggest that 56DHK ameliorates glycaemic control and promotes lipolysis in high sucrose diet-induced insulin resistance T2D of Drosophila flies.
Keywords: 5, 6-dehydrokawain, Antidiabetic, *Anti-Lipogenic*, Drosophila

EM016

Antioxidant Minerals Level in Diabetic Subjects Attending Kwara State Specialist Hospital Sobi, Ilorin

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ABSTRACT
Diabetes mellitus (DM) has been reported to be associated with the derangement of micronutrients. This study investigated the plasma levels of antioxidant elements (zinc, selenium, copper) in diabetes mellitus (DM) patients. Fifty (50) DM patients (test subjects) aged 20 to 50 years and 25 healthy, non-diabetic age-matched (control subjects) were recruited for the study. Fasting blood plasma levels of the elements were determined using atomic absorption spectrophotometer (AAS) after acid digestion. Blood glucose level was determined by the glucose oxidase/peroxidase method to confirm the status of the test and the control subjects. Body mass index was determined from the weight and height of the subjects.The mean values of plasma zinc, selenium and copper were significantly lower ($p<0.05$) in the diabetic patients compared to non-diabetic control. The mean values of glucose and BMI, werealso observed to be significantly lower in diabetic patients than control subjects ($p<0.05$). A significant positive correlation existed between glucose and BMI, copper and zinc ($r=0.00$; $p<0.05$). Negative association was also observed between copper and zinc ($r=-0.00$; $P<0.01$). These findings revealed that DM is associated with significant alteration in the concentrations of essential antioxidants and a significant increase in BMI. This may contribute to various metabolic complications and increased mortality from cardiovascular diseases in DM patients.
Keywords: Antioxidants, Diabetes mellitus, Copper, Zinc.

EM017

Hypothetic Mechanism of Diabetes Mellitus and Covid-19 Severity in Cormobid Patients

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ABSTRACT
Corona virus disease 2019 (COVID-19) is a pandemic that poses a severe threat to human life. It is associated with several diseases, including diabetes mellitus (DM), thereby aggravating the risk or severity of the disease. Presently, no document provides full scenario on how the diseases' (COVID-19 and DM interact. This study therefore attempts to elucidate the hypothetic associations between the two diseases. Relevant articles were retrieved from Google Scholar, PubMed, ScienceDirect and Medline using the keywords: 'SARS-CoV 2', 'diabetes mellitus' and 'COVID-19' for meta analysis. Findings from selected experimental studies reveal COVID-19 and DM both aggravate the severity of either disease. Data analyses suggest COVID-19 infection promotes the elevation of blood glucose, whereas, DM compromises immune response, particularly the innate immune network, which is the main defense system against COVID-19 among other factors. Cormobid patients are definitely at increased risk of severe disease pathogenesis. This study provides a hypothetical scenario of the interactions between COVID-19 and DM. Future investigators would find it useful in the design and development of clinical/basic research targeted at the management of DM in persons infected with COVID-19.
Keywords: SARS-CoV-2; Diabetes mellitus; Hyperglycaemia; Coronavirus; COVID-19

NUTRITION-RELATED COMMUNICABLE AND NON-COMMUNICABLE DISEASES (ND)

ORAL PRESENTATION

ND001

Estimation of the Potassium Bromate Content in Bread Sold in Jega

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ABSTRACT
Bread is one of the oldest man made food and prominent in many parts of the world. Potassium bromate is an additive widely used by bakery operators to as a preservative. Potassium bromate has adverse effect on health and is considered a possible carcinogen by the International Agency for Research on Cancer (IARC). This work was carried out to investigate the presence and quantity of potassium bromate in bread sold in Jega town, Kebbi State. Ten different brands of bread were sampled from Jega Local Government Area of Kebbi State. Quantitative analysis showed that all the bread samples contained potassium bromate ranging between 4.44 ± 0.06 µg/g and 10.80 ± 0.06 µg/g. The detected concentrations are higher than the permissible safe level of 0.02 µg/g approved by the National Agency for Food and Drug Administration and Control (NAFDAC). From the results obtained, all ten bread brands sampled are considered unhealthy for human consumption. It is recommended that strict regulation should be enforced on the use of potassium bromate as a bread preservative or safe alternatives such as ascorbic acid should be encouraged.
Keywords: Potassium Bromate, Bread, Carcinogenicity, NAFDAC, Ascorbic acid.

ND002

Evaluation of Hematological Indices of Weaned Rats Fed with *Arachis hypogaea* L. and *Anarcardium occidentale* L. Nuts Complementary Foods

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ABSTRACT
Childhood malnutrition is still a serious public health problem in developing countries including Nigeria. This may be attributed to the deficiency of vital nutrients especially in infant's weaning foods. To address this challenge, the current study was initiated to formulate complementary food using two nuts: *Arachis hypogaea* (groundnut) and *Anarcardium occidentale* (Cashew nut) and evaluate their nutritional importance in weaning rats. A total of 15 weaned albino rats grouped into five groups; A-E of three rats each were fed with groundnut and cashew nut complementary food for a period of 21 days. Initial body weights of the experimental rats were recorded before starting the feeding treatment at week 0. The rats were also weighed at weeks 1, 2 and 3 during the feeding period after which assays for hematological parameters were conducted. The study revealed 100g groundnut and 100g cashew nut progressively increased the body weights of the treated groups B and C. The study also showed that supplementation of the weaned rats with 100g groundnut and 100g cashew nut increased the Hemoglobin (HB), Packed cell volume (PCV), Red blood cells (RBC) and Platelets (PLT) levels in all the treated groups, with sample C (100g cashew nut) increased to significant levels while decreased levels of white blood cells (WBC) was observed in the treated groups. The result of this study indicated the striking nutritional relevance of the two nuts in the infant's growth and development and prevention of nutritional anaemia.

Keywords:*Arachis hypogaea*, *Anacardium occidentale*, Hematological indices, Complimentary food, weaning

ND003

Effect of Antioxidant-Rich Nutraceuticals in the Management of High Fat Diet-Induced Obesity in Albino Rats

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ABSTRACT

Obesity, a metabolic disorder caused by an imbalance in energy intake and energy expenditure, is a major risk factor for chronic diseases such as type 2 diabetes, hypertension, cardiovascular heart diseases (CHD) and some types of cancer. This research was designed to investigate the effect of antioxidant rich-nutraceuticals in the management of high fat diet-induced obesity in rats. Induction of obesity was achieved by feeding rats with a formulated high fat diet (HFD) for ten (10) weeks. Rats were subsequently group administered 250 mg/kg body weight and 500 mg/kg body weight of the nutraceutical respectively while apple cider vinegar of 5ml/kg body weight was administered to the standard control group. Supplementation showed significant ($p < 0.05$) decrease in the glucose, total cholesterol, triglyceride, low density lipoprotein-cholesterol, malondialdehyde and increased in high density lipoprotein-cholesterol and antioxidant status as compared with untreated high fat diet groups. However, there was no significant difference between supplementation of 500mg/kg and the standard group treated with 5ml/kg of Apple cider vinegar. Antioxidant rich nutraceuticals could provide a protective effect against oxidative stress in obesity and remedy complications associated with obesity by reversing the damage to near normal.

Keywords: Antioxidant, Nutraceutical, Obesity, High fat diet

ND004

Use of Antioxidants for Chronic Disease Management: is there Enough Evidence?

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ABSTRACT

Oxidative stress is implicated in many chronic diseases while antioxidants may reduce oxidative stress by reducing free radicals. Conversely, free radicals produced under normal physiological conditions are important for cellular functions like microbial killing and signal transduction via *NF-κB*. Thus, the human body requires a balance between free radicals and antioxidants to maintain normal physiological processes and prevent disease. This study was designed to assess the evidence supporting the use of antioxidants in the management of chronic diseases. Only data from systematic reviews and meta-analyses were used. Single antioxidant vitamins (A, C and E) were the most extensively studied, while data on antioxidant combinations and standardized antioxidant-rich plant extracts was lacking. Results of randomized controlled trials (RCT) suggested that antioxidants may increase the risks of lung cancer and mortality, while observational studies showed some benefit for cardiovascular disease but not diabetes. The benefits from observational studies may be attributed to confounding variables, reliance on food questionnaires, and lack of validation of historical data or vitamin intake. Results from RCTs also showed conflicting findings, with both beneficial and harmful outcomes likely because of the different doses used in the studies with different baseline situations and duration of intakes. Overall, there was no clinical evidence for the efficacy of antioxidants in chronic disease management despite promising results from pre-clinical studies. Further long term studies are needed especially for combination antioxidants or standardized antioxidant-rich extracts to assess their usefulness in the management of chronic diseases.

Keywords: Antioxidants, Cancer, Chronic Disease, Free Radicals, Oxidative Stress.

ND005

Litmus Test on Health: a Meta Analysis on Albumin Levels in Diverse Health Conditions

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ABSTRACT

Albumin is the principal circulating protein in human serum. It is unique among major plasma proteins in containing no carbohydrate and one of the widely studied biochemical health indicator. Its participations in several crucial physiological processes, in health and ill-health have posited albumin estimation as one of the most decisive fitness predictor. In both communicable and non communicable diseases that affect humans, albumin levels are reported to be altered. Albumin, been a ubiquitous biochemical marker in various diseases development, progression and recuperation, positioned its levels at vantage point for litmus test on health. This study is a meta analysis of various studies linking some selected diseases with alterations of albumin levels. Case–control studies addressing the relationship between the selected diverse diseases (ten communicable and ten non-communicable diseases) with albumin levels were identified through electronic search databases (Scopus, ISI Web of Science, PubMed, EmBase, and Cochrane Library). The relevant data obtained from these papers were analyzed. The searches made in diverse health conditions, in association with albumin levels have shown that Hypoalbuminemia is associated with poor disease prognosis at 30.55 %. Glycated serum albumin can serve as a marker of glucose intolerance at 50.12 %. Albumin is also associated with a variety of diseases including liver diseases at 40.03 %, cancer 60.24 %, inflammatory diseases at 40.34 %, renal disease at 31.09 %, cardiovascular disease at 60.10 %, diabetes at 23.50 %, pneumonia at 10.5 % and diverse infectious diseases at 70 %. The improvements in albumin concentrations were noted during recuperating at 90 %. These observations showed that albumin is an unspecific indicator on health condition.

Keywords: Albumin, Health, Fitness, Diseases, Electronic Search Databases, Indicator

ND006

Efficacy of Community-Based Management of Acute Malnutrition in Argungu Local Government Area of Kebbi State, Nigeria

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ABSTRACT

Childhood malnutrition is a major public health problem in Nigeria as it is associated with significant morbidity and mortality among children under the age of five years. Ready-to-use therapeutic foods (RUTFs) are the key components of the treatment protocol for children who present severe acute malnutrition without medical complications. The objective of this study was to evaluate the efficacy of rehabilitating severely malnourished children in the community in non-emergency situations. An observational exploratory study based on 1069 subjects (6-59months) who attend the four health facilities with CMAM services from 1st January to 30th December 2018 was conducted. Quantitative data were extracted from the individual beneficiary/Outpatient Therapeutic Program (OTP) cards from the health facilities (HFs) with CMAM services or OTP sites. Qualitative information was collected from the communities which form the catchment population of the HFs. The information obtained was subjected to statistical analyses using SPSS and ENA for SMART software. The CMAM program performance indicators revealed that the recovery rate was 89.0 %, non-recovery rate was 3.0 %, defaulters were7.25 % and death rate was≤0.75 %. The performance indicators according to ward/ HFs revealed that Argungu had the highest recovery rate of 92%, followed by Awasa and Lailaba each with 89 % recovery rates and Gulma with 83 % recovery rate. Furthermore, females had higher recovery rates than their male counter-parts. The trend of the recovery rate, defaulters and death rates meets the recommended SPHERE standards. Therefore, the current study indicates that

community-based management of severe acute malnutrition with RUTF could prevent the morbidity and mortality associated with malnutrition in early life.

Keywords: Children, Malnutrition, Morbidity, Mortality and RUTF

ND007

Functional Properties and Storage Stability of Optimized Cereal - Legume Based Complementary Foods

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ABSTRACT

The functional properties and keeping quality of food materials are very important to ascertain their suitability for complementary foods for infants and young children. This study evaluated the functional properties and storage stability of cereal-legume based complementary food (CF). Nutrisurvey (2007) was used to optimize and generate six composite blends designated F1, F2, F3, F4, F5, and F6 from yellow maize (*Zea mays*), wheat (*Triticum aestivum*), millet (*Pennisetum glaucum*), groundnut (*Arachis hypogea*), soyabeans (*Glycine max*), and *Moringa oleifera* respectively. Freshly prepared samples were subjected to analyses of functional properties. During storage, the composite blends were subjected to sensory evaluation, microbial count, moisture, peroxide value and free fatty acid determination at 15 day intervals for a period of 60 days. Data obtained were analyzed by ANOVA and results expressed as mean and standard error of mean. Results of functional properties revealed that bulk density ranged from 0.63to 0.81 g/cm^3, with water absorption capacity of 86-90 %, swelling index of 0.33-1.34 cm^3/g, reconstitution index of 2.20-3.20 and pH of 6.52-6.69. The organoleptic properties at baseline and endline suggested that the foods were acceptable to the panellists. The storage stability profile of the formulated CF at baseline and endline were not significantly different (P> 0.05). Therefore, this study provides a basis for the development of acceptable complementary foods with optimal functional properties and storage stability.

Keywords: Complementary food, Functional properties, Storage stability, Flour blends.

ND008

Study of Antioxidant Efficacy of *Abelmochus esculentus* (Okra) Fruits' Varieties on Rats Fed High-Fat Diet

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ABSTRACT

Consumption of diet rich in fats have been reported to promotes the progression of oxidative stress. Literature survey shows that Okra fruits has the potentials to ameliorate oxidative stress. However, Okra plants are of different varieties, and whether their antioxidant efficacies may vary with varieties is not known. This has prompted the study to compare antioxidant activities of two varieties of Okra fruits (NHB-AI-B and YarKolon) that showed potent antihyperlidaemic and rich phytochemicals content as reported by previous studies .*NHB-AI-B* and *YarKolon* okra fruits were sliced, air dried and pulverized then extracted with methanol (80%) using Soxhlet extractor and concentrated at 30°C in a rotary evaporator, then air dried. Nine groups of five rats were fed high-fat diet for 35 days followed by treatment with extracts for 21 days. Groups 1-3 (rats received varied doses of *NHB-AI-B* okra fruit variety), group 4-6 (rats received varied doses of *Yarkolon* okra fruit variety), group 7 (positive control), group 8: (normal control), and group 9 (negative control). Oxidative stress markers were assayed from serum of each rat. The results showed an elevated malondialdehyde (MDA) levels with low activities of superoxide dismutase (SOD), catalase (CAT), reduced glutathione (GSH) in rats fed high-fat diet. Treatment with extracts of the okra fruits varieties lowered MDA

levels and promotes SOD, CAT, GSH activities in the rats' groups. In conclusion, findings from the study suggested both NHB-AI-B and YarKolon fruits varieties exert antioxidant activities that seem to be in a similar manner.

Keywords: Okra, Varieties, *NHB-AI-B, YarKolon*, Fruit-extracts, Antioxidant, High-fat diet

ND009

Effect of Sicklo-N200 on Haematological and Antioxidant Vitamins in Sickle Cell Anaemia (SCA) Patients

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ABSTRACT

Sickle cell anaemia is a major public health concern and its management has remained inadequate. A nutraceutical for the management of sickle cell anaemia (SCA) using carrot, cabbage and honey was formulated. Thirty nine patients were recruited, randomly divided into 3 groups and administered placebo, and 2.5g and 5g of the nutraceutical respectively. Haematological parameters and antioxidant vitamins were analyzed before treatment and monitored every 4 weeks for 12 weeks using standard analytical procedures. Both treatment groups showed significant increases ($p<0.05$)in serum vitamins C and E starting from the 8th week. The placebo had no significant ($p>0.05$) effects on serum antioxidant vitamins and haematological parameters. Patients administered 5 g of Sicklo-N200 showed a significant increase in the value of the red blood cell count from the 8th week of treatment, but the increase was not significant in the other group. Haemoglobin and packed cell volume were not significantly affected by the treatment. White blood cell parameters and platelets decreased non significantly ($p>0.05$) in the treatment groups. This study showed that the nutraceutical is beneficial in the management of SCA.

Keywords: Sickle cell anaemia, Nutraceutical, Antioxidant vitamins, Haematology, Management

ND010

Biochemical and Antimicrobial Activities of Selected Freshwater Fish Mucus from Taqwai Lake, Niger State, Nigeria

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ABSTRACT

The study determined the biochemical and antimicrobial activities of fish mucus using standard methods. Mucus extract was collected from three different species of fish (African-mud catfish, *Clarias gariepinus*; Tilapia, *Oreochromis niloticus*; and giraffe head catfish, *Auchenoglanis occidentallis*) from local fishermen at Taqwai lake Minna. The proximate composition of the mucus with the highest crude protein is 24.18±0.08%,?and the least crude protein is 14.98±0.16%?, while the highest fat content is 23.28±0.11%. The highest total protein is from Tilapia fish 1.93±0.04 (mg/mL) while catfish has 0.71±0.02 (mg/mL). The amino acid profile of the various fish mucus indicates the presence of both essential and non-essential amino acids. The free radical scavenging activities of the mucus indicates that tilapia fish has activity at 65.56 ± 0.32 and IC_{50} 399.76 µg/ml. All the mucus samples show distinct protease, lysozyme and alkaline phosphatase activities of 43.43±0.48U, 26.11±0.79U, 175.30±6.45U respectively. Mucus extract of the various fishes exhibited antimicrobial activity against clinical isolates. Hence, mucus could be considered a cheap source of molecules for new drugs and effective antibiotics.

Keywords: Mucus, Tilapia, Catfish farmed, Giraffe catfish, Amino acid.

POSTER PRESENTATION

ND011

Effects of Nutraceutical Juices (NUJGA-100 and NUJHA-100) on Foetal Haemoglobin and Haematological Parameters of Sickle Cell Anaemia Patients

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ABSTRACT

Sickle cell anaemia (SCA) is a genetic blood disorder characterized by abnormal rigid sickle-shaped of a red blood cell. The study assessed the effects of treatment with NUJGA-100 and NUJHA-100 on foetal haemoglobin (HbF) and other haematological parameters in sickle cell patients. Forty-five (45) patients were recruited and divided into five groups comprising of group I (100 ml placebo), group II (50 ml NUJGA-100), group III (50 ml NUJHA-100), group IV (100 ml NUJGA-100) and group V (100 ml NUJHA-100). Haematological parameters, HbF levels, haemoglobin polymerization rate and Fe^{2+}/Fe^{3+} ratio were analysed before treatment and after 12 weeks. Results showed that groups that were treated with 50 ml, 100 ml NUJGA-100 and NUJHA-100 had a significant increase ($p<0.05$) in the level of HbF, RBC, Hb, PCV, MCV, MCH and Fe^{2+}/ Fe^{3+} ratio, thus indicating a decreased in haemolysis. Also, a significant decrease ($p<0.05$) in polymerization rate was observed in groups that were treated with 50 ml, 100 ml NUJGA-100 and NUJHA-100. This study reveals that NUJGA-100 and NUJHA-100 can be used in the management of SCA due to the induction of foetal haemoglobin production and improvement of some haematological parameters.

Keywords: Sickle cell anaemia, Foetal haemoglobin, Haematological parameters, Haemolysis.

