NIGERIAN SOCIETY OF BIOCHEMISTRY AND MOLECULAR BIOLOGY (NSBMB)

AND

DEPARTMENT OF BIOCHEMISTRY

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39th ANNUAL SCIENTIFIC CONFERENCE

MAIDUGURI 2023

THEME:

BIOCHEMISTRY AND MOLECULAR BIOLOGY-POTENTIAL TOOLS FOR ALLEVIATING ECONOMIC AND SECURITY CHALLENGES IN NIGERIA

DATE: Sunday 11th – Friday 16th June, 2023

VENUE: Muhammadu Indimi International Learning Centre, University of Maiduguri

BOOK OF ABSTRACTS

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SUB-THEME

FOOD AND NUTRITION (FAN)

FAN 001

PROXIMATE, CHEMICAL COMPOSITION, MINERALS, ANTIOXIDANT AND VITAMINS CONTENT OF PETROSELINUM CRISPUM (PARSLEY) LEAVES

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ABSTRACT

The plant *Petroselinum crispum* was analyzed to establish its proximate chemical compositions, minerals and vitamin C and E contents (Zn, Cu, Cr and Fe) as part of an on-going screening process for plant constituents of nutritional and economic significance. The analysis revealed a proximate composition of P. crispum leaves as 98 ± 0.5mg/dl, 25 ± 5 mg/dl, 50.69mg/dl, 32.81 ± 0.22mg/dl, 10 ± 54.8mg/dl and 1.5 ± 0.5mg/dl, for moisture, ash, carbohydrates, proteins, lipids, and fibre respectively. The antioxidant vitamins were analysed using Spectrophotometre at wavelengths of 700 nm and 539 nm for vitamins C and E respectively and the contents obtained were 22.6 ± 0.15mg/dl and 37.5 ± 3.6mg/dl respectively. The mineral contents of the leaves were analysed using Atomic Absorption Spectrophotometer (AAS) and were found to contain 0.63 ± 0.067 mg/dl, 0.96 ± 0.002 mg/dl, 0.23± 0.002 mg/dl and 0.13 ± 0.034 mg/dl, for Iron (Fe), Zinc (Zn), Copper (Cu) and Chromium (Cr) respectively. These results suggest that the leaves of *Petroselium crispum* used as vegetable, can be a good source of macromolecules, minerals and antioxidant vitamins for body nourishment as well as for garnishing of foods.

Keywords: Proximate composition, minerals, antioxidant vitamins, *Petroselium crispum*.

FAN 002

EFFECTS OF SELECTED LOCAL RICE CONSUMPTION ON THE ANTIOXIDANT STATUS IN DROSOPHILA MELANOGASTER FLY

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ABSTRACT

Routine consumption of polished rice is likely linked to development of oxidative stress in contrast to the unpolished rice which has some beneficial bioactive compounds stacked in its bran layer, usually removed polishing process. In this study, five different local rice varieties grown in Sokoto, Kebbi and Zamfara States, Nigeria were subjected to bioactive compounds analysis to quantify their total phenolic contents, total flavonoid contents and γ-oryzanol contents. The results showed that the unpolished rice varieties had a significantly ($p<0.05$) better deposit of nutrients. Adult fruit flies were then fed on the different rice varieties for seven days after which they were analysed for weight and negative geotaxis as well as levels of oxidative stress markers (MDA, SOD and CAT). Flies on the polished rice groups showed increased weight gain, and a decrease in locomotion ability, as well as high levels of Malondialdehyde and low activities of antioxidant enzymes, compared to those on the unpolished rice. The results of this study, thus, suggested that regular consumption of unpolished rice may reduce the risk of oxidative stress and its related intricacies.

Keywords: Polished rice, unpolished rice, oxidative stress, bioactive compounds

FAN 003

NUTRITIONAL AND SAFETY EVALUATION OF FORTIFIED COMPLEMENTARY FOODS FORMULATED FROM LOCALLY SOURCED CHEAP RAW MATERIALS

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ABSTRACT

The nutrient, anti-nutrient and safety of ten differently formulated cereal–legume-Best based *Hibiscus sabdariffa*-fortified complementary foods were evaluated using standard official protocols. The foods were formulated from different blends of fermented/cooked maize, soybeans and *H. sabdariffa* Calyces flours in accordance with the Codex Alimentarius Commission (CAC)

requirements and analyzed to evaluate the proximate, mineral/trace/toxic elements and anti-nutrient contents and health risk of the trace/toxic elements for young children. The results showed that the foods were good sources of proximate and mineral contents with very low anti-nutritional factors; the mineral and molar ratios were within acceptable reference standards and showed high mineral bioavailability. Trace/toxic elements levels in the foods varied and were within the safe limits recommended by food standard agencies. The estimated daily intakes of these elements via the foods by infants/children were below the reference threshold limits stipulated by food regulatory agencies. The non-carcinogenic health risk index (HRI) values contributed mainly by arsenic and lead and the total carcinogenic risks (R T) contributed mainly by arsenic in the foods were less than 1 and 1.0 410, respectively, signifying no significant health risk for infants/children because of these foods. These findings showed that complementary foods formulated from fermented/cooked maize and soybeans and enriched with *H. sabdariffa* calyce flours may be suitable for alleviating protein–energy malnutrition and hidden hunger without elemental toxicity. These foods could be used in place of expensive imported baby foods for adequate childhood nutrition in Nigeria.

Keywords: local raw materials; complementary foods; nutrients; hidden hunger; food safety

FAN 004

PRODUCTION OF LOW NUCLEIC ACID CONTAINING SINGLE CELL PROTEIN FROM BANANA (MUSASPP) PEELS USING THE YEAST (SACCHAROMYCES CEREVISIAE)

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ABSTRACT

A microbial protein termed “Single Cell Protein” (SCP) is regarded as an alternative protein to complement the conventional proteins as protein requirement is rising, however, the high concentration of nucleic acid present in SCP serve as great limitation for its consumption as food.This study is aimed at producing a single cell protein (SCP) with reduced nucleic acids concentration from banana peels using *Saccharomyces Cerevisiae* through submerged fermentation. The fermentation media were prepared as non-supplemented (only processed peels hydrolysate with distilled water) and supplemented media (mineral salts with processed peels hydrolysate) after which, a high microbial growth and protein production (680ug/ul) was observed on non-supplemented media (NM) compared to 410ug/ul that was obtained on supplemented

media (SM) after 120hrs of fermentation. The products were further treated with 5%, 10% and 20% solution of each of NaOH, NaCl and Gly-NaOH buffer at the pH of 10.3 to reduce the nucleic acids content. The treatment with NaCl showed high decrease in nucleic acid content (51.3ng/ul to 30.1ng/ul) with corresponding greater decrease in protein content (410ug/ul to 190ug/ul) at 20% treatment. However, treatment with Gly-NaOH buffer has reduced the protein quantity from 680 to 330ug/ul (SM) and 410 to 250ug/ul (SM) and decreased the nucleic acid content (47.9 to 23.3ng/ul and 51.3 to 24.5ng/ul on NM and SM respectively), while the protein and nucleic acid contents lost (680 to 110ug/ul and 47.9 to 36.7ng/ul) was observed on NaOH treatment. The amino acids (AA) analysis indicated the presence of the nine (9) essential amino acids and two (2) non-essential amino acid (cystine and tyrosine) in the product. The crystalized form of the product was also obtained through centrifugation at 4,000rpm for 45 minutes. Therefore, Non-supplemented banana peel hydrolysate proved to be good source of SCP with high protein content and more essential amino acids. The use of Gly-NaOH buffer in reducing the nucleic acid content of the SCP produced proved to be more effective, considering the less proteolytic effect they showed on the SCP produced.

KEYWORDS: Supplemented media, Non-supplemented media, Single cell protein, Glycine

FAN 005

FUNCTIONALITY AND POTENTIAL FUNCTIONAL FOOD PROPERTIES OF AFRICAN EBONY TREE (DIOSPYROS MESPILIFORMIS) FRUIT PULP

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ABSTRACT

Diospyros mespiliformis is one of the underutilized plants ubiquitously found in northern Nigeria, reported for treatment of different kinds of diseases. The aim of this study was to evaluate the antidiabetic and antioxidant potentials of Kano grown *Diospyros mespiliformis* fruit and phytochemical profiles. The fruit pulp were air dried, ground into fine powder and extracts of aqueous, 50%, 60%, 70%, 80%, 90% and 100% ethanol were prepared. The α-glucosidase, α-amylase inhibition and DPPH radical scavenging assays, total phenolics content (TPC), total flavonoids content (TFC) were evaluated using standard methods. The phytochemical profiles of were analyzed using liquid chromatographic mass spectrometry. Their phytochemical profiles indicated that 60% ethanol extract had the highest extraction yield. The 50% ethanol extract with the IC50 value 149.4 mg/ml had the highest inhibition against α-glucosidase activity. The IC50 value 144.3 mg/ml of the standard acarbose against α-glucosidase activity was only 1.03 times more potent than that of the 50% ethanol extract. While 100% ethanol extract with the IC50 value

299.58 mg/ml showed the highest inhibition against α-amylase activity, which was only 1.31 times less active than that of the standard acarbose (228.9 mg/ml). The DPPH assay indicated that both 50% and 60% ethanol extracts with the IC50 values 150.1 ± 0.58 mg/l and 150.6 ± 0.32 mg/ml respectively, had the highest antioxidant capacity. The result also showed that the 50% ethanol extract had the highest TPC (167.22 ± 1.11 mg GAE/g), while the 60% ethanol extract had the highest TFC (40.18 ± 1.6 mg GAE/g). The phytochemical profiles of 50% and 60% ethanol extracts identified procyanidin, allicin, linalool, cis-9-cis-12-octadecadienoic acid and 9-octadecenoic acid, which are known potent bioactive compounds against chronic diseases. Thus, the proposed phytochemicals from *Diospyros. mespiliformis* fruit pulp may qualify this plant as a good raw material for functional food and potential source of nutraceuticals against diabetes mellitus, oxidative stress and other chronic diseases.

Keywords: *Diospyros mespiliformis*, functional food, phytochemical profiles, antioxidant, antidiabetic.

FAN 006

DETERMINATION OF SOME PHYSICOCHEMICAL PARAMETERS OF OIL EXTRACTED FROM BROWN RICE (ORYZA SATIVA) BRAN CULTIVATED IN BORNO STATE, NIGERIA.

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ABSTRACT

This study was carried out to evaluate the some physicochemical parameters of oil extracted from brown rice *(Oriza sativa*) bran. Rice bran oil (RBO) has been extracted from Brown rice bran by multistage extraction with hexane solvent followed by ethanol to isolate the components, profile of fatty acids and mineral contents in both of them. Extraction was carried out using 200g of the sample mixed with 300 ml n- Hexane and kept for 48 hours. All the volatile substances evaporated leaving behind the oil which was used for the analysis. Analysis of components and fatty acids of RBO was carried out using GC-MS QP 2010 Shimadzu. Oleic, linolenic and pamitate Stearic acid, linolenic acids Linoeic (2885 mg/L), stearic (288 mg/L) and myrstic (202 mg/L) were found I the n-hexane extracts with a concentration of 3716.56, 163078 and 1021.89 mg/L, respectively Palmitic (6.34 mg/L), laurc (4.78 mg/L), and linoleic (3.52). RBO extracted with hexane had 18.6% of saturated fatty acid and 81.4% of unsaturated fatty acids, with ratio of saturated fatty acids : monounsaturated fatty acds: polyunsaturated fatty acids of approximately 1: 2.3 : 1.3. Ontained about 56.7% of monounsaturated, 24.7% of poyunsaturated, and 186% of

saturated fatty acids. In conclusion, rice bran oil is an excellent source of poly and mono unsaturated fats which can improve blood cholesterol levels thereby decreasing the risk of heart diseases and type 2 diabetes.

Keywords: fatty acids, oil, rice, bran

FAN 007

EFFECT OF DIET ON SECONDARY SCHOOL TEACHERS' CARDIOMETABOLIC HEALTH STATUS IN SABON GARI, KADUNA STATE, NIGERIA

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ABSTRACT
The teaching profession is characterized with high level of mental and emotional stress as well as high workload with little or no time to rest compared to other professions. This has made teachers more at risk of developing coronary heart disease. Our aim was to assess the impact of teachers' diet quality on cardiometabolic health. In this cross-sectional study, 122 teachers from public secondary schools across 6 political wards in Sabon Gari Local Government of Kaduna State participated. Measurements/assessments were taken for participants' height, weight, waist circumference, blood glucose levels, blood pressure and lipid profile [total cholesterol (TC), high-density lipoprotein (HDL-C), and low-density lipoprotein (LDL-C)]. Self-administered questionnaires were used to collect socio-demographic, food frequency and 24-hour dietary recall data. The diet quality of the respondents showed that 73.8% have poor diet quality while only 26.2% met the dietary requirements. About 74% of the respondents were of normal cardiometabolic health status. Positive associations were observed between diet quality and some key indicators of cardiometabolic health. It can be concluded that majority of the secondary school teachers in the study area have normal cardiometabolic health status alongside poor diet quality which could affect their overall health status in the near future.