ND012

Effect of Alcohol (Local Gin) on Acid and Alkaline Phosphatase Activities in Albino Rat

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ABSTRACT

The uncontrolled sales and the relatively cheap price of local gin (ogogoro) in Nigeria have increased its consumption among the populace. The liver being the chief metabolizing organ of alcohol is greatly at risk. This study investigated the effect of local gin (ogogoro) on liver of albino rats using alkaline phosphatase, total protein and acid phosphatase activities as markers. Twelve (12) male albino rats (rattus norvengicus) (with average body weights between (90-300g) were grouped into four (4) with three (3) rats in each group. Group D served as control while group A, B and C were the test groups given 100%, 50%, 25% local gin (120ml per kg body weight), respectively; while group D was given water. The rats were sacrificed after the 14th day and the sera were obtained for the alkaline phosphatase, total protein and acid phosphatase homogenate assay. The alkaline phosphatase and acid phosphatase activities, and total protein were determined using standard methods. The data collected were analyzed using ANOVA, with significant difference determined at $p<0.05$. The results showed that alkaline phosphatase and acid phosphatase activities were significantly increased when compared with the control, while that of total protein level decreased with respect to the concentration given to each group. The study therefore concluded that local gin has a lethal effect on liver cells and that the amount of alcohol consumption is a major determinant of the degree of damage done to the liver.

Keywords: Local gin, Alkaline phosphatase, Total protein, Acid phosphatase

ND013

Elemental Composition, *in vitro* Bioavailability and Associated Health Risk in Cereal Grains from Ebonyi State Nigeria

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ABSTRACT

Cereal grains are the cheapest and most available sources of nutrients to all age groups in developing countries of the world. Mineral nutrients are required at appropriate quantities to maintain optimal health. The bio-availability, safety and wholesomeness of minerals in cereal grains are affected by numerous anti-nutritional factors. Therefore, the levels, *invitro* bioavailability and potential health risk of elements in cereal grains were investigated using standard protocols. The samples were obtained from Ebonyi State Nigeria, processed and analysed using flame absorption spectrophotometer and colorimetric methods. Results showed variable significant ($p < 0.05$) levels of elements, phytate and oxalate in the cereal grains. Elemental interrelationships, molar ratios and safety index values showed high *in vitro* bioavailability and appropriate loading of the elements. Estimated daily intakes of elements were all below maximum permissible limit set by European Food Safety Authority. Hazard quotient and hazard index values though higher in children than adults, were less than one in all cases, indicating no health risk except in wheat and sorghum where the hazard index values for children exceeded one and thus, points towards unacceptable risks. The incremental lifetime cancer risk and total cancer risk values did not exceed the United States Environmental Protection Agency threshold limit (1.0×10^{-4}), hence, acceptable risk level for children and adults. This study will be very helpful to national and international food consumption surveys targeted at providing dietary advice to consumers, production and processing companies, dieticians, researchers and policy makers on the quality of these cereal grains.

Keywords: Anti-Nutrients, Bioavailability, Cereal grains, Elements, Health risk, Nigeria

ND014

Functional Food Ingredients as Potential Inhibitors of COVID-19: A Review

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ABSTRACT

Covid-19 is caused by a novel zoonotic pathogenic virus called Severe Acute Respiratory Syndrome Coronavirus-2(SARS-CoV-2), which was first reported in December 2019 in Wuhan, Hubei Province, China. It is widely transmitted through direct or indirect contact, and currently has no specific treatmentalthough preventive strategies have been advocated. The most common symptoms of SARS-CoV-2 include sore throat, dry cough, fever, and shortness of breath. In severe cases, the clinical presentation includes pneumonia that progresses to multi-organ failure and death. This review focuses on the use of plantbased foods that have the potential to enhance immunity in all age groups against COVID19. Plantbased foods have been reported to increase the beneficial gut bacteria, which account for up to 85 % of the immune system. Further evidence suggests that copius amounts of water, minerals like magnesium and zinc, some herbs, and foods rich in vitamins C, D and E can mitigate the effects of infectious diseases. Similarly, studies on antioxidants like glutathione and quercetin, a bioflavonoid, suggest they may prevent various infections

including COVID19. Thus, plantbased foods may play a vital role in enhancing the immune system of immuno-compromised persons, and can be useful in managing patients with COVID-19.

Keywords: Micronutrients, Functional foods, Coronaviruses, COVID-19, Severe acute respiratory syndrome

ND015

Proximate and Mineral Composition of the Seed of *Diospyrosmes piliformis*

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ABSTRACT

Diospyrosmes piliformis is commonly called Jackal – berry or African ebony, and it is found in Savannah and Northern low land forest. This study was carried out to determine the proximate and mineral composition of the seed of *D. mespiliformis* using standard analytical methods. The seed on dry weight basis (DW) contains moisture (8.74 %), ash (3.31 %), crude lipid (9.78 %), crude fibre (67.73 %), crude protein (0.50 %), available carbohydrate (10.11 %), and calorific value (130.46 Kcal/100 g).The seed also contains calcium (350.94 mg/100 g), potassium (152.32 mg/100 g), magnesium (43.25 mg/100 g), iron (8.35 mg/100 g), sodium (7.27 mg/100 g), copper (3.02 mg/100 g), zinc (0.95 mg/100 g), manganese (0.57 mg/100 g), and cobalt (0.08 mg/100 g).The study revealed that *D. mespiliformis* seed contains an appreciable amount of calorific value, crude fibre, available carbohydrate, and crude lipid. The seed was also found to be rich in minerals such as; calcium, potassium, magnesium, iron, sodium, and copper.

Keywords:*Diospyrosmes piliformis,* Seed, Minerals, Proximate composition

ND016

Physicochemical Properties and Anti-Microbial Activity of *Canarium schweinfurthii* Oil

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ABSTRACT

The purpose of the research was to determine the physicochemical properties and antimicrobial activity of *Canaruim schweinfurthii* oil. The oil of *C. schweinfurthii* was extracted from the kernel by soxhlet extraction and the physicochemical properties determined according to the AOAC official methods.. The parameters determined include iodine, saponification, acid, peroxide and ester values, specific gravity and free fatty acid. The well-diffusion method was used to screen for the antimicrobial activity of the oil on *Escherichia coli*, *Pseudomonas aeruginosa* and *Salmonella typhi*. The colour of the extracted oil was greenish-purple. The results revealed that the values for specific gravity, iodine, saponification, acid, ester and peroxide values were 0.98, 88.49 g I2/100 g, 217.53 mg KOH/g, 18.05 mg KOH/g, 199.20 mg KOH/g and 19.73 meq/kg respectively, while oleic acid was the free fatty acid present with 9.08%. The antimicrobial activity showed that *C. schweinfurthii* oil has higher antimicrobial effect than cotrimoxazole erythromycin, cloxacillin, gentamycin and chloramphenicol on *S. typhi*. The oil has antimicrobial activity on *P. aeruginosa* and *E. coli* than cotrimoxazole. We concluded that *C. schweinfurthii* oil has suitable physicochemical properties for industrial application and can be used as an antimicrobial agent.

Keywords:*Canarium schweinfurthii,*Antimicrobial activity, Oil, Physicochemical property

ND017

Nutrient and Anti-nutrient Composition *of Canarium schweinfurthii* Kernel

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ABSTRACT
Canarium schweinfurthii commonly referred to as the African olive or *elemi* is a species of a large tree native to tropical Africa. The study was aimed at investigating the nutrient and anti-nutrient composition of *C. schweinfurthii* kernel. The fruit of *C. schweinfurthii* was obtained directly from a farm in Kaduna State. The kernel was separated from the seed and was processed to a powdered form for analysis. The proximate composition and anti-nutrient were determined according to the AOAC standard methods. The mineral content of the sample was analyzed using Atomic Absorption Spectrophotometry and Flame Photometry. The results revealed that the kernel and seed comprised 52.59% and 47.41% respectively of the *C. schweinfurthii* fruit. The proximate analysis of the kernel revealed that the moisture, crude lipid, ash, crude protein, crude fibre and total carbohydrate contents were 42.97%, 50.15%, 5.60%, 2.00%, 41.22% and 42.25% respectively. The *C. schweinfurthii* kernel contains 63.33 mg/100 g, 183.33 mg/100 g, 1642.59 mg/100 g and 831.19 mg/100 g of Ca, Mg, Na and K respectively whereas saponin and phytate were found to be 100.01 mg/100 g and 516.62 mg/100 g respectively. In conclusion, *C. schweinfurthii* kernel contains high amount of lipids and mineral contents with low protein content.

Keywords: *Canarium schweinfurthii,* Nutrient, Anti-nutrient, Proximate composition

ND018

Lycopene Contents of Three Tomato (*Lycopersicum esculentum* L.) Cultivars from Sokoto, Nigeria

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ABSTRACT
Lycopene is an antioxidant carotenoid occurring in plants. The importance of lycopene in the diet in recent has grown recently mainly for its pharmacological benefits. It is associated with reduced risk of cancer and cardiovascular diseases. This work analyzed the total lycopene content in three (3) cultivars of tomato, i.e. *DanEKa*, *Bahaushe* and *UTC*. Fresh samples were collected from *Kasuwar Daji* in Sokoto. Lycopene in fresh fruit samples was analyzed using spectrophotometric method where absorbance at 503nm in hexane:ethanol:acetone (2:1:1) mixture was taken and concentration expressed in mg/100g. The results showed that the lycopene contents in *Bahaushe* cultivar had the highest lycopene concentration of 8.08mg/100g, *DanEKa* had 5.47mg/100g and the lowest lycopene content was observed in UTC with 2.38mg/100g lycopene content. The *Bahaushe* cultivar is a good source of lycopene.

Keywords: Lycopene, Tomato, Antioxidant, Sokoto

ND019

Risk Factors Associated with Nutrition-Related Non Communicable Diseases in Developing Countries

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ABSTRACT
Non communicable disease (NCD) is a disease that is not transmissible directly from one person to another. Non communicable diseases represent a public health issue due to their profound impact on population health. Major NCD's risk factors, including obesity, hypertension and diabetes represent a threat of gigantic proportions. As a matter of fact, developing countries are facing a growing epidemic of overweight and obesity due to the frequent energy in balance and reduced daily expenditures. Among others quality of diet

has changed substantially and a global shift to unhealthy diet high in calories and highly processed. Most of NCD such as coronary heart diseases, stroke and diabetes are related to diet and lifestyle. The burden of non-communicable diseases and over nutrition represent a threat to health care services in developing countries. There is a clear need to focus health policies on the prevention of nutrition related non communicable diseases through primary health care services, the use of mass media for communication and education about healthy nutrition and life style and the adaptation of public policies.

Keywords: Communicable disease, Developing countries, Health policy, Primary health care

ND020

Evaluation of Nutritional Qualities of Stored Onion (*A. cepa* L.) Flour in Different Packaging Materials

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ABSTRACT

In order to minimize postharvest losses of onion bulbs, onion flour was produced and packaged in four different materials (amber-plastic jar, transparent-plastic jar, LDPE bag and aluminium foil) for a storage period of six months. This study investigated total polyphenols, mineral contents and proximate compositions before, during and after storage using standard methods. There were significant ($p< 0.05$) differences in the total polyphenolic contents, mineral contents and proximate composition of onion flour stored in the four storage materials during and after storage. Total polyphenolic contents of the onion flour decreased from initial values of 14.60±1.08 GAE (mg/g) to final values of 5.92±0.76 GAE (mg/g), 5.53± 1.02 GAE (mg/g) 1.86± 1.00 GAE (mg/g) and 1.64± 0.78 GAE (mg/g) for the amber-plastic jar, aluminium foil, LDPE bag and transparent-plastic jar, respectively, at the end of the storage period. Proximate parameters of onion flour declined during storage in all the storage materials with the exception of slight increase in crude protein, fibre, and moisture contents in the amber-plastic jar and aluminium foil. The level of decline in the minerals (Ca, Fe, Mg, Zn, Mg, Na and P) evaluated were significantly influenced by type of storage material. Nutritional qualities retention of onion flour is best in amber-plastic > aluminium foil>LDPE bag>transparent plastic packaging materials.

Keywords: Proximate composition, Onion, Nutritional qualities Polyphenol

ND021

Moringa oleifera Leaf-Based Diet and Its Protective Effects on the Mitochondrial Membrane Functions in the Liver and Skeletal Muscle of Malnourished Rats

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ABSTRACT

A large number of diseases are linked to mitochondrial dysfunction. Feed plays key importance in patient convalescence and thus affecting the food choices of recovering patients and those with immune-compromised conditions.This study investigated the effects of *M. oleifera* leaf-based diet on the functions of the mitochondrial membrane of liver and the skeletal muscle of albino rats. This was assessed by feeding albino rats whose mitochondrial function has been compromised with low protein iso-caloric diets for four weeks as a result of malnutrition and thereafter treated with 25 % *M. oleifera* leaf-based diet for another four weeks. In both the liver and skeletal muscle, there was a reduction in the indicators of cytosolic and mitochondrial function markers as well as Ca^{2+}-ATPase of the untreated albino rats. Conversely, the treated groups had significant ($p < 0.05$) increases in these parameters. However, there was no significant ($p > 0.05$) difference in the activities of the groups treated with *M. oleifera* leaf-based diet and the control diet. *Moringa oliefera* plant is available in almost all regions of the world and hence can be considered as a good food source of phytonutrients important in disease management with promising rewards.

Keywords: *Moringa Oleifera*,Mitochondrial integrity, Immune-ompromised, Calcium Atpase, Iso-caloric

ND022

Dietary Antioxidant Constituents of Three Commonly Consumed Powder Vegetables Sold in Lapai Market, Lapai - Niger State, Nigeria

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ABSTRACT

Antioxidant compounds in food play an important role in health protecting factor. Plant sourced food antioxidants like vitamin C, vitamin E, carotenes, phenolic acids, and phytoestrogens have been recognized as having the potential to reduce the risk of chronic diseases. This study therefore investigated some antioxidant constituents of three commonly consumed powder vegetables (*Adansonia digitata, Abelmoschus esculentus and Annona senegalensis)* sold in Lapai markets, Lapai – Niger state of Nigeria. The concentration of ascorbic acids in the powder vegetables were determined by titrimetric method. Total carotenoids, β-carotene and lycopene in the vegetables were analyzed using spectrophotometric method. The result of this investigation revealed that there was no significant difference ($p>0.05$) in the mean values of ascorbic acid for the three vegetables analyzed. The β-carotene concentration of the vegetables decreases as *A. digitata*>*A. esculentus*>*A. senegalensis*. The result also shows that *A. digitata* was significantly ($p<0.05$) higher in β-carotene concentration when compared to the other two vegetables. Concentration of total carotenoid in the three vegetables revealed that A. *digitata* had the highest concentration, followed by *A. senegalensis* and *A. esculentus* recorded the lowest value. These values were significantly different from each other. Lycopene content of the vegetables were similar to that of the total carotenoid but *A. digitata* was significantly different ($p<0.05$) from the other two vegetables. The consumption of these vegetables can significantly contribute to the needed dietary antioxidant in the body that can reduce risk of chronic diseases.

Keywords: Vegetables, Dietary antioxidant, *Adasonia digitata*, Total carotenoids, Ascorbic acid

ND023

Effects of Dietary Pattern on Some Biochemical and Haematological Parameters in *Trypanosoma brucei brucei*-Infected Rats

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ABSTRACT

Trypanosoma brucei brucei is a salivarian haemoflagellate protozoan parasite causing African Trypanosomiasis impacting on host blood tissues. This research was undertaken to determine the effects of carbohydrate-rich and protein-rich diets on some biochemical and haematological parameters in wistar rats infected with *T. brucei brucei*. The rats were randomly divided into seven groups and treated as follows: Group A served as control and received normal diet, while groups B, C and D were fed experimental diet I, a carbohydrate-rich diet (CRD); normal diet mixed with maize flour in the ratios 70:30, 50:50 and 30:70 grams, respectively. The rats in groups E, F and G were fed experimental diet II, a protein-rich diet (PRD); normal diet mixed with dried fish powder in the ratios 70:30, 50:50 and 30:70 grams, respectively. The nutrition intervention commenced on day 1 post-infection with *T. brucei brucei*. The rats were humanely sacrificed on the twelfth day and blood samples collected for analysis. There was weight loss in the rats fed low CRD, but

a significant ($p<0.05$) weight gain with increased carbohydrates concentration. The total plasma proteins of rats significantly decreased ($p<0.05$) in both experimental diet groups compared to the control. Significant change was observed in total bilirubin in both experimental diet groups. Although there was low red blood cell counts in the CRD compared to PRD and the control, no significant difference was observed. White blood cell counts varied significantly between the experimental groups, with leucopenia in the CRD group, suggesting the need for a balanced or protein-enriched diet for normal haematopoiesis in the course of *Trypanosoma* infection.

Keywords: Dietary pattern, Biochemical parameters, Haematological parameters, *Trypanosoma brucei brucei*, Wistar rats

ND024

Effect of Drought Stress on Antioxidants Defense System of Maize (*Zea Mays* L.) Varieties

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ABSTRACT

Drought is one of the principal abiotic stresses that affect plant productivity by inducing osmotic stress. Maize is an economically important cereal crop affected by drought. In this study a variety of maize seedlings (Sammaz 37) was subjected to 2 days, 4 days and 6 days drought stress, to emulate high exposure of drought. Root and leaves were harvested after11 days of sowing. The root and leaves showed increased malondialdehyde (MDA) and the hydrogen peroxide (H_2O_2) concentration at 2, 4 and 6 days drought stress. Activities of enzymatic antioxidants, Catalase (CAT, E .C 1.11.1.6), ascorbate peroxidase (APX, EC 1.1.11.1) increase in all organs of drought treated maize seedling, while superoxide dismutase (SOD, 1.15.1.1) activity decreased in root and leaves at 4 and 6 days drought treated maize. Under drought stress, reduced ascorbic acid (Asc) and tocopherol content increased in both roots and leaves. Glycine betaine concentration decreases in all and that of proline slightly decreased in the root and leaves of drought treated maize seedling. This indicates a possible role of ROS in the systemic signaling from roots to leaves, allowing leaves to activate their Osmotic defense mechanism for better protection against drought stress.

Keywords: Drought, Stress, Antioxidants, *Zea mays L.*

ND025

Evaluation of the Chemical Composition and Anti-Nutritional Factors (ANFs) Levels of Different Thermally Processed *Detarium senegalense* (Tallow) Seed Flour

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ABSTRACT

Detarium senegalense JF Gmelin (Caesalpiniaceae) seed, commonly known as tallow, is used traditionally as a soup thickener in Eastern Nigeria. Despite its high protein content its seed is under-utilized due to the presence of anti-nutritional compounds. This study investigated the effect of different thermal processing methods on the nutritional and anti-nutritional properties of *Detarium senegalense* seed flour. Freshly purchased seeds were cleaned and grouped into unprocessed (raw), boiled, roasted, autoclaved and microwave. They were analyzed for their proximate composition, amino acid profile and anti-nutritional factor using standard procedures. From the proximate composition analysis, the moisture content showed there was significant decrease ($P< 0.05$) in moisture content of roasted, autoclave and microwave in relation to the unprocessed sample. However, there was also a significant decrease ($P< 0.05$) in ash content, crude protein, crude lipid and crude fiber content. A significant increase ($P< 0.05$) in carbohydrate content for all processed samples was observed. The boiled sample had significant increase ($p\leq 0.05$) in essential amino acid profile. Analysis of the anti-nutritional factors of the samples had significant ($p\leq 0.05$) reduction in

values of all anti-nutrients studied. Based on these results, boiled treatment best increased the amino acid profile of *Detarium senegalense* seed flour and reduced the anti-nutrients.

Keywords: Anti Nutritional Factors, Seed Flour, *Detarium senegalense*

ND026

Assessment of Nutritional Status of Pregnant Women in Kabusa Community Federal Capital Territory Abuja, Nigeria

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ABSTRACT

The role of adequate nutrition in pregnancy cannot be overemphasized as requirements for most nutrients are increased throughout pregnancy to meet the high demands of the growing fetus and maternal issues associated with pregnancy**.** A descriptive cross-sectional study design was carried out using quantitative and qualitative method to obtain data from 231 pregnant women regardless of their gestational age at Lugbe and Pyakasa Primary Health Care Centers in Kabusa Area, AMAC, Abuja, Nigeria. Nutritional status was determined using Body Mass Index (BMI) and Mid upper Arm Circumference (MUAC). The research showed the mean age of the respondents as 27.4 yrs. The age distribution showed that there were no participants below 15years, 38.5% were within 15-19 years and 56.3 % within 36 - 45 years with 58% in their third trimester, 40.3% in second trimester, and only 1.73% respondents were in there first trimester. BMI ranged between 12 to 40.2kg/m^2, with the mean BMI at 26.3 kg/m^2. The BMI assessment revealed that 1.3% of the respondents were underweight, 41.5% of the respondents within normal range, 38.9% overweight, 16.9% obese while 0.9% were morbidly obese. MUAC distribution of the respondents falls within the range of 17.6 – 39.8cm and a mean of 27.4cm. 0.9% of the respondents were severely malnourished, 1.7% moderately malnourished, 47.2% normal, 34.6% overweight, and 13% were obese, while the remaining 2.6% were morbidly obese. This research has shown that pregnant women in Kabusa community of FCT have a relatively high percentage of malnutrition thus combined efforts to address the issue is necessary.

Keywords: Nutritional Status, Pregnancy, BMI, MUAC, FCT

ND027

Evaluation of Antioxidant Vitamins and Proximate Compositions of Pawpaw (*Carica papaya)* and Guava (*Psidium guajava)* Fruits

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ABSTRACT

Pawpaw (*Carica papaya*) and guava (*Psidium guajava*) are known for their food and nutritional values throughout the world. This research was conducted in Biochemistry Laboratory Federal University Gusau Zamfara State Nigeria. Anti-oxidant vitamins and proximate compositions of pawpaw and guava fruits were evaluated using standard procedures. Results on antioxidant vitamins of pawpaw showed the highest content of vitamin C (51.17±5.68), followed by vitamin E (5.86 ± 0.97), the lowest content obtained was with vitamin A (0.153± 0.07). Results on antioxidant vitamins of guava showed the highest contents of Vitamin C (12.13 ± 0.38), followed by vitamin E (6.39± 0.38), the lowest content obtained was with vitamin A (0.0 7± 0.01). Results on proximate compositions of pawpaw showed the highest moisture content (36.00 ± 0.27), followed by carbohydrate content (28.45 ± 0.74), then crude fiber (17.33 ± 0.24), ash content (8.83 ± 0.047), crude protein (6.05+0.27), then the lowest content was obtained from crude lipid (3.33+0.25). Results on proximate compositions of guava fruits showed the highest moisture content (66.06 ± 0.47), followed by carbohydrate content (21.69 ± 0.50), crude fiber (5.67 ±0.21), content (3.62±0.16), crude protein had (2.46±0.29), and lowest content was obtained from Crude lipid (0.73 ± 0.25). It has been concluded that,

pawpaw and guava had higher antioxidant vitamins and proximate compositions, therefore it is recommended for consumption at both domestic and industrial levels.

Keywords: Antioxidant, Vitamins, Proximate Compositions, Pawpaw, Guava.

ND028

Effect of Different Pretreatment Techniques when Combined with Fermentation on the Nutrient and Anti-Nutrient Composition of *Indigofera arrecta* Seeds

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ABSTRACT

Studies have shown that pretreatment and fermentation have significant effect on *Indigofera arrecta* seeds. The aim of this study is to determine the effect of the mono and co-culture fermentation on different pretreatment methods which include steam (StPS), acid (AcPS), combined alkaline and steam (CoPS and the ground sample (GdPS) as control on the seeds of *I. arrecta*. Fermentation was then carried out on the pretreated samples using fungal isolates of *Aspergillus niger* (*Asp.n*) and *Trichoderma harzanium* (*Tri.h*) in mono and co-culture combination. The proximate composition, mineral composition and some anti-nutrients of the mono and co-culture formulations pretreated *Indigofera arrecta* seeds were analyzed using standard procedures. Results in the proximate and anti-nutrient for various treatment combinations show significant ($p<0.05$) (14.10±0.02, 26.32±0.3) changes with substantial reduction in StPS *Tri.h* and StPS *Asp.n* and *Tri.h* carbohydrate composition respectively. Significant reduction was also observed in the fiber content of CoPS treatment combinations (CoPS *Asp.n,* CoPS *Tri.h* andCoPS *Asp.n, Tri.h*)with values 8.93±0.1, 5.74±0.2 and 2.34±0.1 respectively. All treatment combinations as well had effect on the anti-nutritional and mineral content of the seed. This research indicates that different pretreatment technique when combined with fermentation is an efficient method in improving the nutritional, mineral content and also in the reduction of antinutrients present in the seeds of *Indigofera arrecta*.

Keywords: *Indigofera arrecta*, *Trichoderma harzanium*, *Aspergillus niger*, Fermentation, Pretreatment

ND029

Proximate Analysis and Amino Acid Profile of Soya Beans

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ABSTRACT

Soya beans have been used in human nutrition because of their favorable agronomic characteristics, relatively low price, high quality protein and oil as well as their important functional properties for the growth and development of humans. The soya bean sample was obtained from Aliero town in Kebbi State. It was grounded to powder using mortar and pestle. The proximate composition of the sample was carried out using standard procedures according to AOAC while amino acid profile was assayed using the method described by Benitez. The result obtained revealed a high protein content at 38.02%, followed by crude lipid 27.52% and carbohydrate 16.17% respectively while the amino acid content was recorded to have the least value at Tryptophan with 1.21mg/100g and the highest value at Glutamic acid with 11.51mg/100g, followed by Aspartic acid with 9.43mg/100g respectively. The study has established the Nutritional composition and amino acid content of soya bean. Thus the result obtained substantiates the nutritional benefit of soya bean and its role in alleviating the problems associated with malnutrition in Nigeria.

Keywords: Proximate, Amino acids, Soya beans**,** Profile

ND030

Effect of Cooking Method and the Nutritional Quality of Some Rice (Oryza Sativa) Varieties Consumed in Minna, Niger State, Nigeria

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ABSTRACT
Rice is a staple food for over half of the world's population. The nutritional value derived from rice consumption is based on a number of factors including how the rice is prepared. This study assessed the effects of two commonly used cooking methods (with and without parboiling) on the nutritional composition of nine milled rice samples consumed in Minna, Niger state (three samples each of Nigerian local, Nigerian bagged and foreign rice). The different rice samples were cooked using the two methods and proximate compositions were evaluated according to the method of the Association of Official Analytical Chemists (AOAC) and compared. The results showed significant reduction ($P< 0.05$) in the percentages of ash, fat, fiber and protein contents of all rice samples using both cooking methods compared to the raw samples. The parboiling method however resulted in significantly more reduction in these nutrient contents compared to the samples cooked without parboiling. The percentages carbohydrate contents were significantly higher ($P< 0.05$) in both cooking methods for all rice samples compared to the raw samples. The significantly higher ($P< 0.05$) loss of nutrient by parboiling methods compared to without parboiling observed in this study suggest that rice is nutritionally better cooked without parboiling.

Keywords: Rice, Cooking, Nutrient, Parboiling

ND031

Nutritional Composition, Phytochemical and Heavy Metals Content of *Allium cepa* (Onion) and *Allium sativum* (Garlic) sold in Wudil Market, Kano State, Nigeria

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ABSTRACT
Farming methods and climate change alter the accumulation and concentration of phytochemistry. This study was aimed at determining the phytochemical, proximate composition, and anti-nutritional factors present in *Allium cepa* L. (onion) and Allium sativum (garlic) sold in Wudil market in Kano state using standard laboratory procedures and heavy metals using Atomic absorption Spectroscopy (AAS). The qualitative and quantitative phytochemicals in *Allium capa* revealed the presence of alkaloids (6.45mg/kg), tannins (1.25mg/kg), flavonoids (1.51mg/kg), total phenolic (20.68mg/kg) while saponin was absent. On the other hand *Allium sativum* shows alkaloids (4.68mg/kg), tannin (0.25mg/kg) and saponin (0.44mg/kg). Proximate composition of garlic show significant ($p<0.05$) difference in fat (2.82%), carbohydrate (24.55%), fibre (2.74%), and ash (4.22%) when compared with onion, while protein (2.96%) and moisture (87.36%) are significant ($p<0.005$) in onion. Anti-nutritional factors present in onion show significant ($p<0.05$) in oxalate(11.85mg/kg) and tannins (0.76mg/kg), while garlic shows significant ($p<0.05$) in phytate (1.79mg/kg) and hydrogen cyanide (0.39mg/kg). Heavy metals in onion show significant ($p<0.05$) in Cd, Cu, Fe, Pb, and Mn, while garlic only show significant ($p<0.05$) in Zn and Co. The Cr in onion shows non-significant ($p>0.05$) when compared with garlic. Cd, Pb, Mn and Co in onion and garlic are above WHO recommended safe limits in Vegetables. It could be concluded from this study that agro-climatic condition may have effect on the phytochemicals of both plants samples from Wudil when compared with others, while sources of the heavy metals need to be investigated and controlled from level of cultivation to that of processing.

Keywords: Phytochemicals, Heavy metals, *Allium cepa, Allium sativum, Wudil market.*

ND032

Comparative Nutritional Evaluation of *Lactuca sativa* (Lettuce) and *Solanum nigrum* (Black Nightshade) Leaves

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ABSTRACT

Both *Lactuca sativa* (Lettus) and *Solanumnigrum*(Black Nightshade) are well known plants worldwide due to their nutritional and medicinal values. The study assessed their nutritional quality. The standard procedures of AOAC (2005) were adopted to analyze the proximate composition and mineral analysis. For the mineral content, Phosphorus level was determined by spectrophotometry, Sodium and Potassium by flame photometry and Calcium and Magnesium by Atomic Absorption Spectrophotometry. The result of the analysis revealed that *L. sativa* contained 10.37%, 15.70%, 2.50%, 39.60%, 14.38% and 17.75% for Moisture, ash, crude lipid, crude fibre, crude protein and available carbohydrate respectively. While *S. nigrum*contained 8.33%, 19.50%, 2.60%, 43.50%, 15.84% and 10.36% for Moisture, ash, crude lipid, crude fibre, crude protein and available carbohydrate, respectively. The mineral determination revealed that *L. sativa* contained 179.2mg/kg, 8766.7mg/kg, 4.78mg/kg, 1427.5mg/kg and 1832.9mg/kg for sodium, potassium, phosphorus, calcium and magnesium respectively, while *S. nigrum*contained 2466.7mg/kg, 6500.0mg/kg, 5.20mg/kg, 1779.5mg/kg, and 1827.3mg/kg for sodium, potassium, phosphorus, calcium and magnesium respectively. These results indicated that both leaves contained relative amount of ash, moisture, protein and fiber with low amount of lipid and available carbohydrate, although, except for moisture, compositions are slightly higher in *S. nigrum*than *L. sativa*. This can be understood looking at the nature of the leaves. Similarly among minerals, *S. nigrum*contained higher amounts of sodium and calcium while potassium and magnesium levels are slightly higher in *L. sativa*. Phosphorus levels of both leaves are low.

Keywords: *Lactuca sativa, Solanum nigrum,* Proximate composition, Minerals.

ND033

Antioxidative Potential of Propolis (Bee Glue)

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ABSTRACT

Propolis is an important bee product used over the years as an antioxidant for treatment of diseases in many communities around the globe. The study investigated the content of antioxidant minerals (Cu, Se, and Zn) and antioxidant vitamins (A, C, and E) of propolis obtained from an apiary of modern bee hives in Sokoto State, Nigeria. Standard methods and techniques were used for the analyses. The result revealed the concentration of Cu, Se and Zn on dry weight basis as 1.37 ± 0.20 mg/100g, 0.16 ± 0.01 mg/100g, and 6.24 ± 1.21mg/100g respectively. On the other hand, the content of antioxidant vitamins on dry weight basis are 2.0 ± 0.12 mg/100g vitamin A, 1.40 ± 0.10 mg/100g vitamin C and 1.94 ± 0.16 mg/100g vitamin E. The results obtained suggest the potential use of propolis as an important supplement of antioxidant minerals and vitamins in our diet, for fight against some diseases and also in the formulation of fortified animal feeds.

Keywords: Propolis, Antioxidants, Minerals, Vitamins

ND034

Proximate Composition and Potassium Bromate Content of Selected Loaves of Bread Consumed in Sokoto Metropolis

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ABSTRACT

There are various loaves of bread manufacturers in Sokoto Metropolis. It is important to evaluate its nutritional value as well as its safety for consumers. The proximate composition and level of potassium bromate of selected bread consumed in the Sokoto metropolis were determined. Four (4) brands Sahara, Shangai, Sunny and Executive were used for proximate analysis using standard procedure. The potassium bromate content of ten (10) brands of bread was determined using spectrophotometric-based on the redox reaction between bromate and promethazine hydrochloride.The range of values obtained from the proximate composition were 9.57to 36.50% (moisture), 1.5 - 2.17% (ash content), 0.5% (crude fiber), 1.0- 2.0% (crude lipid), 35.13 - 49.47% (crude protein), 10.53 - 45.60% (carbohydrate). While the potassium bromate content among the different samples was (1.167 - 3.967 mg/kg). The result showed a significant difference ($p< 0.05$) among the samples in relation to their proximate composition. Values of potassium bromated yielded were also differ significantly ($p<0$, 05). The findings of this current research revealed that the loaves of bread contain adequate nutrients in term of nutritional composition but the potassium bromate content is above the permissible limit set aside by WHO which may predispose the consumers to its harmful effect.

Keywords: Proximate composition, Potassium bromate, Spectrophotometer

ND035

Personalized Care: Prevention of Lifestyle Diseases

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ABSTRACT

Personalized care, which includes personalized medicine, personalized nutrition and even personalized exercise, have been found useful and more effective in the treatment and management of lifestyle diseases such as type 2 diabetes and cardiovascular diseases. The personalized medicine has received considerable attention from researchers, clinicians, drug developers, practitioners of the traditional system of medicine and regulatory agencies over the years. Many if not all of the common chronic conditions seen today, such as obesity and diabetes, are related directly or indirectly to nutrition. Understanding the interplay between diet and genes may help provide direction upon which personalized therapy can be used to manage or prevent these catastrophic life-threatening conditions. Nowadays, we are in an era where the diagnosis and treatment of the patient are perceived to be the patient-tailored approaches due to differences in the genetic makeup of individuals. Personalized medicine can help to treat and manage most of the life-threatening chronic conditions more effectively. This paper provides an insight into the potential of personalized medicine in life-threatening complications.

Keywords: Personalized nutrition, Personalized diet, Personalized exercise, Lifestyles diseases

ND036

Nutritional Value and Ethnomedicinal Potentials of Adansonia digitata L.

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ABSTRACT

Adansonia digitata L. known as baobab tree is a perennial plant growing abundantly in tropical, sudan and sahel savanna. In thisstudy, the nutritional value and ethnomedicinal potentials of *A. digitata* were assessed. The leaves, bark, seeds, husk and fruit pulps of *A. digitata* were collected. The samples were subjected to proximate and phytochemical analysis both qualitative and quantitatively. The mineral constituents of each plant parts were analysed. The result reveals high percentage of carbohydrate in fruit (78.31 %) followed by leaves (65.31%), seeds (50.06%), husk (47.94 %) and bark (0.94%). The seeds is rich in Protein (7.44 %) followed by leaves (5.69 %) and fruit having the least (2.19%). However, the results for phytochemical analysis show the presence of alkaloids, steroids, saponin glycosides and volatile oil in all the plant parts. All the secondary metabolites were present in fruits except balsam and tannins. All the mineral content tested (calcium, magnesium, phosphorous, nitrogen, potassium and sodium) are found present in all the part of the plant. Anthraquinone is present in the fruits and bark, while absent in the husk, seeds and leaves. Cardiac glycosides are present only in the fruits. From the analysis, it shows that *A. digitata* has a great means of ethnomedicinal potential because of the role played by each of the constituent present.

Keywords:*Adansonia digitata* L., Ethnomedicinal potential, Nutritional value

ND037

Comparative Study of the Proximate Composition of Whole Grain and Dehusked Pearl Millet

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ABSTRACT

Information of the difference in processing between whole-grain pearl millet and dehusked grain pearl millet is central to better ensuring nutritional composition in nutritional feed formulation and consumer requirements. The proximate composition (protein, ash, moisture, fibre and carbohydrate) of the whole grain pearl millet, dehusked pearl millet, and only the husk of the pearl millet were established using the method of Association of Official Analytical Chemist 2012 and then compared. The result showed that there was significant ($p< 0.05$) lower crude protein content in the dehusked pearl millet (0.15 ± 0.07 g/100g) compared to the whole pearl millet grain (0.7± 0.28 g/100g) and the husk part of the pearl millet (9.75±0.49 g/100g). The ash content, the moisture content and the fibre content of the dehusked pearl millet as well as the husk of the pearl millet were all significantly ($p< 0.05$) higher than that of the whole grain pearl millet. The carbohydrate content; however, did not show any significantly ($p> 0.05$) difference between the whole grain, the dehusked and the husk part of the pearl millet. In conclusion, our results suggest that the nutritional quality of whole-grain pearl millet was inferior to their dehusked counterpart with respect to ash, fibre and moisture nutrition, and therefore further studies should focus on improving the process of dehusking to enhance the overall nutritional composition.

Keywords: Pearl Millet, Proximate composition, Dehusking, Nutrition

ENTREPRENEURSHIP IN BIOCHEMISTRY AND MOLECULAR BIOLOGY (EB)

ORAL PRESENTATION

EB001

Biochemical Characterization of Solid State Fermented Cassava (*Manihot esculenta* CRANTZ) and its Application in Poultry Feed Production

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ABSTRACT
This study examined the biochemical parameters of solid state fermented peeled and unpeeled cassava (*Manihot esculenta* Crantz) using *Rhizopus oligosporus*, and applying the fermented products to replace maize in poultry feed production. Solid state fermentation was initially carried out at room temperature for 72 h under acidic and basic conditions (pH 3 -9). There was an increase in soluble proteins, total proteins and glucose levels in cultures prepared with peeled and unpeeled cassava post-fermentation. Fermentation also resulted in a significant increase ($p<0.05$) in antioxidant activity, total phenol and flavonoid contents in the peeled and unpeeled cassava. Fermentation of the peeled and unpeeled cassava with *R. oligosporus* reduced the cyanide content significantly ($p<0.05$) at pH 7. The feed formulated with fermented unpeeled cassava boosted serum albumin and calcium levels, significantly ($p<0.05$) increased weight gain in birds, and posed no threat of liver damages in the birds.

Keywords: Cassava, Fermentation, Poultry feed production,*Rhizopus oligosporus*

EB002

An Improved Protocol for Rapid *Agrobacterium*-Mediated Transformation of Tomato (*Solanum lycopersicum* L.) cv. ArkaVikas

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ABSTRACT
Tomato (*S. lycopersicum L.*) is one of the economically important horticultural crops which its transformation and regeneration protocol can still be considered difficult based on the widely variable rates of success achieved. In view of this, some of the important factors that influence transformation efficiency such as age of explants, plant growth regulator concentration, antibiotic concentration, *Agrobacterium* density, and infection time were optimized with a foresight to establish a high-throughput transformation protocol for tomato *cv*. Arka vikas. Seedling explants were transformed using a binary vector carrying *nptII* gene, conferring kanamycin resistance by *Agrobacterium* mediated transformation. The cotyledons of the 8 day old seedlings which was co-cultivated with an *Agrobacterium* suspension of $O.D_{600}$ at 0.6 for 10 mins gave the optimum result of 20% transformation efficiency while 10 day old seedling hypocotyls with an *Agrobacterium* suspension of $O.D_{600}$ at 0.4 for 10 mins also gave the optimum result of 20% transformation efficiency. Better shoot development was observed when shoots induced oncotyledonary and hypocotyl explants were cultured on modified MS medium containing 1.5 and 2 mg/L zeatin, respectively. Supplementation of medium with 200 mg/L timentin effectively suppressed *Agrobacterium* overgrowth. Conclusively, with the required 75 days from inoculation of explants with *Agrobacterium* to transfer of transgenic tomato plants to greenhouse, as compared to 3 to 4months in standard tomato transformation protocols, this method may be adopted as it saves time, energy and consumables which may contribute to insure the genetic stability sought in many applications of genetic engineering.