Keywords: cardiometabolic health, teachers, diet quality, secondary school, Kaduna state

FAN 008

STUDIES ON THE PROXIMATE COMPOSITIONS OF BEANS (PHASEDUS VULGARIS), SOYBEANS (GLYCIN MAX), GROUNDNUTS (ARACHIS HYPOGEAL) AND SESAME SEEDS (SESAMUS INDICUM)

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ABSTRACT

This work was carried out to evaluate the proximate compositions of some local food items (beans, soybeans, groundnuts, and sesame seeds. Gravimetric method was used to determine the moisture contents while Kjehdal method was used to determine the protein contents of the sample items. Carbohydrate content was determined using the nitrogen free methods. Fat content was determined using solvent extraction gravimetric method and fibre content determined using AOAC method and procedure. The ash content was determined using furnace incineration gravimetric method. The results of the study revealed the moisture, proteins, carbohydrates, fats, fibre and ash contents respectively of beans: 5.6, 24.12, 56.95, 3.01, 7.22, 3.53. Soybeans: 4.62, 39.85, 19.12, 23.23, 7.98, 4.02. Groundnuts (raw): 5.92, 20.12, 28.24, 40.26, 4.23, 2.6. Groundnuts (roasted) 1.0, 20.60, 30.45, 40.21, 8.5, and 1.5. Sesame seeds: 4.82, 25.10, 20.56, 42.20, 2.7, 4.95. The study revealed the significance of beans, soybeans, groundnuts and sesame seeds as foods and food supplements to enhance the protein and energy value.

FAN 009

THE EFFECTS OF NUTRACEUTICALS AND FUNCTIONAL FOODS ON THE LIVER AND KIDNEYS

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ABSTRACT

Oxidative stress is involved with many diseases including liver and kidney dysfunctions. The study was aimed at evaluating the effects of Nutraceuticals and Functional foods on the Liver and Kidneys. Eighty albino rats weighing between 120 - 150g were distributed into 8 groups of 10 rats

each. Isoniazid (50 mg/kg) was used to induce oxidative stress for 90 days. Groups 1 and 2 served as the normal and negative control. Groups 3 and 4 were given 50 mg/kg nutraceuticals and 50 mg/kg functional foods. Groups 5 and 6 were co-administered with Isoniazid and 50 mg/kg nutraceuticals and 50 mg/kg functional foods. Groups 7 and 8 were induced with oxidative stress and treated with 50 mg/kg nutraceutical and 50 mg/kg functional foods. Results of liver functions showed a significant ($p < 0.001$) increase in serum ALT, AST, ALP, and GGT in Isoniazid induced group compared to the normal control. Co-administration of Nutraceuticals and functional foods showed a significant ($p<0.001$) decrease in AST, ALT, ALP, and GGT compared to the negative control. Induced oxidative stress and treatment with Nutraceuticals and functional foods showed a significant ($p<0.01$) decrease in ALP compared to the negative control. The kidney functions showed a significant ($p<0.001$) increase in urea and creatinine levels with induction of oxidative stress compared to the normal control. Co-administration of Nutraceuticals and functional foods showed a significant ($p<0.001$) decrease in urea compared to the negative control. The levels of urea showed a significant ($p<0.001$) in oxidative stress-induced and treated with nutraceuticals and functional foods compared to the negative control. These results justify the claim that nutraceutical and functional foods possessed hepatoprotective and nephroprotective properties and could be used for the treatment of liver and kidney diseases.

FAN 010

ANTIOXIDANTS AND LIPID PROFILE EFFECTS OF NUTRACEUTICALS AND FUNCTIONAL FOODS

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ABSTRACT

Antioxidants are either endogenous, or exogenous molecules that neutralized the excessive free radicals, to protect the cells against their toxic effects and to contribute to disease prevention. The study was aimed at evaluating the antioxidant and lipid profile of nutraceuticals and functional foods. Eighty albino rats weighing between 120 - 150g were distributed into 8 groups of 10 rats each. Isoniazid (50 mg/kg) was used to induce oxidative stress for 90 days. Groups 1 and 2 served as the normal and negative control. Groups 3 and 4 were given 50 mg/kg nutraceuticals and 50 mg/kg functional foods. Groups 5 and 6 were co-administered with Isoniazid and 50 mg/kg nutraceuticals and 50 mg/kg functional foods. Groups 7 and 8 were induced with oxidative stress and treated with 50 mg/kg nutraceutical and 50 mg/kg functional foods. The results showed a significant ($p<0.05$) decrease of CAT and GPx activities and a significant ($p<0.05$) increase of MDA in the Isoniazid induced group compared to normal control. Co-administration and

treatment with nutraceuticals and functional foods increased ($p<0.05$) the antioxidants activities and lowered ($p<0.05$) the MDA levels compared to the negative control. The cholesterol, triglyceride, low density lipoproteins showed a significant ($p<0.05$) increase with administration of Isoniazid. Co-administration and treatment with nutraceuticals and functional foods showed decrease ($p<0.05$) in cholesterol, triglyceride, low density lipoproteins compared to negative control. The study found that functional foods possessed similar antioxidants and regulates lipids similar to nutraceuticals. Hence, they can be used for management of diseases associated with oxidative stress and excessive lipids.

FAN 011

DIETARY PATTERN AND IRON LEVELS IN WOMEN OF REPRODUCTIVE AGE AT USMANU DANFODIYO UNIVERSITY, SOKOTO

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ABSTRACT
Iron (Fe) deficiency is the most prevalent nutrient deficiency problem globally particularly among women of reproductive age who are at risk of developing Fe deficiency anemia. Iron deficiency anaemia is one of the main contributors to maternal morbidity and mortality. This cross sectional study investigated the effects of dietary patterns on the iron levels of women of reproductive age consisting of 50 women aged 17 - 29 years within the Main Campus of Usmanu Danfodiyo University, Sokoto, and Sokoto State-Nigeria. Dietary patterns were assessed using Food and Agricultural Organization's 24 hours dietary recall questionnaire and blood samples were collected to determine serum iron levels. Iron was estimated according to methods of the American Association of Cereal Chemists (AACC), and Association of Official Analytical Chemists (AOAC) (1995) using Plasma Atomic Emission Spectroscopy (MP-AES). The results show that women who mostly had plant-based meals had significantly lower ($P < 0.001$) serum-iron levels (172.857±18.212 mcg/dl) compared to those who had a mixed diet (221.276±38.916 mcg/dl). These findings suggest that dietary patterns can significantly impact iron status of women of reproductive age and highlights the need for targeted interventions to improve iron intake in order to prevent iron deficiency anemia in this socially valuable group.

Keywords: Iron deficiency, Iron deficiency anaemia, Iron, Women of reproductive age.

FAN 012

VITAMINS A AND C LEVELS IN WOMEN OF REPRODUCTIVE AGE AT USMANU DANFODIYO UNIVERSITY, SOKOTO

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ABSTRACT
Vitamins A and C are important nutrients especially for maternal and child health, but their deficiencies are prevalent and of public health concern particularly among women of reproductive age. Deficiencies of these vitamins lead to deprived health conditions, poor productivity, poverty as well as increased risk of adverse reproductive outcomes thereby hindering socioeconomic growth. This study evaluated the levels of vitamin A and C in women of reproductive age. Fifty (50) women of reproductive age (aged 17-29 years) were randomly selected for vitamins A and C analyses. Vitamins A and C in serum were determined using spectrophotometric methods of Bassey *et al.* (1946) and Baker and Frank (1968) respectively. The result reveals that the levels of vitamins A and C ranged from 125 - 3222 IU and 0.2 - 2.7 mg/dl respectively. Most (90% and 80%) of the participants had lower vitamins A and C levels. Surprisingly, six (12%) subjects have vitamin A level above the reference range (667-200 IU) while 4 (8%) subjects had vitamin C level above the normal reference range (0.6-2.0 mg/dl). Adequate levels of both vitamins A and C are critical for proper health status of vulnerable groups. Therefore, women of reproductive age should ensure consumption of adequate vitamins-rich foods such as fruits, vegetables, and dairy products for their improved health.

Keywords: Vitamins A & C, Women of reproductive age.

FAN 013

EVALUATION OF PROTEIN QUALITY OF NOODLES PRODUCED FROM WHEAT (TRITICUM AESTIVUM), SOYA BEAN (GLYCINE MAX) AND BAMBARA NUT (VIGNA SUBTERRANEA) USING EXPERIMENTAL ANIMALS

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ABSTRACT

Noodles have become a global diet consumed in almost every part of the world, most especially in the Asian countries. Wheat flour is the main ingredient for the production of noodles and other pasta products. Cereals are lacking in some essential amino acids such as lysine and methionine. Therefore, incorporation of other food materials to wheat (a cereal) for the improvement of nutrients quality has become necessary. This study evaluated the protein quality of noodles prepared from whole wheat, and in combination with soya beans and Bambara nut. The aim of the study was to produce and fortify noodles from soybean flour (*Glycine max*) wheat flour (*Triticum aestivum*) and Bambara nut flour (*Vigna subterranea*). Noodles were produced from various three formulations of wheat flour, wheat flour and Bambara nut, wheat flour and soya beans flour as well as a combination of the all the food materials. 20 experimental animals were grouped into four groups of five rats. The experiment lasted for 28 days. Their average body weights as well as faecal and urinary nitrogen were recorded for determination of protein quality. The results obtained showed that there was a significant increase ($p<0.05$) in weight of experimental animals fed with sample combination of wheat, soya bean and Bambara nut flour compared with those fed with wheat alone. Also, the protein quality of noodles produced from a combination of all these food materials was higher than the groups fed with wheat alone, which was the control group. Conclusively, noodles produced from fortification of wheat with soya beans and Bambara nut possessed enhanced protein quality compared to the one .produced from whole wheat.

Keywords: Faecal, noodles, wheat, rats

FAN 014

AMINO AND FATTY ACIDS PROFILE, GLYCEMIC INDEX AND GLYCEMIC LOAD OF TWO SIMILAR TRADITIONAL DIETS CONSUMED IN NORTHEAST, NIGERIA

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ABSTRACT

Due to rise in prevalence of chronic non communicable diseases (NCD) WHO has recommended dietary approaches in the management of NCDs. Danwake (beans dumpling) is a traditional diet

prepared with different ingredient to obtain different food products such as danwaken fulawa (prepared from processed wheat flour) and danwaken dawa (prepared from cassava, sorghum and beans flour) which are similar diets mostly consumed in Bauchi and Gombe states respectively according questionnaire analysis. This study was carried to assess the amino and fatty acid composition, glycemic index (GI) and glycemic load (GL) of both diets as it may be beneficial in providing nutritional therapy in management of chronic NCDs. Carbohydrate, amino and fatty acid were analyzed using standard procedures. GI was determined by calculating areas under the curve after feeding consented volunteers with 50g of carbohydrate of danwaken fulawa, danwaken dawa and white bread (reference food) and their blood glucose level determined. The result showed that the total amino acids and essential amino acids in danwaken dawa (912, 367 mg/g protein) was higher than danwaken fulawa (854, 294 mg/g protein) respectively, with higher limiting amino acid score compared with WHO/FAO/UNU requirements except lysine. The fatty acid profile of both diets also showed that none of them contained the essential fatty acids however, danwaken dawa was observed to contain more fatty acids than danwaken fulawa. GI and GL analysis showed that both diets were found to have hiigh GI and GL, although danwaken fulawa had higher GI (78.32) and GL (49.62) than danwaken dawa with a GI of 76.52.and GL of 41.71. Considering the higher carbohydrate content, higher GI and GL and a relatively lower amino acid composition of danwaken fulawa compared to danwaken dawa, It is recommended that danwaken dawa should be consumed more than danwaken fulawa, however moderate consumption of both diets is advised especially for people suffering from diet related diseases such as diabetes mellitus, obesity and cardiovascular diseases since both have high GI and GL.