Keywords: Tomato, Transformation,*Agrobacterium,* Genetic engineering

EB003

Assessment of Yoghurt Processing Water for Single Cell Protein (SCP) Production from *Candida utilis*

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ABSTRACT

The major challenge of yoghurt processing factory is its large water consumption which constitutes 80% of the total discharged effluents. Yoghurt processing water contains residual organic matter obtained after the precipitation and removal of fat and casein from whole milk. Physicochemical characterization of the yoghurt processing water indicated the presence of 7600.00 mg/L, 10.80 mg/L and 6.40 mg/L, 160.00 mg/L and 360.00 mg/L for chemical oxygen demand, total dissolved solids, total suspended solids, nitrate and phosphate respectively. Following the screening of medium components by Plackett-Burman design and one-factor-at-a-time analysis, maximum SCP yield of 1.92 g/L was obtained when the concentrations of glucose, yeast, NH_4SO_4 and $ZnSO_4$ were set at 0.25%, 0.3%, 0.3% and 0.20% respectively after 4 days of incubation. The produced SCP from *C. utilis* was found to contain Fe (33.60 ± 0.02 mg/100g), Mn (6.43 ± 0.01 mg/100g), Mg (19.91 ± 0.01 mg/100g), Zn (5.41 ± 0.01 mg/100g), vitamin A (4.78 ± 0.03 µg/100RE), vitamin B_1 (0.33 ± 0.01 µg/100g) and vitamin B_9 (5.36 ± 0.06 µg/100) with *in vitro* protein digestibility value of 85.22 ± 0.82%. The findings in this study indicated that a highly nutrient dense-SCP from *C. utilis* could be obtained by utilizing yoghurt processing wateras basal medium.

Keywords: Yoghurt, Single cell protein, *Candida utilis,* Water

EB004

Effect of Storage Time on Nutrients and Bacterial Load of Mango (*MangiferaIndica*Linn) Fruit Juice

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ABSTRACT

Mango is one of the most vital tropical fruits in the world. It is a seasonal and perishable fruit due to its high water content, making it susceptible to spoilage. This study focused on the effect of storage time on the nutrient content and total bacterial load of processed dried peeled and unpeeled mango juice. Fresh peeled and unpeeled mangoes were sliced into 2 cm and oven-dried at 60^{o}C for 48 h. The dried mangoes were pulverized into 200 µm and stored for 4 weeks in a food-grade polypropylene bag at ambient temperature (28±2^{o}C). The processed dried mango powder was reconstituted with distilled water using 1:5 dried mango-to-water ratio before analysis after storage. The pH, nutrient composition and total bacterial load were monitored after a week of storage for a period of 4 weeks against the fresh mango juice (control). The pH of the reconstituted peeled mango juice ranged from 4.10-5.37 and significantly (P<0.05) negatively correlated with lower total bacterial load (2.83-4.46 $\log_{10}$cfu/g). However, the reconstituted unpeeled mango juice had a significantly higher pH of 4.30-6.24 with a non-significantly (P>0.05) negatively higher total bacterial load. The provitaminA (45.83-66.67mg/ml) and vitamin C (5.37-7.37 mg/ml) for dried peeled and unpeeled mango juice were significantly lower than the provitamin A (53.3-68.80 mg/ml) and vitamin C (6.60-7.51 mg/ml) of the controls.Mango fruit was successfully processed into instant powder juice with an extended shelf life of 4 weeks.

Keywords: Bacterial load, Drying, Juice, Mango, Nutrient

EB005

Texture Profile Analysis, Chemical Interactions and Functional Groups of Kenaf Seed Tofu as Influenced by Processing Temperatures

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ABSTRACT

Tofu is one of the most important and popular protein-based food, that has been made majorly from soybean. Kenaf seed also has the potential for tofu production and several factors could affect the quality characteristics of tofu. Therefore, this study evaluate the effects of processing temperatures (60, 80 and 95^{o}C) of kenaf seed extract with 0.5 g% glucono-delta-lactone addition on the texture profile analysis, chemical bonds, Fourier Transformed infrared spectra and changes in the ultraviolet spectra of kenaf tofu. Increased the processing temperatures from 60 to 95^{o}C, increased the texture characteristics, and decreased the yield and water content of the tofu. Additionally, hard-texture tofu was formed at temperatures 80 and 95^{o}C, while processing at 60^{o}C produced a paste-like curd. Hydrogen and hydrophobic interactions were the major bonds that contributed to the coagulation and stability of the tofu, while ionic bonds and sulphydryl (-SH) groups had limited contribution. Likewise, an increase in the processing temperatures increased the intensity of the chemical interactions, except for -SH group which decreases as the processing temperature increased from 60-95^{o}C. All the tofu had a broad absorption peak between 290-310 nm, moreover, the absorbance intensity decreased as the processing temperatures increased. Also, all the tofu had a typical protein spectral comprised of amide A, B, I, II and III. In the amide I region of the tofu, only one band appeared for each of the temperatures, this band has a wavenumber of 1633.71 cm^{-1} for both tofu made at 95 and 80^{o}C and a wavenumber of 1631.78 cm^{-1} for tofu prepared at 60^{o}C. These wave numbers corresponded to β-sheet, which accounted for the intermolecular interactions and hardness of the kenaf seed tofu.

Keywords: Chemical bonds, Coagulation, Kenaf seed, Texture profile, Tofu

EB006

Optimization of Biodiesel Production from *Acacia nilotica* Seed Oil by Response Surface Methodology

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ABSTRACT

Production of biodiesel by transesterification of triacylglycerol with alcohol is the newest form of technology for biodiesel production and has attracted the attention of many researchers due to various advantages associated with its usage. Response surface methodology, based on a four factor five level central composite design is used to analyze the interaction effect of the transesterification reaction variables such as oil: methanol ratio, *n*-hexane, lipase concentration and incubation time on biodiesel yield keeping temperature and agitation speed at 45^{o}C and 200 rpm respectively. The linear coefficient of incubation time (D), the quadratic coefficient of lipase concentration (C2) and incubation time (D2) had significant ($p<0.05$) effects on the biodiesel production. While the linear coefficient of oil: methanol ratio (A), *n*-hexane (B), lipase concentration (C), the quadratic coefficient of oil:methanol ratio (A2), *n*-hexane (B2), the interaction of oil/methanol ratio and *n*-hexane (A*B), oil: methanol ratio and lipase concentration (A*C), oil: methanol ratio and incubation time (A*D), *n*-hexane and lipase concentration (B*C), *n*-hexane and incubation time (B*D), as well as lipase concentration and incubation time (C*D) are not significant model term for having values greater than 0.05. The R2 value was 0.7220, the adjusted R2 value was 0.76 and the model fvalue was 2.82. Maximum yield of methyl esters from *A. nilotica* seed oil was found to be 55.9% under the condition of oil: meOH ratio of (1:10), *n*-hexane (0.42 ml), lipase concentration of (64.0 U/ml) and incubation time (195 min). In conclusion, lipase concentration and incubation time have been found to be major independent variables affecting the biodiesel yield.

Keywords: Biodiesel, *Acacia nilotica*, Optimization, Response surface methodology

EB007

Production, Optimization and Characterization of Keratinase Enzyme from *Streptomyces* and Its Potential Application in Biodegradation of Poultry Feather Waste

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ABSTRACT

Streptomyces contribute to the turnover of complex biopolymers by being able to secrete a wide variety of extracellular enzymes. Keratinases are important alternative for recycling the large amount of keratin-rich waste being generated from poultry. In this work, we explored the biocatalytic potential of soil *Streptomyces*, focusing mainly on the search for keratinases. *Streptomyces* were isolated and screened for keratinase production and we identified a *Streptomyces* isolate that presented great potential for biodegradation of poultry feather waste. Extracellular keratinase production was optimized through submerged fermentation by a one-variable-at-a-time method, followed by the response surface methodology, using chicken feathers as a carbon source which resulted to increased keratinase production. Time-course study revealed a direct relationship among microbial growth, keratinase production, and feather degradation. Substrate concentration, temperature, pH, carbon source, and nitrogen source were found to be important parameters that influenced the production of keratinolytic enzyme. The initial production of extracellular keratinase under standard conditions was 12.35 ± 0.11 U/ml, whereas optimization of the fermentation conditions increased the production to 38.83 ± 0.07 U/ml. The optimum reaction temperature and pH for extracellular keratinase activity were found to be 45 °C and 8.5 respectively. In addition, the intact native chicken feathers were almost completely degraded by the *Streptomyces* isolate after 96 hours incubation. However, the intact chicken feather was only partially degraded when incubated with the extracellular crude keratinase for 96 hours. These results highlight the potentials of *Streptomyces* derived keratinase in keratin-waste degradation

Keywords: Keratinase, Optimization, Feather, *Streptomyces*

EB008

Utilization of Gum exudates of *Acacia senegal* L. in the Formulation of Corn-Meal Diet for *Drosophila melanogaster*.

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ABSTRACT

One of the major ingredients of *Drosophila melanogaster* diet is agar-agar which acts as a stabilizer and binding agent that gives the meal its semi-solid consistency. The use of agar-agar in diet formulation for drosophila may not be cost effective in routine laboratory maintenance of Drosophila. Gum exudates of *AcaciaSenegal* L. also known as acacia gum or *'karo'* in Hausa language is a natural plant gum that has several uses in the food and pharmaceutical industries as stabilizers, thickeners and binding agents. The utilization of acacia gum as a substitute binding agent in corn-meal diet for Drosophila was assessed. Eight (8) corn-meal diets were formulated by total or partial substitution of agar-agar with acacia gum. Standard methods of AOAC were employed to determine the physicochemical and proximate compositions of the formulated corn-meal diets. Formulated diet 1 (40% acacia gum) was acidic, had the greatest moisture content and therefore most dense and less viscous among all the formulated diets. Formulated diet 5 (1:5 agar-agar: acacia gum) in comparison to the other formulated diets and the control was significantly ($p < 0.05$) higher in protein content [4.53±0.06 g /100 g), 3.37±0.06 g/100 g (control)] but lower in carbohydrates [76.03±0.21g/100 g, (85.10±0.26 g/100 g (control)]. Formulated diets 1 and 4 have failed overall acceptability while formulated diet 5 seemed the most acceptable agar-agar substituted corn-meal diet with

no significant difference ($p > 0.05$) from the control in overall sensory acceptability among all the acacia gum diets. This study showed the potentials of gum exudates of *Acacia senegal* L. as a cost-effective substitute of agar-agar in corn-meal diet for laboratory maintenance of *Drosophila melanogaster*.

Keywords: Acacia, Gum, Exudate, Diet, *Drosophila melanogaster*

EB009

Approaches for Genetic improvement and Transformation of *Jatropha curcas* and *Ricinus communis* for Efficient Remediation of Toxic Metals and Metalloids

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ABSTRACT

Mining, agriculture, urban waste and a variety of industrial activities are implicated in toxic metal and metalloids pollution. Literature search revealed that most of the candidate plants for phytoremediation belong to Asteraceae, Brassicaceae, Euphorbiaceae, and Fabaceae (among dicots); Poaceae and Cyperaceae (among monocots) species. It is generally believed by scientists and regulators that conventional phytoremediation is rather slow. In this context, genetic engineering and related biotechnology tools have yielded promising results for enhancing the phytoremediation capacity of candidate species from Euphorbiaceae. Jatropha (*Jatrophacurcas*) and castor bean (*Ricinuscommunis*) possess enormous adaptive potential in diverse habitats including problematic sites due to their plasticity. In this paper,, possible aapproaches for genetic improvement and transformation ofJatropha and castor bean for efficient remediation of toxic metals and metalloids are substantiated. These approaches will be beneficial for revegetating toxic metal and metalloids contaminated sites. Cogeneration of bio-products including biofuel is an additional advantage for economic sustainability over and above efficient remediation.

Keywords: Adaptive traits, Bioenergy, Carbon dioxide Sequestration, Co-contamination, Ecotechnologies, Toxic metals

EB010

Kinetics and Thermodynamics Studies of Chromium (VI) Bioreduction Potentials of Watermelon Rinds

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ABSTRACT

Presently, the trend in Cr (VI) Bioremediation is focused on seeking new low-cost Biological materials that are readily available, and have excellent bioremediation potentials.The bioremediation potentials of Cr(VI) to Cr (III) from aqueous solution via bioreduction using water melon rinds (WMR) was investigated with respect to effects of process parameters such as concentration of WMR, contact time, temperature, pH, initial concentration of Cr (VI), kinetics and thermodynamics studies. Water melon rinds (WMR) were extracted using maceration technique (70% methanol) and batch process was used for the study. From the results obtained, Cr (VI) bioreduction efficiency was influenced significantly by the concentration of WMR, as the optimum concentration of 0.1mg/ml was able to bioreduced at least 95% of Cr (VI) within a period of 20 min, at a temperature of 25^0C. Also, the bioreduction efficiency was greatly influenced by the variation of pH, as the pH increases, the bioreduction process also increase and the optimum pH was 12.0. Thermodynamic studies revealed that the bioreduction process was exothermic, feasible and spontaneous. The kinetic data showed that pseudo-second order model best describes the reduction process..From the study, the bioreduction characteristics of the bioactive material (WMR) were dependent on dosage, contact time,

temperature, solution pH and Cr (VI) concentration. Results indicated that the stability of the bioactive material was necessary for significant reduction of Cr (VI) to Cr (III).

Keywords: Bioremediation, Chromium Cr (VI), Water melon rind, Temperature, Bioreduction

POSTER PRESENTATION

EB011

Physicochemical Properties of Biodiesel Produced from Degummed*Acacia nilotica* Seed Oil

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ABSTRACT

Fatty acid alkyl esters (biodiesel) have become an alternative fuel for diesel engines. The study investigated the effect of degumming on physicochemical properties of biodiesel produced from *Acacia nilotica* seed oil using AOCS and ASTM standard methods. The results revealed that the values for specific gravity (0.88), iodine value (65.03 g I2/100 g) and refractive index (1.31) of *A. nilotica* seed oil were lower than the AOCS standard. The acid degumming showed higher removal efficiency (89%) than water degumming (77%) and was chosen for biodiesel production. biodiesel yield of 88.97% was obtained from acid degummed oil. The values obtained for cloud point (17.33 °C), pour point (4.67 °C), iodine value (33.35 g I2/100 g), saponification value (166.67 mg KOH/g) and acid value (1.97 mg KOH/g) of the degummed biodiesel were significantly ($p<0.05$) lower than the values of undegummed biodiesel, whereas significant ($p<0.05$) increase was observed in the values for flash point (132.00 °C), cetane number (65.50) and calorific value (60.13 MJ/kg). The study concluded that degummed *A. nilotica* seed oil could be used as feedstock for biodiesel production.

Keywords: *Acacia nilotica*, Degumming, Biodiesel, Physicohemical Properties, Phosphorus content.

EB012

Effect of Storage on some Physicochemical Properties of Shea Butter (*Vitelleria paradoxa*)

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ABSTRACT

Shea butter is an oleaginous material extracted as far from nuts of shea tree (*Vitelleria paradoxa*) that has immense nutritional and medicinal benefits. This research examined the changes in some physicochemical properties of shea butter stored under natural conditions for a period of 0-3 years. Results obtained indicated peroxide value of 99.54±3.21, 214. 88±3.07 and 407.64±3.41 meq/kg. Saponification value was found to be 200±1.03, 235±0.82, 260±0.82 and 280±1.41mgKOH/g. Iodine value was found to be 80.20±0.55, 80.32±0.51, 125.3±1.43 and 150.37±1.24 g/kg. While free fatty acid was recorded as 56.4, 28.2, 87.4 and 82% for 0, 1, 2 and 3 years, respectively. physical properties observed were colour, texture and melting point.The observed colours were gray, 0 and 1 year old butter while 2 and 3years old shea butter were pale yellow. All samples were soft to touch and pleasant in odour and had a common melting point of 31^0c.These results indicate no significant deteriorations of shea butter when stored under natural conditions for a period of 3years.This makes Shea butter a potentially stable raw material with prolonged shelf life for drug, cosmetic, food and confectionary industries.

Keywords: Shea butter, Physicochemical properties, Storage

EB013

Inhibiting Ammonia Emissions in Poultry Layer Farm using Ethno Botanicals in Plateau State, Nigeria

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ABSTRACT

Emission of ammonia (NH_3) poses a serious health challenge to both the birds and caretakers in poultry farms. In this research, three plants- *Eucalyptus torelliana* (ET), *Anarcadium occidentalis* (AO) and *Tamarindus indica* (TI) were used as litter additives in a 10, 30 and 50% inclusion rate to rice husk to mitigate the effect of ammonia in a poultry farm. The NH_3 emitted was quantified for four weeks using the Saraz method. Results revealed some reduction in NH_3 emitted by 7.23%, 25.40%, and 34.41% for (ET); 9.30%, 21.27% and 32.93% for (AO) and a 28.06%, 41.94%, and 52.14% for (TI), respectively as compared to the positive control. Litter pH was found to be 4.18 and 4.51 for TI corresponding to a 30 and 50% inclusion rate which was lower than all other groups. Subjecting the values to statistical analysis using a one way ANOVA followed by Dunnett's multiple comparison tests show no significant reduction ($p>0.05$) in ammonia emission (AE) for all groups of AO and ET while significant reduction in AE was found for TI, 30 and 50% inclusion rate ($p< 0.05$). Phytochemicals screening of these medicinal plants reveals the presence of tannins, steroids, saponins, glycosides flavonoids and alkaloids.

Keywords: Ethno botanical Plants, Ammonia emission. *Anarcadium occidentalis*, *Tamarindus indica, Eucalyptus torelliana*

EB014

Thermostability and pH Effects on Starch Degrading Enzymes from Spirogyra

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ABSTRACT

This study was aimed at determining the thermostability and effects of extreme pH on partially purified starch degrading enzymes from the algae spirogyra. Supernatant from spirogyra homogenate was assayed for enzyme activity using 1 % starch solution incubated at room temperature for 6 minutes after which the reaction was terminated using 3, 5-dinitrosalicyclic acid (DNS) at 100 ºC. Absorbance was then measured spectrophotometrically at 540nm. The crude isolate was subjected to one step sephadex G50 – G150 gel filtration to yield 2 fractions A and B. For each fraction, enzyme specific activity was determined at pH 3 and pH 9 at 25 ºC while enzyme thermostability was done at 45 ºC and 70 ºC (pH 6.9). Specific activities of 0.52 U and 0.64 U was observed for fractions A and B at pH 3 while catalysis was observed only in fraction B at pH 9 with a specific activity of 1.24 U. Both enzyme fractions were thermostable at 70 ºC but were more catalytically active at 45 ºC with specific activities of 3.38 U and 0.52 U for enzyme fractions A and B respectively. Findings from this study suggest spirogyra could be a potential source of industrially useful thermostable starch degrading enzyme isoforms that are catalytically active at extreme pH.

Keywords: Spirogyra, Thermostability, Starch degrading enzymes, Gel filtration

ENVIRONMENT AND TOXICOLOGY (ET)

ORAL PRESENTATION

ET001

Phaseolus vulgaris Aqueous Extract Reverses the Cardio-Toxicity and Nephron-Toxicity Associated with Doxorubicin (an Anti-Cancer Drug) Administration in Female Wistar Albino Rats

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ABSTRACT
The cardio-toxicity and nephron-toxicity associated with doxorubicin administration have limited the therapeutic potentials of doxorubicin in the treatment of cancer. There is therefore need to ameliorate or eliminate the toxicities associated with the administration of doxorubicin. The aqueous extract of *Phaseolus vulgaris* sprouts was investigated for anti-toxic effects on the kidneys and hearts of doxorubicin-induced toxicities in female albino rats with the aim of utilizing it (*P. vulgaris*) to subdue the side effects of this drug (doxorubicin) on the kidneys and hearts of cancer patients. Thirty-five female albino rats used for this study were divided into seven groups. Group 1 received rat feeds and water; groups 2, 3 and 4 received doxorubicin 20 mg/kg, 40 mg/kg and 60 mg/kg body weight respectively, while group 5, 6, and 7 are replicates of groups 2, 3, and 4 respectively but were treated with 10% aqueous extract of *P. vulgaris* sprouts. The investigation lasted for twenty-eight days after which the plasma, kidney and heart homogenates of the rats were assessed for some marker enzymes activities – AST, ALP, ALT; some biochemical parameters - Triglyceride, Total Cholesterol, HDL-Cholesterol, LDL-Cholesterol, Creatinine; and some anti-oxidative activities using Malondialdehyde, Catalase, Superoxide Dismutase and Glutathione. The results showed a statistical significant difference ($p < 0.05$) between group 1 (normal) and Groups 2, 3, and 4 (Induced). The result also showed a statistical significant difference ($p < 0.05$) between the Induced groups and groups 5, 6 and 7 (treatment). In conclusion, this study shows that aqueous extract of *P. vulgaris* sprouts is able to address the doxorubicin-induced toxicities in cancer patients.

Keywords: Antioxidant activity, *Phaseolus vulgaris,* Doxorubicin, Cardio-toxicity, Nephro-tooxicity

ET002

Response Surface Methodology for the Optimization of Waste Canola Oil-Degrading Parameters by Cold-Adapted *Rhodococcus* sp. AQ5-07 from Antarctica

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ABSTRACT
The Antarctica natural environment is often considered as among the most virgin areas in the world. However, the existence of pollutants in research stations debunked this status. Currently, the Antarctic environment is no longer clean as the release of oil has led to serious anthropogenic problems. This instance occurred in wastewaters commonly found around the temperate region where biological degradation by native organisms is limited because of the cold environment. Plackett–Burman design was used to screen the significant parameters that affect pure canola oil degradation rate by *Rhodococcus* sp. AQ5-07. Response surface methodology through the use of central composite design was then used to optimise the significant parameters for obtaining the most superior degradation conditions. The optimum substrate oil concentration, (NH4)2SO4, yeast extract and pH were found to be 3.50% (v/v), 1.05 g/L, 0.28 g/L and 7.50, respectively. Second-order polynomial regression model accurately showed the interpretation of experimental data with an R2 value of 0.9422, Adjusted R2, Predicted R2 and F values of 0.8883, 0.6991, and 14.05, respectively. This study demonstrates the possible use of an Antarctic bacterium with the potential to be used in bioremediating vegetable oil and wastewater treatments in a low temperate environment.

Keywords: Bioremediation, Biotechnology, Degradation, *Rhodococcus* sp

ET003

The Effect of Sesamol on Growth and Lipid Accumulation of *Aurantiochytrium* sp. SW1

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ABSTRACT

Sesamol, a nonoil component of sesame seed oil, inhibited growth and fatty acid synthesis of fungi *Mucor circinelloides in vivo*, via inhibition of malic enzyme activity; an enzyme known to play a vital role in lipid biosynthesis of oleaginous microorganisms. This study, investigates the effect of sesamol on growth, lipid accumulation and malic enzyme activity of *Aurantiochytrium* sp. SW1.The microalgae was grown in a N-limited medium for 120 h at 30^{O}C and 250 rpm in a 5 L bioreactor. Growth of the microalgae was analysed gravimetrically via measurement of dry cells, lipid content was analysed using Folch liquid-liquid extraction method and malic enzyme activity was assayed using continuous assay method. The maximum growth achieved by the microalgae was 10.30 g/L (lipidless biomas) with lipid upto 62% (g/g biomass). Addition of sesamol had effect on both growth and lipid accumulation of the microalgae, 2 mM sesamol caused 50% and 20% growth and lipid content reduction, respectively. Increased in sesamol concentration to 4 mM leads to 75 % growth reduction and 44 % reduction in lipid. The activity of malic enzyme was also seen to decrease accordingly upon addition of sesamol. The result showed that sesamol affected growth and lipid accumulation of microalgae in a different way when compared to fungi. The result also revealed malic enzymes' involvement in growth of oleaginous microorganism other than their lipid accumulation.

Keywords: Lipid accumulation, sesamol, *Mucor circinelloides, In vivo*

ET004

Role of Microorganisms in the Removal of Heavy Metals in Soil: A Review

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ABSTRACT

The unsystematic release of heavy metals into the soil is a major health hazard concern worldwide, as they cannot be broken down to non-toxic forms and therefore have long-lasting effects on the ecosystem. Many of them are toxic even at very low concentrations; arsenic, cadmium, chromium, copper; lead, mercury, nickel, selenium, silver, zinc etc. are not only cytotoxic but also carcinogenic and mutagenic in nature. Plants growing on these soils show a reduction in growth, performance, and yield. In this present study, the role of microorganisms in biotransformation of heavy metals into nontoxic forms is well-documented; also, advances in bioremediation technologies and strategies to explore these immense and valuable biological resources for bioremediation are discussed. Bioremediation is an effective, innovative and promising technology available for removal of heavy metals and recovery of the heavy metals in polluted water and lands (soils), hence it is suitable for the establishment/reestablishment of crops on treated soils. Since microorganisms have developed various strategies for their survival in heavy metal-polluted habitats, these organisms are known to develop and adopt different detoxifying mechanisms such as biosorption, bioaccumulation, bioaugmentation, bioreactors, biostimulation, composting, biopiling, and biotechnological intervention which can be exploited for bioremediation either ex situ or in situ. The aim of this current research it to highlight different mechanisms/techniques involved in the removal of heavy metals in the soil using microorganisms.

Keywords: Bioaccumulation, Biotechnology, Heavy metal, Microorganism

ET005

Foam Properties and Detergent Ability of Saponins of Leaves of *Balanitesa egyptiaca* DEL.

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ABSTRACT

Saponins are glycosides which form long-lasting foam in aqueous solution. The foaming characteristics have been put to use in medicine, cosmetics and food industries. In this study,the foam-foaming potentials of leaves of *Balanites aegyptiaca Del.* have been investigated using various standard methods. Results of histochemical and phytochemical analyses revealed the probable presence of saponins and some other secondary metabolites. Yields of aqueous, methanol and crude saponins (n-butanol) extracts were 19.8%, 22.4% and 2.4% respectively. Foaming activities (foam heights and foaming times) for the extracts and commercial detergents of Triton-X 100 and Tween 80 were determined at graded concentrations (0.2-1.0%) and at various time intervals [0 min, 1 min, 5 min and T hr (total time for disappearance of foam)]. Results showed that foam heights and foaming times increased with increase in concentrations of aqueous solution. Triton-X 100 possessed the highest foam height and foaming times of 0.5% with 11.57±0.51 cm and 30.73±0.42hr, followed by Tween 80 with 7.80±0.22cm and 16.98±0.32hr and finally crude saponins (n-butanol) extract with 6.20±0.25 cm and 1.12±0.06 hr. Foam power of 0.5% crude saponins (n-butanol) extract solution was 52.7% of 0.5% Triton-X 100. Foam power of the 0.5% crude saponins (n-butanol) extract solution was 79.4% of 0.5% Tween 80. The R5 values of 27.59%, 31.47% and 25.81% of aqueous, methanol and crude saponins (n-butanol) extracts respectively represent poor foam stability compared with the values of 90.8% and 85.3% of Triton-X 100 and Tween 80, respectively. Therefore, the potentials of using saponins of leaves of *Balanites aegyptiaca Del.* as stabilizing agents in detergency are poor. However they may be use in food and cosmetics industries.

Keywords: *Balanites aegyptiaca Del,* Saponin, Crude, Foam

ET006

Analysis of Selected Heavy Metals and Microbial Content of Borehole Water in Kalgo Metropolis, Kebbi State, Nigeria

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ABSTRACT

In developing countries with deteriorating environment, the demand for clean drinking water is growing rapidly in recent times. Heavy metals and microbes are increasingly being implicated in the contamination of drinking water and increasing incidence of waterborne diseases. This study was aimed at determining the heavy metal content and microbial loads of pipe borne water in Kalgo metropolis. Water was collected in sterilized sample bottles from public and private boreholes from different locations in Kalgo metropolis. The water samples were analyzed for the presence of selected heavy metals via Atomic Absorption Spectroscopy while standard procedures were used for the bacterial, coliform and yeast count. The results show that the concentration of Lead and Iron were above WHO limit (Pb ≤ 0.01 ppm, Fe ≤ 0.03 ppm) in all but those from Illela Yari area of Kalgo, where the concentration of Iron was within the normal range. Cadmium was only detected in samples from Illela yari and Ungwar jeji areas and was higher than the WHO limits (Cd ≤ 0.003). Nickel was also detected in high concentration in some of the water samples while Copper and Chromium were within the WHO acceptable limit (Cu ≤ 1.0, Cr ≤ 0.003) in all the water samples. Bacterial colonies were detected above the WHO limits in all the water samples while coliform and yeast are within the normal values. Conclusively, the pipe-borne water supply from the majority of the sampled areas was contaminated with some heavy metals and bacteria. It is therefore recommended that, water from boreholes need to be treated further before consumption in order to get rid of these contaminants. Neglecting this might pose a significant public health risk.

Keywords: Water, Heavy metals, Microbes, Yeast, Coliform, WHO

ET007

Evaluation of Heavy Metals and Antimicrobial Efficacy of Four Hand Sanitizers Used During Covid-19 in Afit, Kaduna

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ABSTRACT

The Corona virus disease-2019 (COVID-19) has increased dramatically the demand for hand sanitizers, a non-pharmaceutical product used in the prevention of infectious diseases, to destroy or kill germs on the skin. However, many are not all aware of the harmful effects of these alcohol based hand sanitizers. This study was aimed to evaluate heavy metals and the antimicrobial efficacy of four hand sanitizers used, at the Air Force Institute of Technology (AFIT), during the COVID-19 pandemic. The products analyzed were that of AFIT identified as sample A, with other brands identified as sample B, C, and D respectively. AFIT sanitizer is an alcohol-based hand sanitizer certified by Standard Organization of Nigeria (SON). Sample B, C, and D; are also alcohol-based hand sanitizers certified by Nigerian Agency for Food and Drug Administration Control (NAFDAC), which are all commercial brands sold in the markets. Sample A and B products enhance the hygiene process majorly, there were significant increases ($P \leq 0.05$) in antimicrobial efficacy as bacterial burden load reduced when compared to sample C and D products. All samples had a bacteriostatic effect to *Eschericia. coli*. Heavy metals body-burden in absolute numbers of Sample B, C and D sanitizers were shown to have more presence of cadmium (Cd), sample A, B and D had presence of Lead (Pb). Sample C alone had the presence of copper (Cu), alongside other less toxic heavy metals. Information about the testers' perceptions of the four hand sanitizers, together with their expectations of a hand sanitizer was obtained through a questionnaire. The community showed more interest to antimicrobial efficacy and skin compatibility as a reasonable number were irritated by their different scents.

Keywords: COVID-19, Hand-sanitizer, Heavy metals, Antimicrobial efficacy

ET008

Reduction of Hexavalent Molybdenum (Mo^{6+}) to Precipitable Mo-blue by *Bacillus* sp. Isolated from Agricultural Farm in Kano

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ABSTRACT

Microbial reduction of heavy metals has an important role in detoxification and metals recycling in the environment. Bacterial reduction of soluble hexavalent molybdenum to precipitable molybdenum blue (Mo-blue) forms the basis for its bioremediation. In this study, an indigenous molybdenum-reducing bacterium with ability to tolerate up to 200 mM sodium molybdate was isolated from agricultural farm in Kano. A microscopic examination of the Gram's stain showed that the isolate is Gram-positive, rod-shaped bacteria and was identified as *Bacillus* sp. based on phylogenetic analysis of 16s rRNA partial gene sequencing. The spectral scanning of the Mo-blue produced reveals a peak at 865 nm and a shoulder at 700 nm, a characteristic similar to previously isolated molybdenum- reducing bacteria. Molybdenum reduction in this bacterium was optimally supported by glucose and ammonium sulphate as the best carbon and nitrogen sources, respectively. The optimum phosphate and molybdate concentrations for molybdenum reduction in *Bacillus* sp. were found to be 3.5 and 40 mM, respectively, at pH between 6 and 8, and temperature between 35 to 40 ˚C. The characteristics of this bacterium make it an ideal candidate for bioremediation of molybdenum pollution in the temperate regions.

Keywords: *Bacillus* sp**,** Bioremediation, Bacteria, Molybdenum, Pollution

ET009

Isolation and Characterization of Bacterial Lipases from Oil Contaminated Soils in Sokoto

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ABSTRACT

Lipases occupy prominent place among biocatalysts as they catalyze the hydrolysis of triacylglycerols. Microbial lipases, especially those from bacteria, are more useful than their plant and animal counter-parts because of several important properties such as their short generation time. This study was designed to isolate, screen and characterize lipase producing bacteria from oil contaminated soils using microbiological, biochemical and molecular techniques. Lipid-degrading microbes were isolated and identified by microscopic examination, and biochemical examination. The isolates were screened for lipase activity on tween-20 and phenol red agar plates and were further identified by 16S rRNA gene sequencing. The isolates were then subjected to enzymatic assay using spectrophotometric method, the pH and incubation time studies was done on the most active bacteria lipase. Out of eight (8) bacteria isolated and screened, six (6) lipase-producing bacterial strains showed zone of hydrolysis and change of colour on Tween-20 and phenol-red agar plates. All the six (6) strains were gram positive-rod bacteria and the 16S rRNA gene sequencing revealed five (5) *Bacillus* species and one *Bordetella specie*. *Bacillus subtilis subsp. stercoris strain EG120*4 showed highest lipase activity of (18.01U/mg) using p-nitrophenyl palmitate as a substrate. The optimum pH and incubation time for *Bacillus subtilis subsp. stercoris strain EG1204* lipase was pH 7 and 50 minutes. These lipase-producing bacterial strains that were isolated and characterized from these soils produces lipases with good catalytic activities within 24 hours as such can be used to produce lipases for industrial applications.

Keywords: Lipase, Oil contaminated soil, Bacteria, p-Nitrophenyl palmitate

ET010

Effect of Chronic Exposure to Exhaust Fumes on Hepatic Function and Hematological Indices in Humans

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ABSTRACT

The effects of generator exhaust fumes exposure on liver function parameters, hematological indices and 1-hydroxylpyrene concentration were assessed in forty-one (41) shop owners in the Michael Okpara University of Agriculture computer village, Abia State. The test groups consisted of generator users, while thirty (30) healthy residents ofareas where generators were not frequently used, were included as control. The test groups were further categorized into type of business, duration of stay, hours spent daily, proximity of generator set to business space. Blood samples were collected from participants and each sample was analyzed for total bilirubin concentration. (TB), alkaline amino phosphate (ALP), aspartate amino transferase (AST), alanine amino transferase (ALT), albumin concentration (Alb.), 1-Hydroxylpyrene concentration, methemoglobin (MetHb), total white blood count (TWBC) and differential leucocyte count using standard methods. Results revealed that AST, ALT activities, 1-Hydroxylpyrene, TB, MetHb, TWBC, neutrophil and monocyte concentration of the test group were significantly ($P<0.05$) increased when compared to the control group, while, a non-significant ($P>0.05$) decrease was observed in ALP activity, Alb, lymphocytes, eosinophil concentration of the test group. Increase in these markers of toxicity correlated positively with type of business (computer operator), daily duration of exposure and length of time spent in the business(≥ 4years). These results suggest that chronic exposure to generator exhaust fumes may be potentially toxic to

the liver and blood profile of individuals using generating sets for business purposes as major source of power and calls for regulatory agencies to address issues relating to constant exposure to generator fumes.

Keywords: Hepatic function, Hematology, Exhaust fumes, 1-Hydroxylpyrene, Toxicity

ET011

Insecticidal Activities of Extracellular Cholesterol Oxidase Produced by Soil *Streptomyces*

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ABSTRACT

Microbial cholesterol oxidases have gained great attention due to its widespread use inmedical applications for serum cholesterol determination.Due to broad range of clinical, agricultural and industrial applications of cholesterol oxidase, isolation and screening of bacterial strains producing extracellular form of cholesterol oxidase is of great importance. The aim of this study is to obtain an efficient cholesterol oxidase producer for industrial and medicinal needs, to optimize culture conditions using response surface methodology for high production of cholesterol oxidase by *Streptomyces* collected from Mungadi agricultural land soil. This study describes the isolation of a potential cholesterol oxidase producing *Streptomyces* from Mungadi soil. The isolated strain produced cholesterol oxidase in submerged culture using modified sakaki's method. The extracellular cholesterol oxidase was partially purified using ammonium sulphate precipitation method. The activity of extracellular cholesterol oxidase was assayed under various temperature, pH,carbon sources, nitrogen sources and incubation time for maximum production of extracellular cholesterol oxidase. The effect of cholesterol oxidase on serum sample was determined as well as its insecticidal activities. The isolated strain produced cholesterol oxidase in submerged fermentation culture using modified Sakaki's method, with cholesterol as best carbon source, yeast extract as best nitrogen source for the optimum production of cholesterol oxidase. The production of cholesterol oxidase was optimum at temperature 32^{o}C and pH 7.5, with optimum incubation time of 50 hours. The enzyme reduced the serum cholesterol from 6.25 mmol/l to 4.39 mmol/l, and also exhibited insecticidal activity. These results showed that soil *Streptomyces* of Mungadi agricultural land is a potent producer of cholesterol oxidase with potential as eco-friendly natural insecticidal agent.

Keywords: Cholesterol oxidase, Insecticide, *Streptomyces*, Optimization.

ET012

Genetic Identification of Snakes in Kaduna State and in Vitro Heamolysis Analysis on *Naja katiensis* Snake Venom

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ABSTRACT

The geographic distribution of reptiles in Nigeria has led to different families of snakes found at different locations. The total number of snake-bites is thought to exceed five million, with over 1,250,000 cases of mortality worldwide. It has been estimated that the highest burden of snake bite incidence is seen in rural communities. Kaduna state was surveyed for the presence of venomous snakes followed by analysis using genetic methods. The use of Livak DNA Extraction protocol and the conventional PCR technique followed by visualization by Agarose Gel documentation allowed for the identification of snake species present. Snake venom proteins widely affect vascular system including circulating blood cells, coagulation factors, and vascular wall components. Many of the toxic proteins have multiple targets. For example, the application of spectrophotometry for absorbance determination, indicating the influence of calcium ions in enhancing red blood haemolysis. In this study ten venomous snake species were reported in Kaduna State, the most abundant snake species was Naja species (Spitting cobra). In vitro studies showed high red blood

destruction (53%) in the presence of calcium ions but low destruction (8%) in its absence. This information collected will help in identification of different snake species and their potential hemolytic effects.

Keywords: Naja nigricollis, DNA extraction, Haemolysis.

ET013

Differential Bioaccumulation of Heavy Metals in Tissues of *Tilapia Zilli* Exposed to Liquid Habitat from River Challawa in Kano, Nigeria

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ABSTRACT

Increased water body contamination by heavy metals (HMs) is a serious health hazard to both aquatic biota and their predators. The degree of contamination is a function of bioavailability and bioaffinity to an organism. Metallothioneins (MTs) –a protein with high metal binding ability was used to assess the differential bioaccumulation of HMs in liver and skeletal muscles of *Tilapia Zilli.* HM concentration in all the liquid habitats was above the permissible limits of Federal Ministry of Environment with Zinc having the highest concentration ranging from 6.791-11.825 ppm. Exposure of *T. Zilli* to the three liquid habitats for 72 hours with sample collection twenty-four (24) hourly showed significant ($p<0.05$) induction of MTs by HMs accumulated in liver and skeletal muscle tissues of *T. Zilli* exposed to test habitats. Fishes showed higher induction in the downstream liquid habitat, where accumulation of HMs was higher in liver than muscle tissues. Fishes exposed to that habitat recorded MT concentrations of 102.859 µg/g WWt and 83.947µg/g WWt after 72 hours of exposure for liver and skeletal muscle respectively. The liver demonstrated higher bioaccumulation potential than muscle tissues and the highest bioaccumulation factor for most of the HM was associated with the downstream habitat. *T. Zilli* from this study bioaccumulated HM and MTs played a vital role bioaccumulation assessment of HM. Though HM in skeletal muscles were relatively low, it still poses health threat through bioaccumulation. Thus, consumption of fish from polluted bodies needs to be avoided.