Keywords: Danwake, Amino, Fatty acid, Glycemic Index

FAN 015

LIVER FUNCTION AND HEMATOLOGICAL INDICES OF ALBINO RATS FED WITH MIXED SPICES: A PRELIMINARY INVESTIGATION

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ABSTRACT

This study evaluated the biochemical changes in albino rats maintained on mixed spices supplemented diet. Dried and pulverized spices were mixed; viz: *Capsicum annuum* (chilli pepper 80%), *Zingiber officials* (Ginger 10%), and *Allium cepa* (Onion 5%) *Gallium sativum* (Garlic 2.5%) and Syzygium aromaticum (clove 2.5%). Nine (9) albino rats were used; they were divided into three groups. The groups were randomly assigned to experimental diets. Diet A (control) was grower feed, diet B (mixed supplemented diet), containing 5 % mixed spices and 95 % grower

feed while diet C (mixed supplemented diet) contains 2% mixed and spices 98 % of grower feed. The rats were maintained on their respective experimental diet and water *ad libitum* for four weeks. The liver function and haematological indices and changes in weight were evaluated. From the results, the change in weight in the rats maintained on the mixed supplemented diet of 5% and 2% of mixed spices were not significantly different (P>0.05) from the albino rats maintained on the control. The packed cell volume in 5% mixed spices supplemented diet is significantly low compared with the control (25.33±2.60). The monocytes appear in the albino rats fed with 5% mixed spices supplemented diet (0.66±0.08) but were not detected in both the control and 2% mixed spices supplemented diet groups. The rats maintained on mixed spices supplemented diet had lesser levels of alanine amino transferase (37.26±1.69) in comparison with both the 5% mixed spices (42.43±1.69) and 2% (39.21±0.879) mixed spices. These preliminary findings suggest that mixed spices supplementation could influence metabolism in rats. Further investigation to determine effects of spices supplementation on biochemical processes is recommended.

Keywords: Mixed spices; liver function indices; haematological indices.

FAN 016

COMPARATIVE ANALYSIS OF NUTRITIONAL AND ANTI-NUTRITIONAL CONTENT OF SOME SELECTED INDIGENOUS AND FOREIGN RICE (UN-PARBOILED) IN KANO STATE, NIGERIA

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ABSTRACT

Rice is one of the staple foods in Nigeria. Many Nigerians prefer to consume foreign than local varieties. However, Nigerian government ban the importation of rice in order to improve local rice production. This study compared the nutritional and anti-nutritional content of some selected indigenous (IR) and foreign rice (FR) (Un-parboiled) commonly consumed within Kano metropolis. Samples of rice were purchased from different market in Kano State. Proximate, mineral and anti-nutritional composition were evaluated using standard methods. Data was analyzed using SPSS (Version 20). Independent T-test was used to compare the IR and FR. P-value was set at 0.05. The percentage moisture (11.48±0.46%) and ash (0.91±0.35%) of the IR were significantly higher ($p<0.05$) than those of FR (moisture= 10.09± 0.63%; ash= 0.85±0.69%). Moreover, IR had higher percentage of fiber and CHO (Fiber= 11.33±2.78%, CHO= 66.21±3.54%) than FR (fiber, 7.00±1.56% and CHO, 72.76±2.53%). No significant different was observed in mineral elements in all the rice, but the IR had greater value of Ca (0.44±0.09mg/kg),

K (0.03±0.21mg/kg), Mg (1.13±0.53mg/kg) and Fe (0.333±0.17mg/kg) than imported rice (Ca= 0.33±0.14mg/kg; K= 0.02±0.01mg/kg; Mg= 1.07±0.20mg/kg; Fe= 0.29±0.11mg/kg) except for Na, in which imported (0.06±0.01mg/kg) rice had higher than local (0.05±0.02mg/kg). Subsequently, the anti-nutrients compositions were significantly higher in FR (oxalate= 0.08±0.01%, phytate= 0.61±0.11%, cyanide= 1.65±0.03mg/100g, trypsin inhibitor= 3.56±0.98mg/L) than IR (oxalate= 0.05±0.01%, phytate= 0.32±0.04%, cyanide 1.43±0.08mg/100g, trypsin inhibitor= 2.00±0.43mg/L) ($p<0.05$). IR had higher nutritional value and less anti-nutrients than FR. The study recommends more local rice patronage and it will improve the Country's health and economy.

FAN 017

DETERMINATION OF PHYSICOCHEMICAL PROPERTIES AND HYPOLIPIDEMIAL POTENTIALS OF SELECTED SEED OILS ON HIGH-FAT FED ADULT ALBINO RATS

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ABSTRACT

More than 17 million people die annually from cardiovascular diseases (CVDs) and it is also estimated that by 2030, over 23 million people will die from CVDs each year. In this study, the physicochemical properties of Avocado pear, Moringa, African star apple and pepper seed oils were evaluated through the determination of the peroxide, iodine, acid values, free fatty acid composition, lipid profile and the hypolipidemic effects of the seed oils were assessed. Fifty adult Wistar rats of both sexes weighing between 120 and 170 g were grouped into ten of five anımals each. The animals were stabilized for one week prıor to the induction period. The seed oils were administered in their meals and were sacrificed twenty-four (24) hours after the last administration of seed oils. The blood samples were collected through a cardıac puncture into heparinized tubes centrifuged at 5000 rpm for 10 minutes and were used for haematological and lipid profile assays. Comparatively between the analyte and control groups, the result showed no significant difference ($p\geq0.05$) in haemoglobin (HB) and a significant increase ($p\leq0.05$) in the packed cell volume (PCV) level of the rats. In addition, there were significant reductions in the levels of triglycerides, total cholesterol, and low-density lipoprotein-cholesterol. Among the male rats of the analyte and control group, there was significant increase (p 0.5) in the level of high-density

lipoprotein-cholesterol ın their blood samples. This study reveals that the rich essential fatty acid reported in the seed oils has hypolipidemic effect potential candidate compared to turkey oil.

Keywords: Cardiovascular diseases, hypolipidemic, packed cell volume, seed oil, triglycerides, total cholesterol

FAN 018

EFFECTS OF PROCESSING METHODS ON THE ANTINUTRENT FACTORS, DIGESTIBILITY, FUNCTIONAL PROPERTIES, MICROBIAL AND SENSORY CHARACTERISTICS OF HIGH PROTEIN DIET PRODUCED FROM YELLOW MAIZE (ZEA MAYS) SOYA BEAN (GLYCINE MAX), PUMPKIN (CURCUBETA PEPO) AND FISH (ALESTES NURSE)

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ABSTRACT

The aim of this study was to produce high protein diet from yellow maize, soya bean, and pumpkin seed and fish meal. The raw materials were subjected to different processing techniques such as fermentation for yellow maize, roasting for soya bean and pumpkin seed, and drying for fish. The yellow maize was blended with different proportion of soya bean, pumpkin seed and fish meal with a view to formulating a high protein diets. The formulated food Blends were classified as Blend 1 (70 % YM: 30 % SB), Blend 2 (70 % YM: 30 % PS), Blend 3 (70 % YM: 30 % FM), Blend 4 (70 % YM : 20 % SB : 10 % PS), Blend 5 (70 % YM : 15 % SB : 15 % FM), Blend 6 (60 % YM : 20 % PS : 20 % FM), and a therapeutic milk (F-100) was used as a control diet. All the food Blends were assayed for the following parameters using standard laboratory methods; antinutrtitional factors, in vitro protein digestibility, functional properties, microbial studies and sensory evaluation were carried out using standard laboratory methods. The antinutrient levels (phytate and tannin) in processed samples were significantly ($P<0.05$) reduced. The least antinutrient level was observed in control diet, followed by food Blend 6. The result of the functional properties showed an increased water absorption capacity (WAC) in fermented yellow maize, while swelling power, foaming capacity (FC), water solubility index (WSI) and bulk density (BD) were significantly reduced in all the processed samples. The figure on microbial analysis showed that all the food Blends are wholesome for consumption since all the microorganism analyzed were below the WHO limit of microorganisms. The sensory evaluation revealed that no food formulations were rejected by the panel, although, food Blend 3 was rated

the least by the judges. Therefore, the processing techniques employed have reduced the antinutritional factors, and that have improved the bioavailability of the nutrients. Hence, it improves the nutritional quality of the blends.

Keywords: antinutrents, digestibility, microbial and pumpkin seed.

FAN 019

EFFECTS OF ANTIOXIDANT RICH NUTRACEUTICAL (MS7) ON LIPID PROFILE AND BODY MASS INDEX OF METABOLIC SYNDROME PATIENTS

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ABSTRACT
Metabolic syndrome is a high risk condition comprising of obesity, dyslipidemia, hypertension and diabetes mellitus. The study aim to formulate an antioxidant rich nutraceutical (MS7) from locally available foodstuff (onion, garlic, ginger, tomatoes, lemon, palm oil, and water melon seeds) and evaluate their effects on lipid profile and body mass index in metabolic syndrome patient. A cross over design was used and analysis was carried out after supplementation every four (4) weeks for 12 weeks. Supplementation with nutraceutical (MS7 at 2000 mg) for four weeks significantly ($P<0.05$) increased high density lipoprotein cholesterol (HDL-C) and decreased triglyceride (TG) of the lipid profile when compared with the placebo treatment. The body weight of the patients was observed to be lowered but the body mass index (BMI) non-significantly ($P>0.05$) decreased. The study suggests that the MS7 nutraceutical is useful in the management of metabolic syndrome.

Keywords: Antioxidant, MS7, Metabolic Syndrome, Nutraceuticals, Placebo

FAN 020

QUANTITATIVE DETERMINATION OF VITAMIN C IN PACKAGED FRUIT JUICES AND LOCALLY MADE JUICES USING IODINE METHOD

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ABSTRACT
Ascorbic acid (vitamin C) is a water-soluble micronutrient required for multiple biological functions. It is a cofactor for several enzymes participating in the post-translational hydroxylation of collagen, in the biosynthesis of carnitine, etc. The aim of this study is to quantitatively

determine the vitamin C in some packaged fruit juices and locally made juices using iodine method. Vitamin C contents of the juices was analyzed using iodine method. From the results obtained, Kunun zaki among the locally produced juices has the highest vit C content of 123.35±4.15mg/100ml followed by Tigernut juice (61.67±1.04mg/100ml), with Tamarind juice having the lowest (5.51±0.52mg/100ml). For the packaged juices, Sample F (147.58±1.04mg/100ml) with the Sample J having the lowest content of vit C (8.59±0.10 mg/100ml) were found to have the lowest value. In conclusion, though the packaged fruit juices have higher contents of the vitamin, the locally made juices could also be considered as Vitamin C sources since they are cheaper and more affordable to the populace.

FAN 021
ASSESSING THE NUTRITIONAL AND MEDICINAL QUALITY OF PLEUROTUS OSTREATUS (OYSTER MUSHROOM)

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ABSTRACT

There is a growing interest on nutritional and medicinal properties of mushrooms for meeting dietary and health needs of people in many parts of the world. *Pleurotus ostreatus*, an edible mushroom consumed widely in Nigeria, is believed to be rich in proteins, vitamins, minerals, phytochemicals, and antioxidants. This study evaluated the proximate, mineral, vitamin and amino acid contents of *P. ostreatus*. The proximate analysis showed 6.46% moisture, 17.06% crude protein, 1.21% lipid, 8.22% ash, 23.63% crude fiber, and 43.42% carbohydrate. The simple sugar profile revealed the presence of glucose (55.08g/100g), xylose (7.19g/100g), fructose (19.70g/100g), galactose (17.47g/100g), trehalose (7.37g/100g), chitobiose (11.79g/100g), maltose (29.21g/100g), sucrose (51.60g/100g), cellobiose (0.01g/100g), and erythrose (0.48g/100g). The mineral content per 100g was 12.25mg potassium, 9.66mg iron, 7.00mg magnesium, 0.08mg calcium, 1.93mg sodium and 2.73mg zinc; Lead, cadmium, chromium and nickel was 0.33mg, 0.08mg, 0.02mg and 0.23mg respectively. The vitamin profile showed 2.93 IU/100g vitamin A, 16.46mg/100g vitamin C, 21.50mg/100g vitamin E, and 9.29mg/100g of B

vitamins. The amino acid scores showed more non-essential amino acids (564.17mg/100g) compared to essential amino acids (67.83mg/100g). Lysine (23.18mg/100g) was the highest essential amino acid while aspartic acid (492.12mg/kg) was the highest non-essential amino acid present. The acidic amino acid content was 492.12mg/100g, followed by neutral amino acids, 106.66mg/100g, and basic amino acid, 23.18mg/100g. The results indicate that *P. ostreatus* has a high nutritional and medicinal quality and can be exploited to meet the increasing food demands and reduce micronutrient deficiencies, especially in developing countries.

Keywords: *Pleurotus ostreatus* proximate composition, minerals, vitamins amino acids.