Keywords: Metallothioneins, Bioaccumulation, Aquatic habitats, Heavy metals, Bioavailability.

ET014

Proximate and Heavy Metal Anaysis of *Claries gariepinus* (Catfish) and *Oreochomis niloticus* (Tilapia) Caught from ABU and Zaria Dam

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ABSTRACT

Recently, the concentrations of toxic metals in many ecosystems are reaching unprecedented levels. The increasing use of metals in industry and mining activities have led to serious environmental pollution through effluents and emanations. This study is aimed at investigating the presence and bioaccumulation pattern of heavy metals as well as the proximate content in Gills and Muscles of *Clarias gariepinus and Oreochromis niloticus* in Zaria to establish their suitability for human consumption.As such the presence and bioaccumulation pattern of some heavy metals Manganese (Mn), Lead (Pb), Nickel (Ni), Cadmium (Cd) and Copper(Cu), concentrations in catfish, *Clarias gariepinus* and *Oreochomis niloticus* gills and muscles collected from A.B.U and Zaria dams were assessed. Result from this study showed heavy metals concentrations in their order of increasing concentration as Pb>Ni>Mn>Cu>Cd. Lead (Pb) has the highest concentration in both dams in mg/kg, with a value of 3.398mg/kg which is higher than limited value

recommended by WHO. A relative high value of nickel in both parts of the different fish species caught form ABU dam shows higher values ranging from 0.522mg/kg to 0.981mg/kg which is also higher than FAO and WHO recommended limit of 0.1mg/kg to 0.6mg/kg. Likewise the proximate composition of *Clarias gariepinus* and *Oreochomis niloticus* shows that there were variations in the moisture, crude lipid and crude protein content, between both dams with *Clarias gariepinus* from Zaria damhaving the highest moisture content 9.34+0.15 mg/100g while *Oreochomis niloticus* from A.B.U and Zaria dam had the highest crude protein of 50.63+0.79 mg/100g and crude lipid of 26.50+0.14 mg/100g respectively.Thus, a close periodical and regular monitoring of heavy metal pollution in the water bodies is strongly advocated.

Keywords: Heavy metals, Proximate composition, Dam, *Clarias gariepinus*, *Oreochomis niloticus*

ET015

Incidences and Dietary Intake of Pesticide Residues in Staples: A Case Study of Kogi East

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ABSTRACT

Residues of agrochemicals sometimes consumed in food could exhibit several manifestations of toxicity. In order to ascertain the safety of some staples, the incidences and concentrations of thirty (30) active ingredients of pesticides (19 organochlorines and 11 organophosphates) were determined in beans, cassava, maize and rice sampled within Kogi East using QuEChERS method for extraction and GC-MS/MS for quantification. While noorganophosphate was detected, five organochlorines were detected. The incidence of α-Chlordane in beans, maize and rice samples analyzed were 12.5%, 33.3% and 33.3% respectively. The incidence of γ-Chlordane in beans was 12.5%. The incidence of P,p'-DDE in beans and rice were 37.5%and 50% respectively. The incidence of dieldrin in beans was 62.5%. The incidence of methoxychlor in beans, cassava, maize and rice samples were 87.5%, 100%, 100% and 16.7%, respectively. The concentrations of α-Chlordane, γ-Chlordane, dieldrin, and P,p'-DDE in the staples were below their respective maximum residuelimits (MRL) but methoxychlor was above its MRL of 0.01ppm. The Estimated Dietary Intake [EDI *(mg/kg.bw/day)*] were α-chlordane ($1.27x10^{-6}$), γ-chlordane ($3.48x10^{-6}$), dieldrin ($4.36x10^{-5}$), P,p'-DDE($1.31x10^{-5}$), methoxychlor ($9.86x10^{-5}$) from beans samples, methoxychlor ($3.74x10^{-3}$) from cassava, α-chlordane ($8.84x10^{-6}$), methoxychlor ($8.52x10^{-4}$) from maize, α-chlordane ($1.60x10^{-6}$), P,P'-DDE ($2.55x10^{-6}$), methoxychlor ($3.12x10^{-5}$) from rice. Consumption of the residues in food has been reported to be a possible cause of liver lesion, DNA damage, oxidative stress, reduction in immunity, nervous system malfunction and disruption of reproductive functions as well as carcinogenic risk. The levels of most residues found could trigger chronic toxicity over prolonged uncontrolled consumption.

Keywords: Organochlorines, Staples, Kogi East, Estimated dietary intake

ET016

Sub-Lethal Toxicity Effects of Waste Burnt Tyres Residue on Biochemistry and Antioxidants of *Clarias gariepinus* Juveniles

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ABSTRACT

Waste tyres are burnt in order to obtain iron, steel as well as fuel for human use. Waste burnt tyres residues (WBTRs) are usually washed into the aquatic environment through runoffs which could have deleterious effects on aquatic inhabitants. Sub-lethal toxicity effects of water soluble fractions of WBTRs on serum biochemistry oxidative stress biomarkers (gills and liver) of *C. gariepinus* juveniles was evaluated. A total of 120 mixed sex juveniles were exposed to 3.74,1.87,0.93, 0.47 0.23 and 0.00g/L concentrations in 6

transparent glass tanks (40x25x23cm), each filled with 15 L of borehole water and duplicated. Blood biochemical activities such as alanine tranamines (ALT), alkaline phosphatase (ALP), asparate transaminase (AST), total protein (TP), albumin (ALB) and gamma glutamyltransferase (GGT) were analyzed. Glutathione peroxidase (GPX), malondialdehyde (MDA), Catalase (CAT), Super oxidase dismutase (SOD), reduced glutathione (GSH) of Liver and gills were determined. Data were subjected to one way analysis of variance (ANOVA). There is an increment in activities of AST, GGT, ALP and ALT with increase in WBTRs concentration while TP decrease. There is increase in activities of MDA, SOD, CAT, GPX while GSH reduced with increase in toxicant concentration in gills. There is an increase in activities of GPX, CAT, SOD and MDA as concentration of toxicant increases in liver. WBTRs cause alterations in biochemical parameters and oxidative biomarkers of *C. gariepinus*, therefore its discharge into aquatic environment should be regulated.

Keywords: Serum biochemistry, Oxidative stress, End of life tyres residues, Catfish.

ET017

Effect of Mining Activities on Liver Function and Microbial Growth of Azara Town Inhabitants

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ABSTRACT
Mining is an important economic activity. In recent decades, heavy metals contamination has increased because of mining activities. This pollution is hazardous to human health. The aim of this research was to determine the effects of mining activities on liver function and microbial growth of Azara town inhabitants. Blood and urine samples were collected from the inhabitants of Azara town and liver function tests was carried out on some of the biochemical markers such as serum bilirubin, alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, and gamma glutamyltransferase. Culture of the urine samples were also carried out. Hitachi 917 analyser a fully automated, computerized immunoassay system which permits efficient quantitative and qualitative in vitro analysis was used for the liver function tests. Results of liver function tests showed no significant difference between the samples and the reference range. The microbial growth in the urine samples had no relationship with the mining activities in Azara town. The result obtained could be due to the distance of the mining site from the inhabitants of Azara town. In conclusion, the mining activities had no effect on the population of this locality. Findings of the research have demonstrated that mining effects on health of residents in the community is a function of distance from active mining site.

Keywords: Mining, Liver function, Microbial growth, Azara town

ET018

Cyanide Bioremediation Potential of Wild and Mutant Strain of *Klebsiella oxytoca*

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ABSTRACT
We report the cyanide degrading potential of the wild and mutant strain of *Klebsiella oxytoca*. This was with a view to developing a strain with higher cyanide tolerance that could be applied in bioremediation of cyanide polluted environment. The bacterium was isolated from industrial effluent and subjected to random mutagenesis using a varying concentration of ethyl methyl sulfonate (50-150 µg/ml). New strains were developed and the most productive one was selected for cyanide bioremediation study. Bioremediation of

10, 20 and 40 mMof potassium cyanide (KCN) were investigated. The wild and mutant strain had 23 % (7.7 mM) and 38 % (6.2 mM) degradation efficiency when exposed to 10 mM KCN. At 20 mM KCN concentration, the wild type had a 35 % (13.2 mM) degradation, while the mutant strain had a 75 % (5 mM) degradation. Exposure to a higher concentration of cyanide (40 mM) showed a reduction in degradation efficiency, though the mutant strain demonstrated more cyanide tolerance. The mutant strain of *K. oxytoca* tolerates high concentration of cyanide than wild-type and this could find application in bioremediation of cyanide polluted environment.

Keywords: Cyanide, *Klebsiella oxytoca,* Rhodanese, Nutagenesis, Bioremediation

ET019

Evaluation of Susceptibility of Culex Mosquitoes to Three Classes of Insecticides in Minna, Niger State

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ABSTRACT

Culex mosquito, an arboviral and filarial vector, is present in high numbers throughout Nigeria and other West Africa countries. The common vector control is with different classes of insecticides. The present study assessed the susceptibility of culex mosquito to six World Health Organisation (WHO) recommended insecticides of three different classes. culex mosquito larvae were collected from six local breeding sites within Minna, Niger state, Nigeria and were reared to adults in the insectary. The percentage knockdown and mortality for the adult mosquitoes were evaluated for bendiocarb and propoxur (carbamates); malathion and pirimiphos (organophosphates); permethrin and deltamethrin (pyrethroids) insecticides using WHO standard protocol. Total protein of adult mosquitoes (dead and alive) were determined by Bradford method and Glutathione-s-transferase (GST) activity was evaluated using biochemical method. The highest breeding site for culex mosquito was the rice fields (36.0 %), while the lowest was the tyres (7.5 %). Gutters, dam, streams and rainpools had 21.6, 12.6, 11.6 and 10.7 (%) respectively. The percentage knockdown with deltamethrin, permethrin, bendiocarb, propoxur, malathion and pirimiphos for 30 minutes exposure time, were 76.7, 91.9, 100.0, 72.6, 81.8 and 87.0 (%) respectively. The highest mortality at 1 hour after exposure was achieved with bendiocarb (100 %), followed by permethrin (95.1 %),pirimiphos (87.8 %), malathion (86.2 %), deltamethrin (79.0 %) and propoxur gave the lowest percentage mortality (73.1 %). The total protein of dead mosquitoes (0.253, 0.110, 0.477, 0.250, 0.324, 0.099 mg/ml) were higherthan those alive (0.100, 0.088, 0.127, 0.109, 0.113 mg/ml) after exposure todeltamethrin, permethrin, propoxur, malathion and pirimiphos, respectively. The highest GST activity of alive mosquitoesafter exposure was with deltamethrin (728.0 µmole/min/mg), followed by permethrin (713.3µmole/min/mg), malathion (546.3 µmole/min/mg),pirimiphos (447.4µmole/min/mg), propoxur (272.2 µmole/min/mg) while mosquitoes dead after exposure to permethrin had the lowest activity (66.3 µmole/min/mg). In conclusion, culex mosquitoes resistant to the recommended insecticides except for bendiocarb and GST appear to be the detoxifying enzyme responsible for the resistance.

Keywords: Culex mosquitoes, Insecticides, Knockdown, Resistance, Susceptibility

ET020

Acute and Sub-chronic Toxicity Evaluation of Raw Urine of Camel (*Camelus dromedarius*) in L-NAME-Induced Hypertensive Rats

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ABSTRACT

For centuries camel urine had been consumed by people in Asia, Africa and Middle East for varied medicinal purposes. To the best of our knowledge there is scant literature information about its toxicity profile. This study was therefore designed to assess safety status of urine samples (CU) obtained from some domesticated female camels (*Camelus dromedarius*) in Sokoto, Sokoto State, Nigeria through acute and sub chronic toxicity studies in Nitro-L-Arginine Methyl Ester (L-NAME) induced hypertensive albino rats. In April 2020, samples of camel urine (U1-U5) were obtained from five (5) different female camels overnight by trapping open bowls to collect it whenever the camels were urinating. Acute and sub chronic toxicity evaluation of (CU) was conducted using OECD guidelines and standard methods. Single oral doses at (2000mg/kg body weight) and (5000 mg/kg body weight) were separately administered to 6 groups of rats one after another (one rat per group) at grace observation period of 48h for each acute study. In sub chronic studies too; same CU single oral dose was daily administered at (100, 300 and 500 mg/kg body weights/day) for 28-days. Animals were observed for behavioral changes, post-treatment adverse effects and 2 days post-commencement of acute study animal mortality. Results revealed neither mortalities nor any adverse clinical signs of toxicity in all rats and there were no any observed changes in pattern of food intake or water consumption during both investigation periods. Conclusively, oral LD_{50} above 5000 mg/kg body weight is suggestive from obtained result.

Keywords: Toxicity, Raw urine, Camel, Hypertensive rat

ET021

Changes in Haematological Parameters following *Plasmodium berghei* Infection and Treatment with Sodium Bicarbonate in Albino Mice

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ABSTRACT

The current study evaluated the hematological changes in albino mice following infection with *P. berghei* and treatment with sodium bicarbonate. Twenty albino mice were randomly divided into five groups of four mice each. Groups 3, 4 and 5 were the test groups and administered 84mg/kg b.w of sodium bicarbonate injection once, twice and thrice respectively. Group 1 received dH_20 and group 2 was not treated. Three days after, hematological parameters and differential cells were analyzed. PCV was significantly *($p<0.05$)* lower in groups 2 (32.00±0.70%), 3 (34.00±0.70%), 4 (34.00±0.70%), 5 (33.00±0.70%) compared to control (35.00±0.70%). Haemoglobin decreased significantly *($p<0.05$)* in group 5 (11.00±0.70 g/dl) compared to control (11.80±0.70 g/dl). WBC showed significant *($p<0.05$)* increase in the test groups; 2(3600.00±70.7110^6/mm^3), 3(4600.00±70.7110^6/mm^3), 4(4800.00±70.7110^6/mm^3), 5 (4800.00±70.7110^6/mm^3) compared to control (3200.00±70.7110^6/mm^3). Platelets decreased significantly (*$p<0.05$)* in groups; 2(90.00±.7010^6/mm^3), 3(87.00±.7010^6/mm^3), 4(84.00±.7010^6/mm^3), 5(86.00±.7010^6/mm^3) compared to control (92.00±.7010^6/mm^3). The percentage neutrophils was

significantly *(p<0.05)* higher in group 2(61.00±0.70%), significantly (p<0.05) lower in groups 3(58.00±0.70%), 4(57.00±0.70%), 5(57.00±0.70%) compared to control (60.00±0.70%). Leucocytes increased significantly *(p<0.05)* in groups 2(36.00±0.70g/dl), 3(38.00±0.70g/dl), 4(38.00±0.70g/dl), 5(40.0±0.70g/dl) compared to control (32.00±0.70g/dl). Monocyte was significantly *(p<0.05)* lower in the test groups; 2(2.00±0.07x10^{12}/L), 3(2.00±0.07x10^{12}/L), 4(2.00±0.10x10^{12}/L) and 5(1.00±0.89x10^{12}/L) compared to control (4.00±0.07x10^{12}/L). Eosinophils decreased significantly (p<0.05) in group 2(1.00±0.35x10^{6}/mm^3), increased significantly *(p<0.05)* in group 4(3.00±0.70x10^{6}/mm^3) compared to control (2.00±0.70x10^{6}/mm^3). Basophils were not detected in neither of the groups. This study revealed that sodium bicarbonate administered to albino mice infected with *P. berghei* caused significant *(p<0.05)* elevation of WBC, leucocytes, eosinophils and neutrophils but significantly *(p<0.05)* reduced monocytes.

Keywords: Differential cells, *Plasmodium berghei*, Sodium bicarbonate, Extracellular fluid pH, Malaria

ET022

Impact of GSTM1 and GSTT1 Polymorphism and Markers of Oxidative Stress in Individuals Environmentally Exposed to Lead

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ABSTRACT

Genetic variation in enzymes involved in metal detoxification could have influence on susceptibility to lead-induced oxidative stress. The present study aimed at evaluating the effects of genetic variation of Glutathione-S- transferase gene on oxidative stress markers (GSH, SOD, CAT and MDA) among individuals environmentally exposed to lead. GSTM1 and GSTT1 null homozygous genotypes were determined by polymerase chain reaction. Blood lead levels were determined using flame atomic absorption spectrophotometer. Activities of superoxide dismutase, catalase and glutathione levels were assayed using Cayman's commercial kits. The mean blood lead level of the study subjects was 78.16± 5.79 µg/dl with a range from 26.6 to 191.0 µg/dl. The frequencies of GSTM1 and GSTT1 null genotypes were 23% and 50.8% , respectively. The frequency was high in individuals with blood lead levels greater than 70 µg/dl. A significant decreased in activity of antioxidant enzymes (SOD and CAT), glutathione levels and concomitant increased of MDA concentrations were observed in individuals with GSTM1 and GSTT1 null genotypes. Therefore, the findings from this study infer a causal relationship between environmental exposure to lead and oxidative stress. Individuals with homologous null at GSTM1 and GSTT1 loci are predispose to increased risk of multi-organs toxicity from environmental exposure to lead.

Key words: Lead, Glutathione S-transferase, Polymorphisms, Superoxide dismutase, Catalase.

ET023

Non-Enzymatic Antioxidant Responses of Landraces and Improved Drought Tolerant Varieties of Maize (*Zea Mays*l.) to Water Stress

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ABSTRACT

This study determines the non-enzymatic antioxidant responses of landraces and improved drought tolerant varieties of maize to water stress. Ascorbic acid, β-carotene, flavonoids, as well as lipid peroxidation values, were determined using the indophenol, acetone extraction, aluminum chloride- colorimetric, and thiobarbituric methods respectively. High ascorbic acid contents was measured on day 15 for the improved drought tolerant (Sammaz 40) variety (35.94±0.02 mg/100g Fw) at 50% field capacity, whereas at 25% field

capacity, there was significant ($p<0.05$) decrease in the ascorbic acid content of both varieties with the landrace (TZM 219) having higher content (23.51±0.04 mg/100g Fw) compared to the improved variety (22.17±0.03 mg/100g Fw). The landrace (TZM 219) had higher contents of β-carotene at 25% field capacity (0.86±0.01 mg/100g Fw) than the improved variety with a mean of (0.65±0.02 mg/100g Fw) at day 30. There was significant increase ($p<0.05$) in the flavonoids contents of all the varieties with increase in the severity of the stress on day 15 of the experimental period, with landrace (TZM 1422) having the highest flavonoids contents at 25% field capacity (54.67±0.67 mg QE/g Fw) than the improved variety (44.00±1.15 mg QE/g Fw). There was significant increase in the lipid peroxidation value for all varieties, with increase severity of stress. However, landrace (TZM 219) had the lowest value (1.94±0.04 nmol/g Fw). This study showed that the landraces had higher contents of ascorbic acid, β-carotene, flavonoids and low value of lipid peroxidation compared to the improved variety in response to water stress, an indication of stress tolerance.

Keywords: Non-enzymatic antioxidant, Landraces, Drought tolerant, Zea mays L

ET024

Are Energy Drinks Safe?

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ABSTRACT

Energy drinks are mainly regarded as non-alcoholic, often lightly carbonated beverages that are designed to give the consumer a burst of energy by the addition of several energy enhancing ingredients, most notably caffeine. They are widely consumed mostly in urban cities for energy, alertness and concentration. Almost all the energy drinks commonly consumed contain the ingredient caffeine which is a brain stimulant in addition to vitamins, amino acid derivatives, sugar and herbal extracts. The concentration of caffeine in most energy drinks is unprecedentedly high thus making them harmful to the body. Part of the harmful effect of excess amount of caffeine in energy drinks to the body is a decrease in blood vessels ability to dilate; thus, leading to constriction and eventually causing high blood pressure resulting in a heart attack. Regulating the intake of these energy drinks can lead to a healthy life devoid of complications such as cardiovascular diseases.

Keywords: Energy drink, Caffeine, Carbonated beverages, Blood vessel

ET025

Characterization of Drought Tolerant Gene of *Cymbopogon schoenanthus* L. spreng (Camel Grass) and *Cymbopogon citratus* Linn. (Lemon Grass)

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ABSTRACT

This research work assesses the influence of drought on the physiological activities of *Cymbopogon schoenanthus* (camel grass) and *Cymbopogon citratus* (lemon grass) and the characterization of the drought tolerance gene of both grasses. The Relative water content (RWC) and cell membrane stability (CMS) were determined. Whole gDNA libraries were constructed from the leaves of well-watered samples of both grass samples, with a relative water content of 90%. Sequences obtained were evaluated and gene identity matches were selected for those that had a significant low expected value (e-value) of not less than zero. Closely related hits were selected which falls above 99.65%. The results for RWC (59.20% and 07.14%) and CMS (59.20% and 52.58%) were low in samples under water stress in both *C. schoenanthus* and *C. citrates,* respectively when compared to well watered samples (*C. schoenanthus* =82.91% and *C. citratus* =55.41%). The result for characterization of drought tolerant genes indicated that almost all the related hits were from chloroplast complete genome. The candidate gene for drought stress was located at chromosome 10 (Chr 10) which falls within the range of 10910913-10918562 having a gene name of "Os10g". The genes

identified were: LOC_Os01g54390.0, LOC_OS10g21404.1, LOC_Os01g54390.0 and LOC_Os10g21394.1 each having a different role played under drought stress and when up regulated. The grasses showed the presence of drought tolerant genes and can tolerate drought stress. Although, it yielded more under well watered conditions.

Keywords: *Cymbopogon schoenanthus, Cymbopogon citratus*, Drought tolerant, Gene

ET026

Isolation, Purification and Characterization of Laccase from *Microcystis flos aquae* and its Effects on Decolorization of Cibacron Brilliant Blue (azo) Dye

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ABSTRACT

Discharges from manufacturing companies such as the textile industries account for up to 280,000 tons of dye wastes annually leading to wide range of environmental pollution and health hazards. Hence, the need for the development of decontaminant utilizing green technologies that rely on enzymes for bioremediation/biodegradation of pollutants. In this study, seven organisms belonging to cyanobacteria and microalgae were screened for the production of laccase with bioremediation activities. The laccase best produced from cyanobacteria *Microcystis flos aquae*was purified using a combination of ammonium sulfate precipitation, dialysis, anion exchange and size exclusion chromatographic methods. The bioremediation potential of the laccase was assayed using 0.039 g/l of Cibacron Brilliant Blue (CiBB) solution. The yield for the laccase was 0.55% obtained at a purification fold of 10.21, and specific activity of 0.16 mmol/min/mg at 40 °C and pH of 4. The enzyme was estimated to be ~66 kDa in size on SDS-PAGE and kinetic assessments using ABTS [2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid] as substrate indicated that the enzyme has K_m and V_{max} values of 51.71 mM and 5.02 μMmin^{-1},respectively. The activity of the enzyme is suppressed by the presence of EDTA and Fe^{2+} whereas Cu^{2+} is needed for the enzyme to be active. The CiBB dye which is an azo dye was rapidly decolorized within 3 hours. In conclusion, the purified laccase from *Microcystis flos aquae* could be used for the bioremediation of textile effluents.

Keywords: *Microcystis flos aquae*; Laccase; Bioremediation; Azo dyes; ABTS, Cibacron brilliant blue

ET027

Comparative Studies on Laccases Produced from *Chlorella Sorokiniana* and *Microcystis flos aquae* and their Possible Decolorization Potentials on Cibacron Brilliant Blue (azo) Dye.

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ABSTRACT

Synthetic pollutants released by textile industries into water bodies create havoc of huge environmental hazard to the populace as well as aquatic habitants surrounding the areas. In this study, efforts were made to isolate and compare laccases with high bioremediation and/or biodegradation capacity against these pollutants. Seven organisms belonging to cyanobacteria and microalgae were screened for the production of laccase. The bioremediation potentials of the bestlaccase producer (*Chlorella sorokiniana*) from the microalgae was compared with the best laccase producer (*Microcystis flos aquae*) from the cyanobacteria. Laccases from *Chlorella sorokiniana* (LCS) micro-algae and *Microcystis flos aquae* (LMF) were both isolated and purified using a combination of ammonium sulfate precipitation, dialysis, anion exchange and size exclusion chromatographic methods. The LSC had a purification fold of 7.49 lower than that obtained from LMF (10.21) and a yield of 0.49% when compared with LMF (0.55%). The specific activity of 0.10 mmol/min/mg and 0.16 mmol/min/mg was obtained from LSC and LMF, respectively. An SDS-PAGE recorded a molecular weight of ~97 kDa for LCS higher that recorded for LMF (~66 kDa). Kinetic

assessments using ABTS [2,2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid] as substrate were carried out on both laccases. The K_m and V_{max} values of LSC were 295.56 mM and 24.63 µMmin^{-1} respectively.In LMF, K_m and V_{max} values of 51.71 mMand 5.02µMmin^{-1} was recorded, respectively. While both enzymes performed best at acidic pH, LCS and LMF were recorded to have optimum temperature of 30^{o}C and 40^{o}C, respectively. The relative activities of both enzymes were significantly enhanced by Ca^{2+}, Mg^{2+}, Zn^{2+} and Cu^{2+}. Interestingly, both enzymes were found to decolorize significant amount of Cibacron Brilliant Blue (azo dye), but LMF decolorizes the dye faster. In conclusion, it could be inferred that both laccases could be used in bioremediation of textile effluents and the laccase from LMF appeared to be more efficient and effective.

Keywords: Bioremediation; Cibacron brilliant blue, *Chlorella sorokiniana,* Decolorization, *Microcystis flos aquae;* Synthetic pollutants

ET028

Effect of Different Types and Concentrations of Auxins on Callus Induction and Primary Somatic Embryogenesis in Low Cyanide Cassava Cultivars (*Manihot esculentum Cranz*)

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ABSTRACT
Somatic embryogenesis *in vitro* was evaluated in explants derived from shoot apices of three low cyanide cassava cultivars cultured on Murashige and Skoog (MS) basal medium. To produce primary somatic embryos from low cyanide cultivars, Callogenesis was first conducted, where leaves from *in vitro* plantlets obtained from organogenesis were excised and cultured on MS supplemented with different concentrations of Auxin (namely; 2,3 and 4mg/L 2, 4-D and 5,6 and 7mg/L of Picloram). The result indicated that, 4mg/L 2, 4-D and 7mg/L Pictogram produced better callus in all the three low cyanide cultivars for the production of primary somatic embryos. Bakin ice had higher values in the two mentioned concentration with the highest response (7.86) and (83.0) respectively. It was followed by Dakata which recorded (76.7 and 80.0 respectively), While Mesiliya was the least (73.3 and 56.0 respectively). Maturation of primary somatic embryo was achieved by culturing the calli on MS supplemented with 0.1mg/L BAP for three weeks under 16 hour photoperiod. To produce secondary somatic embryos, primary somatic embryos were excised and cultured on MS supplemented with different concentration of Auxin (namely; 3,4.5 and 6mg/L 2, 4-D), the culture was kept in the dark for four weeks. The result indicated that, 4.5mg/L 2, 4-D recorded the highest production of secondary somatic embryos in Bakin ice (9.40) fallowed by 3.0mg/L 2,4-D in Dakata (6.13). This study showed that low cyanide cassava cultivars are amenable to *in vitro* regeneration.

Keywords: Auxin, Cassava, Cyanide, Embryogenesis, *In vitro*

POSTER PRESENTATION

ET029

Determination of Heavy Metals in Three Species of Fish (*Tilapia zilli, Synodontis nigrita* and *Clarias gariepinus)* from Tagwai Dam, Niger State.

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ABSTRACT
The pollution of the aquatic environment with heavy metals has become a worldwide problem and has gained attention in recent years, because the pollutants are indestructible and most are toxic to organisms. The concentration of some selected heavy metals namely; Manganese, Iron, Copper and Zinc (Mn, Fe, Cu and Zn were determined in *Tilapia zilli, Synodontis nigrita* and *Clarias gariepinus* from Tagwai dam. The whole fish of individual sample was ground into fine powder and sieved for digestion. The levels of heavy metals were determined using atomic absorption spectrophotometer. The results reveal that Zinc has the highest concentration (33.61 and 64.49mg/kg) and Copper has the lowest concentration (2.78 and 2.70) in

both *Synodonits nigrita* and *Clarias gariepinus,* and both follow the same trend in decreasing order: Zn > Fe > Mn > Cu. While in Tilapia fish Iron has the highest concentration (38.98mg/kg) and Manganese has the lowest concentration (4.34mg/kg) and follows the trend in a decreasing order: Fe > Zn > Cu > Mn. All the concentrations obtained for these heavy metals were below the maximum permissible limit recommended by international standard; hence, they are safe for human consumption.

Keywords: Spectrophotometer, Heavy metals, *Tilapia zilli, Synodontis nigrita, Clarias gariepinus*

ET030

Comparative Study of the Effects of Chemical Fertilizer (NPK) and Organic Manure (Cow dung) on the Growth of Bambara Groundnut in Borno State, Nigeria

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ABSTRACT

A comparative study of the effects of Chemical fertilizer (NPK) and Organic manure (Cow dung) on the growth of Bambara Groundnut (*Voandzeia subterranean (L.) thousars*) was carried out in the Botanical Garden of the Department of Biological Sciences, University of Maiduguri. The aim of the study was to access the potentials of Organic manure (Cow dung) vis-à-vis NPK fertilizers for the production of Bambara Groundnut. The treatments consisted of soil amended with NPK fertilizers and Cow dung at the rate of 10g/2800g of sterilized soil under restriction (polythene bag) conditions; untreated soil served as control. The experiment was laid out in a complete randomized design (CRD) and each treatment replicated 10 times. Analysis was carried out using Excel statistical packages. The result indicated that NPK improved growth as measured by the height in shoot, number of leaves and fresh and dry Biomass. The slow release of nutrients from Cow dung may be responsible for the low performance of Bambara Groundnut in this study. Control had the least performance. In conclusion organic manure can serve as an alternative to chemical fertilizers, which is not only cheap, readily available, and can be utilized by subsistence farmers, but is less toxic to the soil and environment.

Keywords: Chemical fertilizer, Organic manure**,** Bambara Groundnut, Growth

ET031

Effect of Seasonal Changes on Secondary Metabolites from Selected Plants in North Central Nigeria

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ABSTRACT

This study was carried out to evaluate the effect of seasonal changes on the quantity and antioxidant activity of secondary metabolites from Neem and Eucalyptus plants. Leaves and bark of Neem and Ecucalyptus plants from the Federal Capital Territory, Abuja, were collected during the four quarters (January-December) of the year 2019. The samples were dried, milled into powder. The quantity of secondary metabolites from the sampleswas estimated using standard methods. The antioxidant activity was also determined by the radical scavenging activity of the methanol extract of samples against DPPH (Sigma Aldrich) by UV-Visible Spectrophotometer at 517 nm. The results showed statistical difference in secondary metabolite composition of the selected plants across different seasons in the year. The saponin content was significantly lowduring the fourth quarter of the year and significantly high during the second quarter for both plants. In eucalyptus bark and leaves, alkaloid content was found to be significantly low during the first quarter of the year and significantly high during the fourth quarter. For tannin, a significantly highquantity was obtained during the third quarter for both plants' leaves and bark. Both plants' bark and leaves were shown to have lowest antioxidant activity during the third quarter. The findings of the study indicate that the properties of inherent secondary metabolites in the medicinal plants vary in specific manners at different times of the year due to seasonal variation.

Keywords: Secondary metabolites, Seasonal changes, Antioxidant, Medicinal plants, Alkaloids

ET032

Susceptibility Bioassay of *Anopheles gambiae* to Pyrethroid Class of Insecticides

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ABSTRACT
Malaria remains the fearsome infectious tropical disease owing to its devastation in Africa and parts of Asia. The most successful vectors of the disease, Anopheles mosquitoes, potentiates the bulk of the global 229 million and 409 000 incidence and deaths respectively. About 25% global malaria burden is domiciled in Nigeria – which leads the malaria-endemic nations. Successful mosquito control will be pivotal to successful malaria control. However, Anopheles mosquitoes are increasingly becoming resistant to the insecticides in use. The resistant mosquito phenotypes are common in Nigeria. The study evaluated the potency of the pyrethroid class of insecticide against the *Anopheles gambiae* complex using cypermethrin and lambda-cyhalothrin. *A. gambiae* larvae were collected from stagnant aerated sunlit pools of water by the dipping method and allowed to emerge into adults. The adults were maintained at 10% sucrose solution soaked in cotton wool at 25±2°C under 12-hours day/night cycles with 70-80% relative humidity. The adult females *Anopheles gambiae* were exposed to cypermethrin insecticide at various concentrations of 0.00, 0.2% 1.0%, 2.0%, 4.0% and 10% while lambda-cyhalothrin was exposed at the concentrations of 0.001%, 0.005%, 0.01%, 0.02% and 0.05%, based on WHO susceptibility bioassay. The result showed that *A. gambiae* was susceptible to all concentrations of the two insecticides. Conclusively, the pyrethroid class of insecticides remains potent against *A. gambiae* found within Ahmadu Bello University, Zaria – Kaduna State.

Keywords:*Anopheles gambiae,* Bioassay, Insecticides, Mosquito

ET033

Phytochemical Studies and Heavy Metal analysis of Crude Leaf Extract of *Calotropis procera* (AIT.F.)

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ABSTRACT
The main purpose of this study was to evaluate phytochemical activities, heavy metal contents and NPK from leaves of *Calotropis procera* (Ait.) N-hexane, chloroform and distilled water extracts were used for the qualitative phytochemical analysis, heavy metals and NPK by standard methods.. Results confirm the presence of alkaloids, flavonoids, tanins, amino acids, carbohydrates, phenols, triterpenoids, proteins, saponins and phytesteroids while glycosides, fixed oils and fats, steroids, phlobatanins, anthnoquinone and resins were not detected. Heavy metals estimated in mg per kg indicated the presence of seven heavy metals (Zn, Cu, Ni, Mn, Fe, Ca, and Mg), and NPK compounds for this part of the plants. Further investigations are needed to identify the active constituents and the exact mechanism(s) of action responsible for the reported antimicrobial, cytotoxicity and antioxidant properties of *Carlotropis procera* plant.

Keywords: Phytochemical, Heavy metal, Leaf extract, *Calotropis procera*

ET034

Physicochemical Analysis and Bacteriological Properties of Sachet Water Produced in Damaturu, Yobe State, Nigeria

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ABSTRACT
The study tends to determine the physiochemical and bacteriological properties of sachet water produced in Damaturu metropolis. Five different sachet water were purchased within 24 hours of production and analysed, the bacteriological analysis were determined using EMB and colony characteristic. The results showed that,the microbial analysis on characterization on EMB and DCA agar medium, Salmonella species were presence in sample A, E. coli in sample B and D. physical parameters were within W.H.O limits with

temperature 26.8-28.5^{o}C, while p^{H} value was determined using digital p^{H} meter. Sample C and Ewith p^{H} value 5.9-6.5, sample A, B with p^{H} of 6.62, 6.74, and D with p^{H} of 6.9. The p^{H} values of sample A, B, and D were within 6.5-9.5 range stipulated by the WHO. The chemical parameters were determined using AAS, the result showed that, concentration of Copper, iron and aluminium 0.025mg/L, 0.017mg/L and 0.022mg/L were recorded in sample D,0.009 mg/L of copper in sample B. 0.005 mg/L of aluminium in sample E were also recorded. The concentration of chromium, lead and cadmium in the samples were found to be 0.00 mg/L. In conclusion, some of the water samples were fit for human consumption and others are satisfactory, effort should be made by the manufacturers to still improve the quality of their products.

Keywords: Sachet water, physicochemical parameters, Bacteriological

ET035

Tilapia zilli as Natural Indicators of Heavy Metal Contamination of River Challawa Using Bioaffinity and Bioaccumulation Studies

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ABSTRACT

Pollution of water bodies is increasing due to industrialization with concomitant contamination of host organisms. The degree of contamination is a function of bioavailability and bioaffinity to an organism. *Tilapia Zilli* is a good source of protein and recommended for its supply in diets. Metallothioneins (MTs) –a protein with high metal binding ability was used to assess the differential bioaccumulation and bioaffinity of heavy metals (HMs) in liver and skeletal muscles of *Tilapia Zilli*. This quality of MTs was used to assess contamination of HMs in tissues *Tilapia Zilli* from river Challawa. HM concentration was above permissible limits of Federal Ministry of Environment. Exposure of T. Zilli to three liquid habitats from river Challawa for 72 hours with sample collection twenty-four (24) hourly showed significant ($p \geq 0.05$) induction of MTs by HMs accumulated in liver and skeletal muscle tissues of T. Zilli exposed to test habitats. Fishes showed higher induction in the downstream habitat, where accumulation of HMs was higher in the liver. Fishes exposed to that habitat recorded MT concentrations of 102.859µg/g WWt and 83.947 µg/g WWt after 72 hours of exposure for liver and skeletal muscle respectively. Cadmium showed higher affinity to MTs than other HMs studied considering its binding percentage when it reacted with zinc and copper bounded apometallothioneins. MTs bioaccumulation assessment of HM in Liver and Skeletal muscles of *T. Zilli* indicated high contamination river Challawa.

Keywords: Metallothioneins, Bioaccumulation, Aquatic habitats, Heavy metals, Bioavailability, Bioaffinity.

ET036

Efficacy of Indoor Insecticidal Sprays on Sale in Nigerian Markets in the Control of Mosquito Vectors

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ABSTRACT

The study was conducted to determine the efficacy of some insecticidal sprays available in the Nigerian markets used for controlling adult mosquitoes in the households. Mosquito larvae were collected from the surrounding drainage system within Kano University of Science and Technology, Wudil, and reared to adults and then maintained in a cage on 10% sugar solution soaked on cotton wool. Three hundred and fifty (350) adult mosquitoes divided into seven (7) groups of 50 each were exposed to seven (7) different insecticidal sprays labeled A to G by aerosol bioassay method and their median knock-down time (KDT_{50}) determined.

Eleven species of mosquitoes belonging to 3 different genera; *Anopheles* (64.28%), *Culex* (18.57%) and *Mansonia* (17.14%), were exposed to the insecticidal sprays and the knockdown time recorded at 5 mins interval for 30 mins. Insecticide C had the lowest median knockdown time (KDT_{50}) of 6.0±0.58mins, while insecticide F had the highest median knockdown time (KDT_{50}) of 24.0±0.58mins with statistically significant difference (P<0.05). Our findings revealed insecticide C with insecticidal active ingredients (IAIs) imiprothrin(0.02%), d-phenothrin and D-trans-allethrin (0.10%) as the most potent product for mosquito vector control. We recommend that commercial insecticidal products with proven efficacy should be used for mosquito vector control to reduce the burden of vector-borne diseases such as malaria and filariasis.

Keywords: Mosquitoes, Insecticidal spray, Efficacy, Knockdown time, Active Ingredients

ET037

Toxicological Studies of a Commercial Polyherbal Product on Female Wister Albino Rats

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ABSTRACT

This research was designed to conduct acute and sub-chronic oral toxicity studies of a commercial polyherbal product marketed by Sacra Multi-Links Limitedpopularly known in Nigeria as NawaginiBaban Aisha Herbal formulation. As indicated on the product's leaflet, the herbal syrup was developed from three ethno-medicinal plants' extracts which is acclaimed for the management of waist pain, typhoid, ulcer etc. Different batches of the products samples were obtained and dehydrated at40◦C to obtain its concentrate. In the acute aspect of the study, a single oral dose (5000 mg/kg) was administered to five setsof rats which were observed for behavioral changes for 72 h up to 14 days. In the sub-chronic toxicity study, repeated doses (500, 1000 and 2000 mg/kg/day) was administered to three different sets of rats (6 rats/group) for 28 days. On the 29th day,the animals were sacrificed and the blood samples were collected for hematological and biochemical analysis while liver and kidneys were isolated for histopathological examinations.In the acute toxicity study, no behavioral changes or mortality were recorded throughout the 14 days observation period. Also, the sub-chronic toxicity study revealed no significant (p<0.05) differences in hematological, liver and kidney function parameters compared with the normal control group. Similarly, histopathology examinations of the liver and kidneys revealed no morphological alteration. The herbal product was found to be safe at 5000mg/kg. Overall, its consumption could be safe and may not cause any toxic effect in albino rats.