FAN 022
CHEMICAL AND NUTRITIONAL CHARACTERIZATION OF CASHEW SEEDS

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ABSTRACT
Cashew seeds are widely consumed nuts across Africa. This research aimed to provide insight into the nutritional composition (and potential utilization), mainly, the polar lipid content (phospholipids and glycolipids), elemental analysis, and Fatty acid profile. The polar lipid composition was analyzed using appropriate extraction and analytical techniques. Elemental analysis was performed using Atomic Absorption Spectroscopy whereas fatty acid composition was determined through lipid extraction and Gas chromatography analysis. The percentage yield of cashew seeds oil that was extracted from roasted cashew nuts for GCMS was 31. The analysis revealed that phospholipid content was more (3.68±0.42) compared to glycolipids (2.01±0.33). The elemental analysis (mg/100g) of cashew seeds revealed an ample amount of Potassium and Magnesium (13.05±0.49 and 9.44±52 respectively) compared to Zinc (2.43±0.11) and Iron (2.21±0.09). The fatty acid composition analysis revealed that Oleic acid was the most abundant fatty acid, constituting 23.28% of the total fatty acids. Palmitic acid (17.12), linolenic acid (22.05), palmitoleic acid (1.03), and arachidonic acid (0.21) were present. The high content of oleic and linolenic acid suggests the potential health benefits associated with the consumption cashew seeds. These findings herald the potential use of cashew nuts as an important source of mineral-rich fatty acids for health benefits.

FAN 023

BIOACTIVE COMPOUNDS COMPOSITION OF PLEUROTUS TUBER REGIUM (SING) MUSHROOM GROWN IN IMO STATE POLYTECHNIC FARMLAND SUPPLEMENTED WITH PIG AND POULTRY DUNGS

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ABSTRACT
Edible fungi such as mushrooms have been known to possess great potentials in the production of useful bioactive metabolites for drugs and nutraceuticals. The Gas Chromatographic-Mass Spectrometric analysis of the n-hexane extract of the Pleurotus tuber-regium mushroom were carried out and the results identified several bioactive compounds. Bioactive compounds found majorly in sample A were n-Hexadecanoic acid (24.45 %), linoelaidic acid (40.05 %), tetradecanoic acid (8.37 %), and cis-13-Octadecenoic acid (4.72 %). That of sample B was n-Hexadecanoic acid (30.26 %), 9, 12-Octadecadienoic acid (Z, Z)-(30.63 %) and ergosterol (5.95%). While n-Hexadecanoic acid (28.54 %), 10, 13-Octadecadienoic acid (6.44 %) and 9, 12-Octadecadienoic acid (Z, Z) (51.34 %) respectively were found in sample C. The presence of these bioactive compounds could be responsible for its medicinal prowess.

Keywords: bioactive, compounds, Pleurotus, nutraceutical, chromatography

FAN 024

PROXIMATE, PHYTOCHEMICAL, MINERAL, VITAMIN C AND SENSORY EVALUATION OF FRESH AND PROCESSED ORANGE JUICE

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ABSTRACT
Large quantities of oranges, *Citrus sinensis* are lost at postharvest due to an array of factors. Processing is considered a means of minimizing losses. However, the question of loss in nutrients remains a major challenging factor deterring the acceptability of processed juices. To compare the nutritional composition of processed and freshly squeezed orange juices, four samples were used

for analysis in this experiment: three brands of processed orange juice: Caprisone orange juice, five alive orange juice and chi-exotic orange juice were obtained from Yelwa market, Bauchi metropolis. One variety of fresh orange was used in making freshly squeezed juice, and was also obtained from the same market. Proximate composition, vitamin C and mineral content were determined, using standard methods. The result shows that fresh orange juice has more vitamin C than processed orange juice (Fresh orange juice = 11.20 mg/100g, Capri-sone = 2.25 mg/100g, chi-exotic = 2.56 mg/100g, 5-Alive = 2.30 mg/100g). The samples showed high moisture content Chi-exotic (89.10%) and capri-sone had the lowest (85.45%). Fresh orange juice had the highest ash content (4.5%/100ml) while capri-sone, 5-alive and chi-exotic had 3.1%/100ml, 3.8%/100ml and 3.2%/100ml respectively. Capri-sone had the highest protein content (0.35%/100ml), fresh orange juice, 5-alive and chi-exotic had 0.35%/100ml, 0.33%/100ml and 0.24%/100ml respectively. Freshly squeezed orange juice contained (2.0%/100ml), capri-sone (1.0%/100ml) while 5-alive and chi-exotic had 1.2%/100ml and 0.8%/100ml respectively. Fresh orange juice had the highest amount of carbohydrate (12.967%), Capri-sone, 5-alive and chi-exotic had 12.555%, 10.826% and 11.074% respectively. 5-alive had the highest calcium content (0.050 ppm), chi-exotic had the highest sodium and iron content (0.3176 ppm and 0.1287 ppm) while capri-sone had the highest potassium content (0.210 ppm). The highest pH was shown by Capri-sone (5.65), followed by Chi-exotic (5.56), Fresh orange juice (5.24) while the lowest was 5-Alive (5.22). Phytochemicals were also present in the juice with phenolics and flavonoid being the highest followed by alkaloid and saponin. This study hereby the shows that orange juice is taken not only to aid digestion but should be preferentially taken as a meal. The report shows rich sources of nutrients found, especially in freshly squeezed orange juices actually qualifies it to be taken as a source of food. Freshly squeezed orange juice contains more vitamin C than the processed ones.

Keywords: proximate analysis, phytochemical screening, mineral content and sensory evaluation.

FAN 025

EEFECTS OF ACACIA NILOTICA SUPPLEMENTED FEEDS ON GROWTH PERFORMANCE, BIOCHEMICAL AND HAEMATOLOGICAL PARAMETERS OF BROILER CHICKEN.

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ABSTRACT

In this research the nutritional potential of *Acacia nilotica* fruit at different dietary level of inclusion on growth performance, Biochemical and haematological parameters of broiler chicken was investigated. Twenty-five (n= 25) apparently healthy broiler chickens fully vaccinated weighing 247.9 - 338.0grm were used, the chicken was randomly divided into five treatment groups (T1T2 T3T4 & T5) (n=5). The supplementation of *Acacia nilotica* (AN) fruit was administered as T1 (control) received only commercial feeds, T2 received 15:85, T3 25:75 , T4, 50:50,and T5, received 75:25 of commercial feed to *Acacia nilotica* fruit respectively, in all the groups feed and water was provided at libitum. After twenty-eight days, animals were sacrificed and blood samples were collected for haematological and serum biochemical analysis. The results show that T2 and T3 recorded significant (P>0.05) weight gain among the treatment groups. T5 with 75% Acacia nilotica supplementation show significantly (P>0.05) higher level of both AST and ALT compared between treatment groups and the control. While treatment group T2, T3 and T4 all revealed values that are significantly low compared with T1. However, Haematological parameters measured indicate neutrophils, haemoglobin and lymphocyte count has no significant difference among treatment group, red blood cells values were higher than the control (1.00±0.28) in T2, (1.53±0.536) and T3 (1.10±0.115), also there was a decrease observed in T4 (0.93±0.272) and T5 (1.00±0.057) respectively. It is concluded that 15 and 25% *Acacia nilotica* supplemented broiler feed produced better growth performance, hence has the potential of being used as cheaper source of feed.

Keywords: *Acacia nilotica*, Haematological, Biochemical parameters, Broilers.

FAN 026
EVALUATION OF LOW FAT POTATO BASED FEED ON BROILER CHICK GROWTH PERFORMANCE

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ABSTRACT

Feeding cost is a major constraint on the profitability of poultry farming in Nigeria. This study evaluates the performance of broiler chicks maintained on low fat potato based diet as an alternative source of energy in poultry. Broiler mash was formulated using commercial concentrate and granulated boiled potatoes mixed with maize at 50:50 ratio (w/w) after which feed proximate analysis was conducted. Two groups of day old chicks in replicates were fed formulated and standard commercial diets for 28 days during which feed intake and body weight changes were monitored. After slaughter, carcass analysis was done and feed conversion ratio

determined. Total RNA was extracted from breast and liver tissues of the broiler chicks and qPCR was conducted to estimate the expression levels of AMPK, MyoD and SREBP genes as indicators of energy utilization and growth. Proximate analysis revealed high carbohydrate content in formulated diet but deficient protein, lipid and overall estimated energy compared to chicks fed commercial diet. Interestingly, feed conversion ratio of 2.91 and dress weight of 395 g suggest efficient utilization of formulated diet for sustained growth. Levels of expression of AMPK and MyoD genes indicated adequate responses to energy requirements for metabolic processes and build up of muscle mass. Furthermore, remarkable expression of SREBP gene suggests activation of lipogenic pathways in broiler fed formulated diet. In conclusion, utilization of low fat potato based formulated diet for muscle mass and fat generation could be an alternative maintenance ration for grower stage of broiler chicks.

Keywords: Broiler chick, Potato based feed, AMPK gene, SREBP gene, qPCR

FAN 027

VALORIZATION OF BAOBAB (*ADANSONIA DIGITATA*) SEED AS AN ALTERNATIVE POULTRY FEED: PRODUCTION AND CHARACTERIZATION

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ABSTRACT

The population of Sub Saharan Africa is forecasted to double by 2050. Increase in population comes along with issue of malnutrition and food insecurity. With decrease in fish stock globally, poultry can provide excellent source of balance proteinous food to an increasing population in Sub-Sahara Africa. However, poultry production is constrain/limited by high cost of poultry feed. There is need for alternative source of nutritional feed for poultry in order reduce cost of production. Therefore, we use baobab seed and other organic waste materials to produce poultry feeds with high nutrient value. Baobab seed as base in combination with fish meal, bone meal, neem leaf extract, salt and oyster shell, four different feeds (A, B, C and D) were formulated and produced. Proximate Analysis of the feeds reveals that feed A, have the highest protein content (20.6%) and phenolic content (TPC; 21.72 mg GAE/g dw) meeting the National Industrial Standard baseline of protein content for chicken. Interesting sample A has the highest titratable acidity value (1.168 % citric acid) and the least fatty acid content. The lipid content of the feeds range from 23% to 26%. The energy value of the feeds A, B, C and D are as follows, 358.8 kcal, 341.8 kcal, 368.8 kcal and 397.5 kcal respectively. In conclusion the feed describe here contain only organic waste and will be an excellent alternative feed for poultry production thus bringing the production cost of poultry farms.

FAN 028
ASSESSMENT OF MALNUTRITION CASES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN PRIMARY HEALTH CARE, MAKARFI

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ABSTRACT
Assessment of malnutrition status among pregnant women attending antenatal care in Primary Health Care Makarfi was determined using anthropometric parameters. The data collected was analyzed using descriptive statistics. Result showed that 26% of the pregnant women were overweight, 1% underweight while 73 had normal gestational BMI. Weekly gestational weight gain showed that 76% of the pregnant women gained weight between 0.35-0.5kg, 17% gain >0.5kg while 7% gain ≤ 0.3kg. Hb level revealed that 27% had normal Hb level, 24% had mild anemia and 9% moderate anemic. Relationship between BMI and Hb level showed that 43% of the respondents with normal BMI had Hb level within the normal range. Weekly gestational weight gain and Hb level shows that 46% of the respondents with weekly gestational weight gain of 0.35 -0.5kg had normal Hb level ≥12g/dl. Majority of the pregnant women had acceptable (normal) gestational BMI with weekly gestational weight gain of 0.35kg – 0.5kg associated with high rate of normal blood pressure and haemoglobin status. There is need for health personnel and nutritionists to educate the pregnant women on important of healthy diet during pregnancy and beyond.

Keywords: Malnutrition, Antenatal care, BMI, Hb level, Pregnancy

FAN 029
NUTRITIONAL COMPOSITION AND CHARACTERIZATION OF BIOACTIVE COMPOUNDS FROM WATERMELON (*CITRULLUS LANATUS LINN.)* EXTRACT

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ABSTRACT
This study aimed to explore the nutrients and bioactive compounds inherent in Watermelon. Proximate composition revealed an appreciable quantity of proteins (10.13±2.83 mg/100g), Carbohydrates (34.72±4.50 mg/100g), and fat content (6.30±0.34 mg/100g). Atomic Absorption Spectrometry (AAS) was used to facilitate the quantification of vital micronutrients such as calcium (58.12±3.62 mg/100g), potassium (107.15±8.15 mg/100g), and magnesium (99.74±2.80 mg/100g) in the following order K>mg>Ca. GCMS analysis employed in identification of specific bioactive compounds within watermelon predominantly revealed the presence of; 2-pyridinamine, Hexadecanoic acid, Phenol 2,4- dibromo acetate, and 9,12-Octadecadienoic acid. These

compounds boast a myriad of health benefits and contribute significantly to watermelon's antioxidant properties, crucial for maintaining optimal well-being. Furthermore, employing FTIR analysis, the presence of significant functional groups in watermelon was ascertained, including O-H, C=C, and C=O. These groups serve as indicators of bioactive compounds. These findings underscore watermelon's nutritional potential.

Key words: GCMS, FTIR, Watermelon, mineral element

SUB-THEME

FORENSIC SCIENCE (FSC)

FSC 001

APPLICATION OF FORENSIC SCIENCE IN THE ALLEVIATION OF ECONOMIC AND SECURITY CHALLENGES IN NIGERIA

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Abstract
The steady rise in both violent and financial crimes, such as ritual killings, kidnapping for ransom, advance fee fraud (A.K.A Yahoo Yahoo), and corruption, all of which are enhanced by technology, is attributable to the absence/inadequacy of state of the art crime investigation and prevention tools in the country, amongst which is forensic science facilities. Forensic science is the application of science to the activities of criminal justice system. This paper x-rays the application of forensic science to prevention and investigation of crimes in Nigeria. It further examines the challenges faced by forensic science in the country, some of which include inadequate training of officers in criminal investigation, grossly inadequate funding of the police, sheer lack of forensic science facilities, lack of proper public database, reluctance of the public in assisting with criminal investigations, and proper evidence Preservation. It is the opinion of the writer that if the aforementioned snags are resolved, these crimes, the consequences of which include poverty, hunger, retrenchment, collapse of financial institutionsand businesses, breach of security, corruption, etc, would become less fashionable especially amongst the youths who constitute a significantly dominant fraction of the population as criminals would be less likely to get away with crimes.

Keywords: Forensic science, crime, security, economy.

SUB-THEME

ENTREPRENEURSHIP AND INNOVATION IN BIOCHEMISTRY AND MOLECULAR BIOLOGY (EIB)

EIB 001

DEVELOPMENT OF SWEET POTATO STARCH-BASED BIOPLASTICS INCORPORATING PLASTICIZERS FOR SUSTAINABLE PACKAGING IN NIGERIA

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ABSTRACT

This study aims to address the environmental challenges associated with conventional plastics by developing and characterizing sweet potato starch-based bioplastics while incorporating specific plasticizers. The focus is on exploring biodegradable and renewable materials for sustainable packaging applications in Nigeria. The objectives are to investigate the mechanical properties of sweet potato starch-based bioplastics with the addition of plasticizers which includes assessing the tensile strength, Young's modulus, and elongation at break of the bioplastics. The bioplastics were formulated using sweet potato starch as the primary component. Various plasticizers were incorporated to enhance flexibility and mechanical performance. Tensile strength, Young's modulus, and elongation at break were evaluated to characterize the bioplastics. The results demonstrate significant tensile strength values ranging from 4.83 MPa to 8.75 MPa, with corresponding Young's modulus values ranging from 0.068 GPa to 0.138 GPa. The addition of specific plasticizers improved the elongation at break, which ranged from 2.98% to 5.9%. The findings highlight the potential of sweet potato starch-based bioplastics, combined with suitable plasticizers, as viable alternatives for sustainable packaging in Nigeria. The utilization of these bioplastics can contribute to reducing plastic waste and promoting environmental conservation. Further research and the implementation of these innovative materials in the packaging industry are recommended to support sustainable practices while adding value to sweet potato and the economy.

Keywords: Sweet potato starch, Bioplastics, Plasticizers, Sustainable packaging, Mechanical Properties

EIB 002

DEVELOPMENT OF INDIGENOUS FOOT-AND-MOUTH DISEASE VACCINE AGAINST CIRCULATING FOOT-AND-MOUTH DISEASE VIRUS SEROTYPES IN NORTH-EASTERN NIGERIA

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ABSTRACT

Foot-and-mouth disease virus (FMDV), a picornavirus, causes one of the most highly contagious and economically devastating diseases of cattle, sheep, goats and pigs. The disease, Foot-and-mouth disease is characterised by fever and lesions inside the mouth and feet, and affect milk and meat production. FMD is endemic in many developing countries worldwide, damaging livestock industries and increasing poverty. There are clinically indisguishable seven different serotypes of the FMDV, with several variants, six of which are particularly important in Africa, i.e. A, O, C, South African Territories (SAT) types 1, 2 and 3. Despite success in the developed world toward the control of FMD using vaccine, developing countries lack the capacity to control the disease due to lack of vaccines that have a close antigenic match with the current circulating isolates. This research is aimed at developing a new master seed FMDV which will be used in large scale for FMD vaccine production. Samples will be collected from cattle showing obvious clinical signs of FMD, brought to various Veterinary Hospitals in the six states of the region. Virus detection and characterization will be carried out using Polymerase Chain Reaction (PCR) and sequencing. Furthermore, antigenic vaccine matching and subsequent selection of better vaccine candidates will be conducted using appropriate bioinformatic tool. Thereafter, development of master vaccine seed and multiplication of the vaccine will be conducted in an animal model- guinea pig. Efficacy of the vaccine in cattle will be carried out in 12 month-old calves by giving the optimal dose. Sero-conversion and/or induction of cell mediated immunity (CMI) will be monitored, and animals will be challenged at 28 days post-vaccination by intradermolingual inoculation with FMDV serotype A. Flow cytometer will be used for immunophenotyping of CMI, while annexin V apoptosis assay kit will be used to measure apoptosis of the cellular immune cells. The

development of a suitable vaccine based on current circulating serotypes will help in the control and prevention of FMD.

Keywords: Foot and Mouth Disease; FMD serotypes; FMD vaccine; FMD virus;

EIB 003
ANTHOPECTINOLINA SWEET-TABLET FOR HEALTHY IMMUNE SYSTEM

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ABSTRACT

Nutraceuticals are concentrated forms of food-derived nutrients that could be used as supplements to provide the body nutritional value and additional health benefits like immune modulation, delayed aging, and cardiovascular benefits. Numerous studies have reported the health and medical benefits of nutraceuticals with regards to the aforementioned benefits. Global market value of nutraceuticals was expected to be US $250 billion in 2018. There is need to develop novel agents to meet additional health needs of the population. Therefore, developed new nutraceutical supplement, called anthopectinolina made from anthocyanin and pectin from hibiscus and spirulina algae. Using Microwave-assisted green technique we extracted anthocyanin from hibiscus, followed by pectin extraction from the residue. Pectin and anthocyanin were confirmed using FTIR. Spirulina was extracted from marine body and cultured. The pectin and anthocyanin were combined with spirulina, to formulate anthopectinolina-sweet-tablet. Nutritional composition reveal high protein (72.2%) with in vitro protein digestibility of 99.52%. Total anthocyanin content, phenolic content and antioxidant DPPH percentage inhibition are 648.99 mg CGE/100 g, 5987.85 mg GAE/100 g and 98.56%. In conclusion and mostly importantly, the anthopectinolina nutraceutical supplement contain excellent protein content in addition to its high antioxidant properties, which makes the product unique and superior to other similar products and will provide essential nutrient to the body that will be vital in the fight against undernutrition, malnutrition, diabetes, cancer, age-related disease and for healthy life.

EIB 004

A CLINICAL SUITABLE TOOL FOR DIAGNOSIS OF TOXOPLASMOSIS.

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ABSTRACT

Toxoplasmosis is a zoonotic disease of public health important cause by *Toxoplasma gondii*. Toxoplasmosis is both a food-borne and water-borne diseases with several outbreaks reported. As a leading cause of neonatal death and congenital abnormalities, the severity of toxoplasmosis in humans is correlated to the genotype of *T. gondii*. In tackling the public health challenges of toxoplasmosis, early detection and routine surveillance is vital. However current serological methods are ineffective due to poor sensitivity. While available molecular diagnostic methods are not clinically suitable. Therefore, we developed and optimized a method that is sensitive and suitable for clinical diagnosis of *T. gondii* to genotypic level. Utilising bioinformatics tools targeting the surface antigen gene2 two pairs of nested primers were designed and the restriction enzymes BsrDI and BspMI were predicted to be capable of distinguishing between the inner amplicons of *T. gondii* genotypes. The method was optimized on *T. gondii* oocytes and tested on field samples of 80 cat faeces. The amplified first and second PCR products of the *sag2* gene were approximately 1000 and 500 bps, respectively, confirming *T. gondii*. For identification of genetic variants, the second product was gel-purified and digested with BsrDI and BspMI. The digestion patterns were as predicted for the canonical genotypes, but interestingly, the presence of non-canonical variants were also identified. Therefore, the method described herein combine the ability to detection and genotype *T. gondii* with excellent reliability, specificity and sensitivity and will help to reduce cost and waiting time for diagnosis of *T. gondii*

EIB 005

A COST-EFFECTIVE APPROACH TO OBTAIN POLYCLONAL ANTIBODIES FROM CHICKENS

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ABSTRACT
Antibodies in biomedical research have multiple applications such as immunoblotting, immunolocalization, immunoprecipitation and ELISA. However, a major limitation to research involving immunological techniques is the high cost and difficulty of storage of antibodies. A source of inexpensive and long-lasting antibodies should reinvigorate immunological techniques in research conducted by Nigerian biomedical scientists. In this paper, I discussed the comparative advantage of chicken polyclonal antibodies (IgY) as well as their production and various methods of purification. These methods produce large amounts of antibodies against recombinant proteins or specific peptides. Antibodies produced in this way can be stored at 4°C for several years with no loss of avidity. The methods are easy and with collaborations among Nigerian researchers, there should be enough resources to produce multiple antibodies that suit the research needs of the country.

EIB 006

CANNABIS SATIVA L. FOR PHYTOMEDICINE, INDUSTRY, ENVIRONMENT, BIOMASS AND BIOENERGY

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ABSTRACT

This review attempt to provide a compendium of scientific information on potential of cannabis inflorescences for industries, current state of research on Tetrahydrocannabinol (THC) chemistry and biochemistry, the chemical pathway that *Cannabis sativa* uses to create bioactive compounds called cannabinoids, the pathway that is an unusual one, involving a unique form of one enzyme, called hexanoyl-CoA synthetase, and another enzyme, called olivetolic acid cyclase (OAC), that has never before been seen in plants, paving the way for the development of marijuana varieties to produce pharmaceuticals or cannabinoid-free industrial hemp. Cannabis phytoconstituents, medical application of cannabis and its products, medicinal and therapeutic uses of cannabis and cannabinoids, prospects for cannabis plant oil in cosmetics, biomass and bioenergy production, biofuel, phytoremediation etc are overviewed.

Keywords: *Cannabis sativa* , phytomedicine, industry, environment, biomass, bioenergy,

SUB-THEME

ENVIRONMENT AND TOXICOLOGY (EAT)

EAT 001

AMELIORATIVE EFFECT OF GARLIC AND GINGER OIL EXTRACT ON EZBON® (ASPARTAME, ACESULFAME-K AND SUCRALOSE) INDUCED TOXICITY IN DROSOPHILA MELANOGASTER MODEL

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ABSTRACT

Medicinal plants are currently in considerable significance view due to their special attributes as a large source of therapeutic phytochemicals that may lead to the development of novel drugs. To extract and determine the ameliorative effect of garlic and ginger oil on the toxicity of artificial sweetener in *Drosophila melanogaster* model. METHODOLOGY: Fresh samples of garlic and ginger were purchased from local market and was processed. Standard soxhlet distillation procedure was adopted for the extraction of oil. The solvent used was ethanol and the ratio of solvent to sample was 50g to 250ml at 70-80^{O}C of temperature. Phytochemical analysis of the extracted oil was carried out using standard procedures to test for the presence of medicinal constituents that are present in the oil. RESULTS: the results shows that in both garlic and ginger oil, many phytochemical constituent were present in high concentration, which reveals the oil samples therapeutic values. Consequently artificial sweetener ezbon® (Aspartame, Acesulfame-K and Sucralose) was use to induced toxicity to the model organism Drosophila melanogaster through their standard laboratory feed for the period of seven days, resulting to oxidative stress which affected the negative geotaxis ability and activeness of the flies. DISCUSSION: Afterwards the flies were then treated with the oil extracts of garlic and ginger in several doses incorporated in their feed for five days, the medicinal efficacy and ameliorative effect was observed and determined by measuring behavioral assay which shows a good amelioration when compared to the normal control after treatment and biochemical assay which shows increase level in the activity of catalase and melondialdehyde also improves the amelioration from oxidative stress induced by ezbon toxicity. CONCLUSION: People whose dietary pattern is mostly on the intake of fast foods and soft drinks should consume diet that is richly abundant in garlic and ginger oil since it has shown to have the ability to ameliorate any potential toxicity that may be induced by these artificial sweeteners.