Keywords: Sacra Herbs, Acute, Sub-chronic oral toxicity, LD_{50}, Wistar Rats.

ET038

Susceptibility Bioassay of *Anopheles gambiae* to Organophosphate Class of Insecticides.

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ABSTRACT

About 17% of the global infectious disease burdens are vector-borne. With about 300 million infections and ~450 000 (>62%) deaths annually, mosquito-borne diseases remain the key players of infectious diseases. Malaria – a parasitic disease remains the most important of the eleven viral and parasitic mosquito-transmitted diseases, with over 93% of the global cases in Africa. Nigeria remains the epicentre for malaria with a quarter of the global scourge. Indiscriminate use of insecticides on farm and pest, with environmental factors, has led to the emergence of resistant mosquito phenotypes. Therefore, there is a growing need to map-out the insecticide resistance in the malaria-endemic area especially Nigeria. The study aimed to evaluate the potencies of two organophosphates – chlorpyrifos and dichlorvos, against the *Anopheles gambiae* in Ahmadu Bello University, Zaria. The *Anopheles gambiae* larvae were collected from a stagnant aerated sunlit pool of water by the dipping method and allowed to emerge into adults, the adults were

maintained at 10% sucrose solution soaked in cotton wool at 25 ± 2°C under 12-hours day/night cycles with 70-80% relative humidity. Adult females – *A. gambiae*, were exposed to chlorpyrifos insecticide at various concentrations of 0.125%, 0.25%, 0.500%, 0.632%, and 1% while dichlorvos was exposed at the concentrations of 0.005%, 0.025%, 0.05%, and 0.25%. At the end of the study, it was found that the *A.gambiae* found within Ahmadu Bello University, Zaria was susceptible to the organophosphate class of insecticides.

Keywords: *Anopheles gambiae,* Bioassay, organophosphate insecticide

ET039

Prevalence of Insecticide Resistance of Malaria Vector (*Anopheles gambiae*) Breeding in Fadamar Nasiru Irrigation and Residential Sites, Kano State

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ABSTRACT

Resistance to insecticides is spreading rapidly in *Anopheles* mosquitoes across Nigeria.In the major vector *Anopheles gambiae* ,insecticide resistances are increasing in North-western Nigeria with the fear that such could disrupt malaria control. Mosquitoe insecticides diagnostic kit was used to establish susceptibility and resistant status using different insecticides; permethrin, deltamethrin, dichlorodiphenyltrichloroethane (DDT), and bendiocarb impregnated paper according to WHO procedure. Synergist bioassays were also conducted using piperonylbutoxide (PB0) an inhibitor of CYP450s. The result of the study show high resistance status of malarial vector to all insecticides based on WHO interpretation (<90% mortality).Malarial vector collected from the residential sites show percentage mortality of 23.12% and 56.21% and those collected from the irrigation sites show percentage mortality of 9.95% and 41.67% for permethrin and deltamethrin respectively. DDT show percentage mortality of 13.33% and 4.89% for residential and irrigation sites respectively. Furthermore, bendiocarb show a percentage mortality of 80.20% and 88.72%for residential and irrigation sites respectively. Synergist bioassay against deltamethrin show high activities of CYP450s.The finding of the study establishes resistance in both residential and irrigation sites. Higher activities of CYP450s may be induced by indiscriminate use of insecticides in residential and irrigation sites against malarial vector and other flying insects and selection pressure that confers resistance to malarial vector is not restricted to agricultural activities alone.

Keywords: Piperonylbutoxide, Bendiocarb, Permethrin, Deltamethrin, DDT, Malarial vector

ET040

Evaluation of Heavy Metals in Water Samples from Wells, Boreholes and River, in Azara Community

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ABSTRACT

Heavy metals are metallic elements with high relative density, they are adulterants in water and confer toxicity when present beyond permissible limits. Some heavy metals are essential trace nutrients others are outright poisonous and toxic. This study assessed levels of heavy metals in drinking water sources in Azara, community where mining activities is predominant. Fourteen (14) water samples were collected from boreholes, hand dug wells, surface running water, and a stream in the community. The parameters analysed includes; temperature, pH, conductivity, salinity total dissolved solid, nitrate, sulphate, iron, tin, zinc, copper, cyanide cadmium, chromium, total hardness, calcium, magnesium, manganese and nickel. EPA method and Atomic Absorption Spectrometry were employed and the results were compared to the permissible limits as prescribed by the Federal Ministry of Environment of Nigeria. Results reveal that all parameters of the analysed surface water fell within the permissible limits. Findings from the fourteen underground water

samples analysed, depicts that all the parameters are within the permissible limits, except sample one of which the copper content 0.137mg/l is above the permissible limit of 0.1mg/l. Sample 10 and 11 out of the 14 samples fell within the permissible limit of the total hardness, while sample 4 and 12 out of the 14 samples are above the permissible limit of 50mg/L of Magnesium content. The study concludes that the river water is safe. The underground water unless treated are hard and unsafe for consumption as too much cupper can cause nausea, skin irritation, kidney damage and hypermagnesaemia.

Keywords: Heavy metals, Water, Boreholes, Wells, River

ET041

Effect of Processing on the Concentrations of Pesticide Residues in Staples

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ABSTRACT
The utilization of pesticides in agricultural practices has been linked to toxic effects on the environment, animals and humans. Pesticide residues are amount of pesticides that linger on or in agricultural produce after harvest. This work reports the effects of processing on the levels of residual pesticides in maize, rice, beans and cassava. The treatments included cold water washing, hot water washing, soaking and fermentation. The extraction of pesticide residues was performed using the Quick, Effective, Cheap, Easy, Rugged and Safe (QuEChERS) technique, and gas chromatography tandem mass spectrometry was used for quantification of the pesticide residues in the samples. The various treatments showed some effectiveness in reduction of the concentrations of pesticide residues. In beans, cold water treatment resulted in 98% and 45% reduction in P,p'-DDE and methoxychlor respectively, while warm water treatment resulted in 100% and 98.42% reduction in P,p'-DDE and methoxychlor respectively. In rice, cold water processing led to 28.4% and 86.2% reduction in P,p'-DDE and methoxychlor, respectively, while warm water processing led to 70.7% reduction in methoxychlor. The soaking treatment resulted in 6.20% reduction of methoxychlor in cassava after 36 hours and 35.5% reduction of methoxychlor in maize after 72 hours. Fermentation caused 22.86% and 74.4% reduction in methoxychlor level after 120 hours in cassava and maize respectively.In conclusion, this work has presented evidence that various food processing steps reduce the initial concentrations of pesticide residues taken up from the farm, before such food are consumed.

Keywords: Oorganochlorines, Staples, Processing

ET042

Effect of Special *Moringa sundu* and Tobacco Snuff on Haematological Parameters in Wistar Rats

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ABSTRACT
Besides smoking, tobacco and other products derived from it are widely consumed orally and intranasally without burning in form of different kinds of smokeless tobacco as alternative for nicotine delivery. This research was aimed at investigating the effect of two brands of snuff on haematological parameters in Wister rats. 30 rats were randomly divided into 5 groups. Group1 (control); received only distilled water. Groups 2 and 3 (received 4mg and 2 mg/kg b.wt of tobacco, TBC, respectively). Groups 4 and 5 (received 5mg and 2.5 mg/kg b.wt special *Moringa sundu*, SMS, respectively). After two months of administration, the rats were anesthetized and blood sample collected via heart puncture. Result reveal significan t($p<0.05$) decreases in WBC count, PCV and platelet among groups 2, 3 and 4 in relation to the control with a significant ($p<0.05$) increase in group 5. Hb levels significantly ($p<0.05$) decreased between groups 2, 3 and 4 while it decreases significantly in group 5 compared to the control. Neutrophil level increased significantly in groups 2, 4, 5 but decreased significantly in group 3 compared to the control. Lymphocyte levels show significant decrease

across the treatment groups, except for group 3 that significantly increased when compared to control. Significant increase in levels of monocyte was detected across the treatment groups in comparison with control. There is significant reduction in eosinophil levels in groups 2 and 5, while groups 3 and 4 demonstrated significant increase compared to control. Hence, both brands of snuff adversely affect haematological parameters in Wistar rats.

Keywords: snuff, Haematological parameters, *Moringa sundu*, Tobacco

ET043

Impact of Rima and Sokoto Rivers Irrigation Water on *Brassica spp.* Bioaccumulation of Goitrogens

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ABSTRACT
The Rima and Sokoto Rivers of Sokoto State have been established to be contaminated with cyanogenic glycosides**,** glucosinolates, thiocyanate and polyphenols. *Brassica spp* is a vegetable commonly cultivated by farmers all year round partly by irrigating cultivated flood plains of Rima and Sokoto Rivers. This study was conducted to compare the extent by which *Brassica* spp. bioaccumulates goitrogens as influenced by irrigation with contaminated water from both rivers. *Brassica* iodine concentration was determined by Cerium IV reduction method. Cyanogenic glycosides content was determined by hydrocyanic acid method while level of glucosinolate was estimated enzymatically. Thiocyanide was measured by reacting with benzidine hydrochloride and the totalpolyphenols estimated by phosphotungustomolybdic oxidation reaction. Results of the study showed no significant difference *($p > 0.05$)* in iodine, cyanogenic glycosides and glucosinolates levels between Rima river- irrigated and Sokoto River- irrigated *Brassica*. Polyphenols and thiocyanate estimated in Sokoto river- irrigated *Brassica;* however, differ significantly *($p < 0.05$)* from that observed for Rima river- irrigated. In conclusion, *Brassica* spp. cultivated in the study demonstrate significantly high levels of goitrogens which may impact negatively on daily iodine requirements and predispose to iodine deficiency induced goitre.

Keywords: *Brassica* spp., Iodine, goitrogens, Rima river, Cyanogenic glycosides**,** Glucosinolates,Thiocyanate,Total polyphenols,

ET044

Phytochemical Analysis and Acute Toxicity Studies on *Agbo iba ponto* Sold in Lagos Metropolis

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ABSTRACT
The increasing hawking of local herbal mixtures has become common in the streets of Lagos metropolis. These herbal mixtures popularly called *Agbo* are commonly used as a curative herbal remedy for various ailments. The present study was carried out to determine the acute toxicity and phytochemical composition of the herbal mixture obtained from three different areas in Lagos metropolis used against typhoid fever and *Agbo iba ponto.* The acute toxicity study was done in two phases. Single doses of 10 mg/kg, 100 mg/kg and 1000 mg/kg body weight were administered to three groups of three mice each in the first phase. For the second phase, single doses of 1250 mg/kg, 2500 mg/kg and 5000 mg/kg body weight were administered to another set of three groups of one mouse each and the animals were observed for 24 hours. Qualitative and quantitative phytochemical screening carried out using standard methods showed the presence of saponins, tannins, phenols, phlobatanins, terpernoids, steroids, cardiac glycosides and alkaloids. The results showed saponins as the most prominent phytoconsituent with values ranging between 35.00 ± 0.37 and 37.45 ±0.37 mg/100 g while the least values were from the terpernoids (15.93 ± 0.23 to 17.41 mg/100 g). In the acute

toxicity study, no mortality was observed at the highest dose (5000 mg/kg bwt) of the herbal mixture. The result of this study revealed a wealth of phytoconstituents in this herbal mixture and dosage up to 5000 mg/kg body weight may be considered nontoxic for oral intake.

Keywords: *Agbo iba ponto*, Acute toxicity, Phytochemicals, Typhoid fever

ET045

Osmoprotectants and Malondialdehyde Levels of Two Cowpea [*Vigna Unguiculata* (L.) Walp] Varieties Exposed to Salinity Stress

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ABSTRACT

Vigna unguiculata is an important legume consumed in western and central Africa because of its high protein content. Nigeria accounts for 70 % of the world's cowpea production. Cowpea is an important legume cultivated in regions prone to salt stress. In this study, two cowpea seedlings (cultivars IT-288 and IT-99 K-S 73) were treated with 100, 200, 300 and 400 mM NaCl concentrations while the untreated group served as control. Roots (R), matured leaves (ML) and young leaves (YL) were harvested after 21 days of sowing, and their osmoprotectant and lipid peroxidation status were determined by estimating the proline, glycine betaine and malondialdehyde (MDA) using standard laboratory procedures. The cowpea cultivated at 200 mM NaCl increased IT-99 matured leaf proline level. 100 and 200 mM NaCl resulted in a significant elevation in young leaf proline content but at higher salinity, proline content decreased. IT-288 matured leaf proline level showed concentration-independent increases at all salt regimes. 100 mM NaCl had no effect on IT-99 matured leaf GB content when compared with control, but increased salinity stress caused enhanced GB levels between 200 and 400 mM NaCl. Glycine betaine content of young leaf for IT-99 increased at 100 mM, NaCl concentration. There was a significant ($p<0.05$) concentration-dependent increase in MDA concentration in all tissues of IT-99 (Table 4.12). IT-288 showed a similar trend in matured leaves and roots, while the increase in young leaf MDA was concentration-independent. Lipid peroxidation was also increased significantly ($P<0.05$) in both cowpea cultivars. These results indicate that increased synthesis of the osmolytes can mitigate salt-induced oxidative stress.

Keywords: Proline, Glycine Betaine, Malondialdehyde, Sodium chloride

ET046

Comparative Assessment of Antioxidant Enzymes and Vitamins of *Lactuca sativa L.* Obtained from the Vicinity of Kalambaina and Kwalkwalawa Area of Sokoto, Nigeria

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ABSTRACT

Environmental pollution is a major global issue. Industrial activities are the leading cause of metals emission often associated with soil and plant metal concentration in adjacent regions. Invariably, cement industry is one of the polluting industries in Nigeria. The aim of the study is to compare the antioxidant enzymes and vitamins concentration of *Lactuca sativa L.* samples from an industrial area (*Kalambaina*) and a non-industrial area (*Kwalkwalawa*) as a control, using spectrophotometric procedures. Antioxidant enzymes such as CAT, SOD and GSH were found in *Lactuca sativa L.* obtained from industrial area at high concentration of 881.22 ± 87.735, 2.030 ± 0.017 units/ml, and 2025 ± 115.47mg/dl respectively in comparison with the control sample. Also the antioxidant vitamins A, C and E obtained from test sample were found at high concentration 219.48 ± 10.970mg/dl, 4095.28 ± 54.843 mmol/L and 33.5 ± 1.782 mg/dl respectively. These values are significantly higher in comparison with the control sample from the non-industrial area. The present study showed that there is accumulation of ROS which damages the plant cells and this is inferred

by the elevation of antioxidant enzymes in test plant from *Kalambaina* cement factory industrial area. The elevation of the antioxidant enzymes might be an adaptive strategy to cope with the oxidative stress resulting from exposure to cement dust.

Keywords: *Lactuca sativa L.*, Kalambaina, Environmental pollution, Cement.

ET047

Mycotoxins Contamination of Sorghum Grains from Different Eco-Niches in Northern Guinea Savannah Agro-Ecological Zone of Nigeria

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ABSTRACT

Surveys were conducted on the extent of mycotoxins contamination of Sorghum samples from the northern guinea savannah (NGS) agro-ecological zones. The NGS was delineated into five major sampling locations (Babanna, Kontagora, B/ Gwari, Sabuwa and Maiduguri)and each district is further sub-grouped into five locations from which the samples were collected from the three eco-niches. A multi-mycotoxin extraction method was employed for the extractions of all the AFs, ZEA, OTA and DON. Aflatoxins were individually determined using HPLC with fluorescence detection andZEA was analysed by a fluorescent detector at excitation and emission wavelengths of 274 nm and 455 nm respectively. OTA analysis was performed and residues for FB analysis werederivatized with o-phthaldialdehyde (OPA) and separated using HPLC system fluorescence. DON was analysed on a photodiode array detector (PDA) at 220 nm. Samples from the stores, market and field had values of 471.30± 82.13, 228.60± 34.80,137.20± 26.73 µg/kg)for aflatoxin(s) in descending order. Concentrations of 1890.00± 34.20, 1636.80± 17.00 and 1083.40± 21.00 µg/kg for fumonisins in samples from field, store and market respectively was obtained. In the case of ochratoxin contamination, field, market and stores had respective values of 92.93± 3.20, 88.75± 3.20 and 66.90± 4.3 µg/kg in descending order. Mean level of 1192.00± 11.40, 1125.50± 26.00,360.40± 12.40µg/kg were recorded for Zearalenone in the field, market and store respectively. Deoxynivalenol had values of 1227.00± 25.00M, 1134.50± 23.45F and 583.00± 10.70S µg/kg recorded from the market, field and store respectively. It suffices to state that, mycotoxins contamination of sorghum grain in all the eco-niches in this agro-ecological region is far above the recommended level.

Keywords: Northern guinea savannah, Eco-niches, Mycotoxins, Contamination,HPLC/MS

ET048

Acute and Sub-Acute Toxicity of the Aqueous Extract of the Rhizome of *Sanseveiria senegambica* in Albino Rats

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ABSTRACT

The use of herbal medicines has gained more popularity in recent times owing to their affordability accessibility and tolerability by patients of most herbal medicines. The safety and also the long term effects of most of these good alternatives are also of major concern. *Sanseveiria senegambica*a stemless evergreen perennial plant has been in use in the traditional management of Diabetes mellitus and

hypertension which require long term management. This study seeks to evaluate both the acute and sub-acute toxicities of this plant. The acute and subacute oral toxicities were carried out using Lorke's method and the OECD 425 guidelines respectively. A total of 32 adult albino rats weighing between 80 and 220g of both sexes were used. For the subacute toxicity studies,20 rats were randomly grouped into 4 groups of 5 animals each and administered daily oral doses (500, 1000, and 2000 mg/kg body weight) of the extract for 28 days. The control group received 10 ml/kg of distilled water. The acute toxicity revealed no behavioural sign of toxicity and mortality in both phases up to 5000 mg/kg dose. The haematological indices showed a significant increase ($p \leq 0.05$) in WBC count in the group that received 500 and 1000 mg/kg of the extract. The liver function test showed a significant increase ($p \leq 0.05$) indirect bilirubin and alkaline phosphatase. Renal indices showed a significant increase ($P \leq 0.05$) in Na^+ ion at a dose of 1000mg/kg. Histopathological section of the liver showed ballooning degeneration at 1000 and 2000mg/kg doses. This result suggests that the aqueous extract of the rhizomes of *Sanseveiriasenegambica*is low at short-term use but may be toxic to the liver on long term use.

Keywords: Aqueous, Sanseveiria senegambica, Chronic and Sub-acute toxicity, Histopathology

ET049

The Role of Biotechnology in Mitigating Climate Change Disasters

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ABSTRACT
Man's activity and/ or inactivity continually impedes the entire environment in many ways. Sometimes, these impediments could be negative with catastrophic consequences. Greenhouse gases, desert encroachment, deforestation, global warming, and general environmental degradation by different human practices poses a lot of threat to this planet. It has therefore become imperative to explore novel ways or technologies in checkmating hazards emanating from these disasters. Biotechnology which simply refers to the use of living organisms particularly microorganisms to produce materials for human and animal consumption comes in handy. This paper will review the importance of applying this technology in mitigating issues of hazards arising from climate change. The focus will be centred on agricultural and industrial biotechnology more as a result of their involvement in land and environmental-related matters. Manipulation of crops via genetic engineering for varieties with stress resistance, phytoremediation, tissue culture of orphan crops, and so many other biotechnological practices will be examined to highlight their role in stemming disasters caused by climate change. In conclusion, the paper will attempt to explain the reason why developing countries like Nigeria are so vulnerable to climate change effect and suggest some biotechnological methods as a possible panacea to stemming them.

Keywords: Climate change, Biotechnology, Environmental degradation, Disaster