EAT 002

SEASONAL VARIATION OF SOME POTENTIALLY TOXIC ELEMENTS (PTES) UPTAKE OF MAIZE CROP GROWN ON WASTE DUMP-SITE SOIL OF WAKALIGA, KAMPALA, UGANDA

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ABSTRACT

The aim of this study was to identify some selected Potentially Toxic Elements (PTE) in soils and maize crops grown on Wakaliga dumpsite and compare them with the standard set limits by national and international agencies such as the World Health Organization (WHO) and NAFDAC. Samples were collected for two seasons, the dry (DS) season, May-July 2021, and the wet season (WS), September-November 2021. Samples collected were digested using HCL, HNO3 and hydrogen peroxide, and then later analyzed using Atomic Absorption Spectrophotometer. Results of the analysis of the soil and crop samples indicated that some of the investigated elements were found in concentration levels within the permissible limits while others were below the permissible set limits. The findings indicated the presence of potentially toxic elements; Zinc had a maximum level of 3.127±0.021 mg/kg and 1.060±0.036 mg/kg dry weight in dry-season and wet-seasons picked maize soils respectively, while the lowest concentrations of copper 0.0617±0.0021 to 0.074 mg/kg dry weight were found in wet-season picked maize-crop. Copper was found to exist below the permissible limits for all the picked soils as well as maize crops. Concentration of lead in maize was found to be within the permissible limit of 2.0 mg/kg dry weight while in other maize crops samples lead concentration was found to be below the permissible limits. Negligible amounts of cadmium were found in all the samples collected. Toxic elements in the soil samples were found to be below the permissible levels in arable soils as indicated by the WHO (1993). Besides, zinc concentrations were found to be higher in both crop and soil samples of the dry seasons followed by lead, copper and cadmium in this sequences Zn>Pb>Cu>Cd. This could be attributed to the availability of many discarded materials containing these elements in the environment as well as atmospheric deposit in case of lead exhausted by the moving vehicles within the city.

Keywards: Dumpsite, NAFDAC, W.H.O Toxic Elements, Wakaliga.

EAT 003

PHYTOCHEMICAL SCREENING AND TOXICITY STUDY OF THE LEAVES AND STEM BARK EXTRACT OF DODONIA VISCOSA IN DROSOPHILA MELANOGASTER

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ABSTRACT

Medicinal plants have recently become of interest because they play key roles in the treatment of various ailments. However, extract from plant sources are known to contain toxic chemical substance in small or large quantities which can pose threat to lives. Drosophila melanogaster has known become an emerging promising model organism in toxicolgy. This study was carried out to evaluate the phytochemical constitents and toxicty of D. viscosa leaves and stem extract in D. melanogaster. Plant samples of the leaves and stem of D.viscosa were prepared and extracted by maceration using ethanol. The qualitative and quantitative phytochemical constituents were screened using standard analytical methods. Drosophila melanogaster model organisms were fed with an array of triplicate doses of the leaves and stem extract in two phases using treatment vails. In phase I, the model organisms were fed 10mg, 20mg, 30mg, 40mg and 50mg/10g diet. While phase II were fed 100mg, 250mg, 500mg, 750mg and 1000mg/10g diet. Mortality was recorded every 24hours for seven days. The pupa cases of each treatment vail was recorded on the thirteenth day to determine effect of each concentration on the rate of eclosion (emergence) of D. melanogaster models. The results for the qualitative phytochemical screening for both leave and stem extract revealed the presence of tannins, alkaloid, saponin, phenol and flavonoid. While the quantitative phytochemical screening tannins and phenols to be significantly higher in the leave. These results shows that both the leave and the stem of D. viscosa can be a source of effective drug for treatment of diseases with median lethal dose (LD_{50}) of both extracts to be greater than 1000mg/10g diet (safe).

Keywords: Dodonia viscosa, Extraction, Phytochemicals, Toxicity, LD_{50}

EAT 004

ISOLATION AND IN-SILICO VALIDATION OF ANTIVENOM COMPOUND IN METHANOLIC LEAF EXTRACT OF SOLANUM DASYPHYLLUM AGAINST COBRA VENOM

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ABSTRACT

Snakebites envenomation is an acute medical emergency, especially in the tropics and its clinical management is by the administration of antivenom. However, antivenom was reported to induce early or late adverse reactions in human beings. Given the limitations of conventional antivenom, the plant kingdom is explored for possible antivenin compounds. The objective of this study was to isolate and identify an antivenom lead compound in the ethylacetate fraction of S. dasyphyllum by docking with Phospholipase A2 and Acetylcholinesterase enzymes from cobra. Leaves of S. dasyphyllum were extracted with 85% methanol, followed by fractionation into hexane, ethyl acetate, and n-butanol fractions. The ethylacetate fraction was subjected to different chromatographic techniques for antivenin compound isolation. The compound isolated, methyl linolenate, determined using spectrometric analysis of proton-NMR and Carbon-NMR was evaluated for antivenom potential by docking with Phospholipase A2 and Acetylcholinesterase enzymes from cobra; the enzyme-inhibitor interaction with residual amino acids was analyzed using bioinformatics tools. The interaction of methyl linolenate with Phospholipase A2 and Acetylcholinesterase revealed glide scores of -6.60 and -5.37 respectively. This finding is suggestive of the antivenom potential of methyl linolenate and it could lead to the development of a pharmaceutical drug for treating snakebite.

Keywords: Solanum dasyphyllum, envenomation, docking, chromatography, NMR

EAT 005

ENVIRONMENTAL STRATEGIES TOWARDS SUSTAINABLE DEVELOPMENT IN NIGERIA

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ABSTRACT

Researchers seek to introduce development leading to technologies that address environmental problems, and learn how to interact with stakeholders, managers and policy makers for

appropriate actions. One of the greatest strategies that African countries need to consider in realizing sustainable development is effective, efficient, credible, and lasting environmental sustainability and ensure that future generations have access to natural resources to live in a better way. Therefore the co-ordinated set of participatory and continuously improving processes of analysis, capacity, planning and investment which seek to integrate social and environmental objectives of society, and this is not given a priority in Nigeria. Environmental sustainability is a field where people can understand natural environment, and public works for sustainable development. Sustainable development requires shifts from ordinary ways of doing things to a modern ways of executing activities ranging from low to high productivity, the creation and adoption of new strategies, new skills and knowledge. It ensures a developed world with secured and healthy environment for all; human beings, animals and plants alike. This paper is to carry out a review of various literatures sources to ascertain the potential strategy of environment and sustainable development reform using content analysis method to discuss the environmental strategies towards sustainable development in Nigeria. The objectives of this paper is to enable the Nigerians understand and have orientation on how to manage environmental resources and avoid environmental impact on ecosystem. Also to find a sustainable solution for environmental issues without compromising economic development.

Keywords: Development, Environment, Strategies, Sustainable

EAT 006

ASSESSMENT OF GROUNDWATER CONTAMINATION IMPACT BY BUA CEMENT PRODUCTION TO NEIGHBORING VILLAGES AROUND BUA CEMENT COMPANY OF SOKOTO

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ABSTRACT
Water quality is a growing concern throughout the developing world. Drinking water sources are under increasing threat from contamination, with far-reaching consequences for the health of children and for the economic and social development of communities and nations. An increasing body of evidence shows that water quality interventions have a greater impact on diarrhoea mortality and morbidity than previously thought. Water quality is thus becoming a major component of sectoral programmes. For a company to operate it requires an assessment of groundwater in support of the Environmental and Social Impact Assessment. Expanded limestone quarrying operations in BUA Cement include the expansion of the existing quarry (which borders on the south-western side of the BUA plant side and is currently expanding westwards), as well as new quarry areas 'S' and 'Q'. The new limestone quarries were developed approximately 3 km

south and south-west of the plant on either side of the Sokoto-Binji Road, respectively. The limestone is reported to be 11-13 m in thickness, below a shallow layer of overburden. Hydrogeological datasets at the BUA Cement site were used to assess the hydrogeological conditions, contamination sources. Other reports were reviewed as part of this assessment: Water Quality from hydrocensus and off site community wells, Groundwater Chemistry within BUA Cement was assessed. The research found that underlying shallow aquifer is vulnerable to contamination and is relied upon for community use. The cement factory poses an increased risk to the groundwater quality which has the potential to affect community supply wells. Community activities may also be having a detrimental effect on the groundwater quality. Thereafter it is recommended that several mitigation measures should be adopted to reduce contamination of the underlying aquifers.

Keywords: Water, Groundwater, Contamination, Cement BUA

EAT 007
ASSESSMENT OF AIR QUALITY IN SOME SELECTED AREAS OF SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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ABSTRACT
Air pollution has an important influence on climate change and consequently, has become a topical issue of discourse at national, regional and global fora. For several years the United Nations has been convening several conferences at global level to find solution to climate change and its consequences. One agreed way is curbing greenhouse gas emission including air pollutants. Monitoring air pollution will enable tracking the levels of pollutants, monitor impact on health and compliance by cities and countries. Air pollution monitoring is hardly done in Nigerian cities. We therefore, monitored the quality of the air in some selected strategic areas of Sokoto metropolis in Sokoto State. The assessments were done morning, afternoon and evening

for two weeks in dry and raining season using hand- held air polluting detection devices. The parameters measured were carbon monoxide (CO), Ozone (03), total volatile organic carbon (VOC) and suspended Particulate Matter (PM). Climate conditions such as temperature (T), and relative humidity (RH) were also measured. The results show the highest concentrations of 1016.0mg/m3 is for PM1.0, 597mg/m3 for PM2.5, 10.53mg/m3 for PM10, 1289ppm for CO, 1.2ppm for VOC under raining season, 0.30 for 03, 39oC for T and 23 for RH. The dry season concentrations of air pollutants were higher than the rainy season concentrations with no significant difference. There were no differences in the mean levels of all the pollutants except TVOC between the seasons. Most of the air pollutants measured in this study were above tolerable limits and therefore pose environmental and health threat to the populace of the study areas. There is, therefore, the need to monitor the quality of the air from time to time and put policies in place to limit emissions to safeguard the health of the public and slow down global warming or climate change.

Keywords: Air pollution, air quality and strategic areas of Sokoto metropolis.

EAT 008

HAEMATOLOGICAL, SERUM BIOCHEMICAL AND HISTOPATHOLOGICAL CHANGES IN RATS FOLLOWING SUB ACUTE EXPOSURE TO GRADED SUB-LETHAL DOSES OF LEAD.

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ABSTRACT

Lead is a common heavy metal toxicant which abounds in our environment. Humans and animals are constantly exposed to sub-lethal doses of lead but information of the clinico-pathological effects of sub-lethal doses of lead is sparse in literature. This study describes the effects of sub-acute exposure to sub-lethal doses of lead acetate on the haematology, serum biochemistry and histomorphology of rats. Sixteen (16) male albino Wistar rats were randomly assigned into four groups (A, B, C & D) and exposed orally to 0%, 20%, 40% and 60% of the LD_{50} of lead acetate (4665mg/kg), respectively for a period of 21 days. At the end of the study, the blood was collected for haematology and serum biochemistry, and the rats were humanely euthanized and organ samples collected for histopathology. Significantly lower packed cell volume, total red blood cell and leukocyte counts were observed in all the lead treated groups ($P<0.05$). Significant increases ($P<0.05$) in the ALT of Group D (31.75 ± 4.8 µ/L) and AST of Group C (62.5 ± 1.3 µ/L) and D (60.0 ± 6.6 µ/L) were also observed in the lead intoxicated groups. The histopathological examination of the brain of lead treated rats showed neuronal degeneration with central chromatolysis, neuronal cell necrosis, and neuropil vacuolation, while the kidneys showed renal

tubular degeneration and necrosis. The findings of this study support the assertion that there is no safe level for lead and also suggest that lead, even in sub-lethal doses, poses a serious threat to human and animal health.

Keywords: Lead acetate, Sub-lethal doses, subacute exposure, Histopathology

EAT 009

MORINGA OLEIFERA POWDER SEEDS AND LIME JUICE IN THE TREATMENT OF WASTEWATER: A CONTEXTUAL ANALYSIS OF AJIWA DAM

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ABSTRACT
The significant expense of treated water makes most people in the rural community resort to promptly accessible sources which are ordinarily of bad quality presenting them to waterborne illnesses. It is in this light that this investigation was done to affirm the adequacy of powder extracted from mature-dried *Moringa oleifera* seeds which are ordinarily accessible in most rustic communities of Africa. This was done utilizing a Completely Randomized Design with a stacking portion of 2, 4, 6, 8, 10, and 12 g/L of the powder processed from *Moringa* seeds, and aluminium sulfate (alum) as a coagulant, while Chlorine and Lime juice was used as a disinfectant. A control (water from the stream without alum and *Moringa*, Chlorine or Lime juice treatment) was likewise included. The turbidity, pH, conductivity and total coliform were determined for all the samples. The turbidity for the samples ranged from 0.02 to 0.19 NTU while the conductivity ranged from 127 to 411µS/cm. All the treatments gave values that are acceptable as indicated by the World Health Organization (WHO) guidelines for safe drinking water. The control sample gave higher limits values which are unacceptable. The pH values (6.58 to 7.83) obtained for the treatments were in the recommended range set by WHO. The Most Probable Number per 100 ml for total coliform counts had values from 3 to 7 at 95% confidence limits while the control gave the most elevated value of 210 for the Most Probable Number per 100 ml. The findings of this examination lean in support of previous studies suggesting the utilization of Moringa Seed Powder and Lime Juice for water treatment.

Keywords: Moringa olifiera, Wastewater, Lime juice, waterborne ilnesses, Water treatment.

EAT 010

HEAVY METALS LEVEL IN SOIL AND UNTREATED WASTEWATER USED FOR AGRICULTURE IN SOME SELECTED LOCATIONS IN JERE LGA, BORNO STATE

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ABSTRACT

Background: Heavy metals constitute one of the major causes of contamination in the environment. Soil and water heavy metals result from natural geological events and human activities. These metals have very long residence time in the environment. Their presence in Agricultural soil and untreated wastewater used for growing crops constitutes serious environmental and health risks. **Aim**: The Study was done to determine the level of heavy metals in soil and untreated wastewater for irrigation farming along river Nggada in Jere L.G.A of Borno State. **Method**: 50 samples each of soil and untreated wastewater were collected in sterile polythene bags and bottles respectively, from ten (10) locations in the study area by convenient sampling. The samples were analyzed by digestion and the AAS technique. **Results**: The overall mean levels of the detected heavy metals Fe, Cr, Pb, Zn, Ni and Mn in soil samples were 18.22±6.5, 5.67±2.95, 6.64±2.01, 29.27±10.92, 3.86±0.86 and 19.04±6.82 mg/kg respectively and were within the permissible limits. In the wastewater, the overall mean concentrations of Cu, Fe, Cr, Pb, Zn, Ni and Mn were 1.44±0.44, 1.59±0.32, 0.28±0.08, 1.58±0.82, 1.19±0.29, 0.63±0.12 and 1.02±0.22 mg/L respectively, and are all significantly higher ($p<0.05$) than the WHO permissible levels. **Conclusion**: The study revealed normal levels of heavy metals in the soil but higher in the wastewater samples. The high levels of the heavy metals in irrigation wastewater portend serious environmental and health risks that requires urgent attention of relevant stakeholders.

Keywords: Heavy metals, Agriculture, Soil, Wastewater, Jere L.G.A

EAT 011

ISOMETAMIDIUM CHLORIDE IMPEDES SURVIVAL, CLIMBING PERFORMANCE AND ALTERS THE REDOX STATUS OF DROSOPHILA MELANOGASTER

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ABSTRACT

Isometamidium chloride is a drug used in the prevention and treatment of Animal African Trypanosomiasis (AAT). However, several side effects have been reported in the use of this drug. This study was, therefore, designed to evaluate its ability to induce oxidative stress using *D. melanogaster* as a model organism. The LC_{50} of the drug was determined by exposing the flies (1-3 days old of both genders) to six different concentrations (1mg, 10mg, 20mg, 40mg, 50mg and 100mg per 10g of diet) of the drug for a period of seven days. The effect of the drug on survival (28 days), climbing behavior and redox status after five days exposure of flies to 4.49mg, 8.97mg, 17.94mg and 35.88mg per 10g diet was evaluated. The result showed the LC_{50} of isometamidium chloride to be 35.88mg per 10g diet for seven days. Twenty eight (28) days exposure to isometamidium chloride showed a decreased percentage survival in a time and concentration-dependent manner. Isometamidium chloride significantly ($p<0.05$) reduced climbing ability, total thiol level, Glutathione-S-transferase and Catalase activity. The level of H_2O_2 was significantly ($p<0.05$) increased. The results suggest that isometamidium chloride could be cytotoxic as it impedes survival and disrupts the redox status of *D. melanogaster*.

Keywords: Isometamidium chloride; oxidative stress; survival; climbing behavior; *Drosophila melanogaster*

EAT 012

EFFECT OF HYDROCHLOROTHIAZIDE ON TRAUMATIC BRAIN INJURY IN ALBINO RATS

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ABSTRACT

Hydrochlorothiazide is a diuretic of the benzothiadiazole class with diuretic properties that can be used to quench edema. In this study its effect on neurological function deficit, using the NSS-R score, serum and hematological parameters as well as oxidative stress biomarkers in traumatic brain injury (TBI) induced rats, was examined. TBI was induced using Weight drop method. Three groups of rats, each consisting of five rats, were used for this study. Group I (TT) was induced with traumatic brain injury and treated with hydrochlorothiazide at a dosage of 2.5mg/kg, orally, Group II (TNT) was traumatized but not treated and group III (NTNT) was not traumatized and not treated. Treatment started one hour after traumatic brain injury and lasted for 21days after which the rats were sacrificed, blood sample was taken and brain tissue were collected and sent to the laboratory for analysis. Oxidative stress biomarkers (MDA, SOD, GPx and CAT) were measured. Hydrochlorothiazide improved the NSS-R score and levels of SOD, GPx and CAT in the treated group compared to group II, which showed no significant improvement ($p<0.05$). Hydrochlorothiazide significantly ($p<0.05$) decreased the level of MDA in the treated group compared to group II. Some serum biochemical and hematological parameters in the treated group were elevated compared to group II (TNT), which showed no significant improvement. Group III (NTNT) shows a normal NSS-R score and serum biochemical and hematological parameters. From this result, it can be deduced that hydrochlorothiazide may have a beneficial effect in the management of TBI.

Keywords: Hydrochlorothiazide, oxidative stress, traumatic brain injury.

EAT 013

EFFECT OF LOCALLY CONSUMED HERBAL DRINKS IN UBURU ON SOME BIOCHEMICAL PARAMETERS IN ALBINO RATS

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ABSTRACT
Alcohol is a psychoactive drug that provides energy but chronic consumption of herbal-based alcoholic beverages and it economic, physiological and biochemical effects remains a serious problem in Uburu South East Nigeria. This study examined the liver toxicity of four different herbal bitters mostly consumed in South East Nigeria (Akpaka, Odogwu, bulamon and Confam bitters) on Wister albino rats. A total of 30 male rats were randomly divided into 5 groups labeled A, B, C, D and E. Group A served as control that were administered with distilled water. While the albino rats in the groups B, C, D and E were given 50mL/Kgbw of Akpaka, Odogwu, Ballamo and Confam respectively once daily for 28days via oral intubation. Animals were fasted and sacrificed 24 hours after the 28th day of administration. Blood samples were collected into sample bottles for biochemical analysis. Bitters administration significantly ($p < 0.05$) decreased albumin, total protein, catalase, superoxide dismutase, reduced glutathione (group B, C, D and E) when compared to group A. While AST, ALT, ALP, bilirubin and MDA increased significantly ($P<0.05$) indicating toxicity. Our results observed that high intake of these bitters cause some degree of hepatic damage and should be taken with care by the youth that take it on daily basis, However, proper monitoring of liver function indices by our youth who consume these bitters is critical.

EAT 014

ASSESSMENT OF SUB ACUTE TOXICITY OF DIGITARIA EXILIS AQUEOUS GRAIN EXTRACT

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ABSTRACT

Digitaria exilis exhibit myriads of pharmacognostic efficacy with no scientific data on its probable toxic effect. This study thus assessed the plant for its possible toxic effect in rats. 24 rats were assigned into four groups (n=6). Animals in group i (Control) were given 0.5 ml of distilled water while those in group ii, iii and iv received 250, 500 and 1000 mg/kg body weight of aqueous grain extract of Digitaria exilis (AGEDE), once daily for 28 days after which body weight, feed/water intake, liver and kidney function, haematology and histology were assessed. The median lethal dose (LD50) was found to be greater than 5000. The results indicated no deaths, visible stress, clinical signs of toxicity or changes in physical appearance/behaviour in rats. AGEDE reduced feed and water intake. Except for the increased PCV, Hb, WBC, Plat, Lymph and HDLC, other function indices as well as the red and white blood cell indices showed figures that compared ($p>0.05$) well with those of the control group. The levels of albumin, total and conjugated bilirubin, urea, creatinine, Na+, K+, Cl−, HCO3−, TAG, Chol, LDLC as well as the activities of ALP, AST, ALT and GGT were altered at specific doses of the AGEDE. The AGEDE also maintained the wholeness of liver histology. With some exceptions, the extract treated groups showed values that are not statistically ($p>0.05$) different from those of the control group. This therefore suggests that Digitaria exilis is pre-clinically safe for oral administration at the doses used in this study.

Keywords: Digitaria exilis, Sub acute toxicity, Haematology, Pharmacognostic efficacy, Function indices, Pre-clinically safe.

EAT 015

ASSESSMENT OF LEAD (II) REMOVAL FROM TANNERY WASTEWATER USING EXTRACELLULAR POLYMERIC SUBSTANCES PRODUCED BY PENICILLIUM EXPANSUM

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ABSTRACT

Extracellular polymeric substances (EPS) are products of microbial metabolism that exist as a complex of polymers outside the cell. Fungi, bacteria and algae use EPS to protect themselves from toxic environment, a technique that has enabled application of EPS in the treatment of wastewater. Removal lead (II) from tannery wastewater using EPS produced by *Penicillium expansum* was assessed. The removal of Pb^{2+} from the wastewater with initial concentration of 137.985 mg/L conducted under unoptimized sorption conditions of 90 mg/L EPS concentration,

180 rpm agitation, pH 4.6 at room temperature (25 ± 2°C) gave 20.75% as maximum percentage removal, while 23.13% was recorded as best percentage removal under optimized sorption conditions (90 mg/L EPS concentration, 180 rpm agitation, 5.0 pH and 40°C) after a residence time of 2 hrs. The percentage removal was significantly ($p < 0.05$) higher under optimized conditions than unoptimized conditions. The low percentage removal of Pb^{2+} called for more batches of biosorption process under optimized conditions. After subjecting the EPS to four batches of sorption process, a complete removal of Pb^{2+} from the tannery wastewater was achieved in less than 8 hrs. Other Physicochemical parameters of the tannery wastewater were significantly ($p < 0.05$) reduced to 50% or less during the process. These findings showed that EPS produced by *P. expansum* have the ability to remove Pb^{2+} from tannery wastewater.

Keywords: Tannery wastewater, Extracellular polymeric substances, Lead (II), *Penicillium expansum*.

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EAT 016

BIOCHEMICAL AND HISTOPATHOLOGICAL ASSESSMENT OF TRANSGENIC COWPEA IN MALE WISTAR RATS

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Abstract

Cowpea is one of the most consumed legumes in Africa. Recombinant DNA technology has been used to insert foreign genes into plants genome thereby creating a new generation of plants with desired traits. Such plants possess improved seed quality, yield and resistance to pests and pathogens. The aim of this work is to assess the safety profile of an improved variety of cowpea by examining its effect on the liver and kidney. Native cowpea and improved variety of cowpea, IT89KD, were fed to Wistar rats which were divided into 3 groups. One group was fed poultry feed with 50% native cowpea and the second group was fed poultry feed with 50% improved cowpea variety while the control group was fed standard rat chow. At the end of 40 days feeding period, improved varieties group were found to have higher protein content than normal variety. Also, there was elevation in the following liver enzymes, Alanine Transaminase (ALT), Aspartate transaminase (AST) and bilirubin in the group fed with improved variety. The presence of black arrowheads and inflammation in liver and kidneys of rats fed with Genetically Modified (GM) cowpea was observed. This suggests that caution should be applied in the use of GM Cowpea as feed for Wistar rats and food for man.

Keywords: Bilirubin, Inflammation, Arrowhead, cowpea, genome.

EAT 017

ANTAGONISTIC EFFECT OF COMBINED EXPOSURE TO LEAD AND CANNABIS ON HEPATOTOXICITY AND NEUROTOXICITY IN MALE WISTAR RATS

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ABSTRACT

Humans are often exposed to various combinations of toxicants at the same time. In investigating the toxicity of combined exposure to lead and cannabis in the brain and liver, twenty-eight male Wistar rats were divided into four groups of seven animals each. Group 1 (control) was administered lead-free distilled water, group 2 received 200 ppm lead as lead acetate in drinking water, group 3 was administered Cannabis sativa extract (25 mg/ kg bw) while group 4 received both 25 mg/kg bw Cannabis sativa extract and 200 ppm lead for eight weeks. Hematological parameters, liver function tests, oxidative stress markers and brain acetylcholinesterase (AChE) activity were determined microscopically and spectrophotometrically. Co-treatment with lead and cannabis resulted in significant increases in PCV and Hb in the rats. Antagonistic interactions between both toxicants were observed in plasma transaminase activities, liver superoxide dismutase (SOD) activity, brain AChE activity (elevated by 160, 133 and 100 % in the lead, cannabis and lead plus cannabis-treated groups respectively), and brain catalase activities (up-regulated by 167, 33 and 100 % by lead, cannabis and lead plus cannabis treatment respectively). Additive interactions between lead and cannabis were observed in liver and brain glutathione-S-transferase activities. Brain SOD activity was increased by 40 % in co-treatment compared to control. Histological examination of tissues revealed various stages of lead and cannabis-induced hepatocellular and neuronal necrosis. Results reveal that mainly anta gonistic interactions herald the hepatotoxic and neurotoxic effects observed in combined exposure to lead and cannabis.

Keywords: Lead, Cannabis, neurotoxicity, hepatotoxicity, acetylcholinesterase, antagonistic

EAT 018

PHYSICOCHEMICAL PARAMETERS, HEAVY METALS AND ASSOCIATED HEALTH HAZARD OF SACHET WATER PRODUCED IN OTA, OGUN STATE.

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ABSTRACT

Ota, an industrial city in Nigeria hosts many industries including food, pharmaceutical, chemical, and agro-allied industries. Sachet water factories are also sited near these industries that release lots of effluents into the environment, which may impact water quality. In this study, the concentrations of lead (Pb), nickel (Ni), chromate (Cr), manganese (Mn), zinc (Zn), cadmium (Cd), cobalt (Co), aluminum (Al), and Iron (Fe) were determined in twenty brands (A-T) of sachet water produced in Ota using atomic absorption spectrophotometer. Physicochemical parameters including pH, color, conductivity, total hardness, total solid, total suspended solids, and total dissolved solids were assessed in the samples. Quantitative health risk assessments (QHR), hazard quotient (HQ), hazard index (HI), chronic daily intake of metallic contaminants (CDIMI), and carcinogenic risks (CR) of each heavy metal were estimated in both children and adults. The Pb level was higher than the permissive level in all of the sampled water, while Co, Cr, Ni, and Al were higher in 50 %, 60 %, 40%, and 25% of the sample respectively. Other metals were not detected in the samples. The physicochemical properties of the samples were within the permissive level except for sample B which had a higher pH value. Calculated QHR, HQ, HI, CDIMI, and CR of some of the samples suggest that they may have carcinogenic and non-carcinogenic risk in children and adults. Regulatory bodies should ensure that water factories are not sited near industrial areas and that producers conform to necessary standards.

Keywords: Sachet water, physicochemical properties, heavy metal, health risk assessments

EAT 019

PHYTOCHEMICALS AND SUB-ACUTE TOXICITY PROFILES OF ETHANOL LEAF EXTRACT OF ACROSTICHUM AUREUM IN FEMALE RATS

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ABSTRACT

Acrostichum aureum is eaten as vegetables and traditionally used in the treatment of many diseases including ulcer, diabetes, pharyngitis and cancer. However, there is dearth of information on the safety of the plant. The study aims to determine the quantitative phytochemical composition and sub-acute toxicological effects of ethanol leaf extract *of Acrostichum aureum* (ELAA) in female albino rats after 28 days of repeated administration. The concentration of the secondary metabolites of the plant was determined before rats were orally dosed with 0, 100, 200, 500 and 750 mg/kg body weight of ELAA for 28 days. The impact of the treatment on body weight and relative organ weight was assessed and compared with control value. Urinalysis, hematology, plasma biochemistry and histopathology were assessed in both treated and control groups. The concentration of secondary metabolites in the ethanol leaf extract of *Acrostichum aureum* varied in the order: phenol > flavonoids >tannins> alkaloids > cardiac glycoside. Rats treated with all the different doses of ELAA showed no mortality or any clinical signs of toxicity. The body weight and relative organ weight of the treated rats did not also differ from control values. In addition, there was no significant difference between the outcomes of the urinalysis, hematological and plasma biochemical parameters of the treated rats and the control. Moreover, treatment related pathologies were not observed in any of the treated groups. Therefore, suggesting that ethanol leaf extract of *Acrostichum aureum is* safe under the present experimental conditions.

Key words: *Acrostichum aureum,* secondary metabolites, sub-acute toxicity, hematology, serum biochrmistry and histopathology

EAT 020

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 samples and urine samples were collected from the inhabitants of Azara town and liver function test was carried out for some of the biochemical markers such as serum bilirubin, alanine aminotransferase, aspartate amino transferase, alkaline phosphatase, and gamma glutamyltransferase. Culture of the urine samples was also carried out. Hitachi 917 analyser a fully automated, computerized immunoassay system which permits efficient quantitative and qualitative in vitro analysis was used for liver function test. Results of liver function 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.

EAT 021

BIOFLOCCULATING EFFICIENCY OF SAPONIN- RICH EXTRACT OF TALINUM TRIANGULARE LEAF AND ITS APPLICATION IN WASTEWATER TREATMENT

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ABSTRACT

The discharge of contaminated water into the environment has been of serious concern due to its consequences on human and aquatic lives. This study investigated the bioflocculating efficiency of saponin extract of *Talinum triangulare.* The bioflocculant efficiency was determined by evaluating its effect at various dosage, pH and temperature against kaolin clay suspension in the presence of different cations which serve as activator. Optimum bioflocculating efficiency of the extract was achieved with 0.5 mg/ml at 60 ^{0}C, pH 6 and 0.5 mg/ml at 60 ^{0}C, pH 3 in the presence of Ca^{2+} and K^+ respectively. The concentration with optimum efficiency were thereafter used for treatment of

wastewater. Physiocochemical properties (BOD, COD, TSS, Nitrate and Turbidity) of the wastewater were determined before and after treatment. The most effective flocculation was revealed at 0.5 mg/ml in the presence of K^+ showing a reduction in the degree of biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solid and turbidity, with a removal efficiency of 66.7%, 60%, 69% and 57.1% respectively while there was an increase level in nitrate of 460%.. it also reduced heavy metal in the wastewater. FTIR analysis of the saponin extract of *Talinum triangulare* revealed the presence of functional groups like –COOH, -NH_2, -OH, while the GCMS showed the existence of pentadecanoic acid, methyl ester and hexadecanoic acid. The result obtained suggest that the extract possess high flocculating properties and has the potential to serve as a good alternative in wastewater treatment.

Keywords: Bioflocculants, Saponin, Biological oxygen demand, Wastewater, *Talinum triangulare*

EAT 022

EFFECT OF PLANT OILS, SURFACTANTS AND ORGANIC ACIDS ON THE CH CENTRE, SHEDA SCIENCE AND TECHNOLOGY COMPLEX, SHED A. MYCELIAL BIOMASS PRODUCTION OF GANODERMA LUCIDUM

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ABSTRACT

Ganoderma lucidum is a natural scarce bacidiomycetous polypore fungus that has high medicinal value. It is pharmacologically and commercially one of the most sort after mushrooms in the world.This investigation focuses on the stimulatory effect of plant oils, surfactants and organic acids in the mycelial biomass production of *Ganoderma lucidum*. The plant oils used were Olive oil, groundnut oil and palm oil. The surfactants were tween 20, tween 80 and triton x 100. The organic acids were lactic acid, acetic acid and nicotinic acid.The result shows that on addition of the additives the mycelia biomass was significantly higher than in the control.The highest mycelial biomass (MB) production was observed in Olive oil with an MB of 9.71g/l on the 7th day and 14.50g/l on the 14th day.Palm oil also showed a marked increase 12.80g/l on the 14th day. The surfactant tween 20 also gave a marked MB of 8.86g/l. Lactic acid gave an MB of 7.90g/l on the 14th day. A very slight increase in biomass production was observed on the 14th day on addition of organic acids.The use of additives can go a long way to meet the high demand for the mushroom since it stimulates its production.

Keywords: Stimulatory, plant oils, surfactants, organic acids, mycelial

EAT 023
DETERMINATION OF CADMIUM AND LEAD LEVELS IN PLASMA, RENAL AND HEPATIC TISSUES OF RATS ORALLY EXPOSED TO DIESEL

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ABSTRACT
The levels of cadmium and lead in the plasma, renal and hepatic tissues of rats orally exposed to diesel were assessed in this study. Twenty-one adult male albino Wistar rats (180.0±20.0 g), distributed into three groups, of seven rats each were used in the study. Rats in groups one and two, which served as controls, were given distilled water and sunflower oil respectively, while rats in group three were given 2 ml/kg b.wt of diesel in sunflower oil vehicle daily, through orogastric tube for sixty days. At the end of the exposure period, the animals were appropriately anaestheisized, sacrificed, and relevant tissues collected and processed for the analyses of Cd and Pb levels using atomic absorption spectrophotometer (AAS Model SOLAAR 969 UNICAM series). The results obtained from this study showed that the levels of Cd and Pb in the plasma, renal and hepatic tissues of rats exposed to diesel were significantly (p< 0.05) higher than the respective level recorded for the control groups. This gives indication that the Cd and Pb contents of diesel used in this study were readily absorbed through the GIT. However, the levels of these heavy metals recorded for renal and hepatic tissues were significantly (p< 0.05) higher than the levels obtained for the plasma. This observation suggests that the Cd and Pb content of diesel absorbed through the GIT tends to be rapidly cleared from the blood, and distributed within the renal and hepatic tissues, following sixty-day oral exposure. The results of this study therefore suggests that the previously reported diesel induced renal and hepatic toxicities may be associated with the increased levels of Cd and Pb, among other factors, in these tissues.

Keywords: Gasoline, kerosene, heavy metals, biological tissues.

EAT 024
SPECTROSCOPIC STUDY OF CYANOTOXICITY OF POTASSIUM CYANIDE ON NORMAL HUMAN HEMOGLOBIN

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ABSTRACT

Potassium cyanide (KCN) one of the salts of cyanide finds its application in several fields of endeavor such as pharmaceuticals, industrial, agricultural, mining, metallurgy, medical, photography and as a biological weapon. Release of cyanide from KCN into the blood stream during its usage has been found to be toxic to human health. Sequel to this, the study aims at investigating by spectral analysis, the cyanotoxicity effect of KCN on normal human hemoglobin. The study was divided into 8 groups consisting of control and test groups (0.2, 0.5, 1 and 1.5M KCN + 1000µl Oxy-hemoglobin respectively and 2000, 3000 and 4000µl Oxy-hemoglobin + 1.5M KCN respectively). It was found that KCN caused concentration dependent oxidation on normal human hemoglobin and also a concentration dependent reduction in oxy- hemoglobin concentration which are all precursors to several pathophysiologic conditions in man. Therefore, measures should be put in place to curtail the hazardous effect of cyanide emission on human.

Keywords: Oxyhaemoglobin, Potassium cyanide, Cyanotoxicity, Emission and Oxidation.

EAT 025

PHYTOCHEMICAL CONSTITUENTS AND DETERMINATION OF ACUTE TOXICITY STUDY ON ARTEMISIA ANNUA LEAF EXTRACT IN DROSOPHILA MELANOGASTER

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ABSTRACT

Extract from plant sources are known to contain toxic chemical substances in small or large quantity which may accumulate and induce damage to living organism. Drosophila melanogaster has now become an emerging promising model organism in biomedical sciences. RESEARCH PURPOSE: The phytochemical constituents and acute toxicity study of *Artemisia annua* were investigated in this study to ascertain their safe usage. Plant samples of *A. annua* was prepared and extracted by maceration using n-hexane and distilled water. METHODOLOGY: *Drosophila melanogaster* model organisms were administered with an array of triplicate concentrations of *A. annua* leaf extract in two phases using treatment vails. In phase I, the model organisms were administered 10mg, 20mg, 30mg, 40mg and 50mg/10g diet. While phase II were administered 100mg, 250mg, 500mg, 750mg and 1000mg/kg diet respectively. DISCUSSION OF RESULTS: Mortality was scored and recorded every 24hours for seven days. The pupa cases of each

treatment vail was scored and recorded to determine the effect of each concentration on the rate of eclosion (emergence) of *D. melanogaster* models. The median lethal dose (LD 50) of A. annua leaf extract of aqueous and n-hexane was found to be 311.1mg/10g and 309.3mg/10g diet respectively. The eclosion of the young flies from the pupa cases were found to be significantly (p<0.05) reduced from 250mg /10g - 1000mg /10g diet in *A. annua* of n-hexane extract and from 10mg/10g-1000mg/10g diet showed no significant difference(p>0.05) in A. nnua of aqueous extract. The LD 50 and emergence rate of *A. annua* n-hexane and aqueous extract shows that, safe doses are 50mg/10g diet and 100mg/10g diet respectively. CONCLUSION: The median Lethal Dose (LD 50) of aqueous and n-hexane extracts of *Artemisia annua* shows the plant has some toxicity at higher doses. Therefore pharmacologically, 30% of the LD 50 should be used for further studies.

EAT 026

BIOACTIVES AND CYTOTOXIC EFFECT OF FICUS ASPERIFOLIA AND PHYLLANTUS AMARUS AQUEOUS AND ETHANOLIC LEAF EXTRACT USING BRINE SHRIMP (ARTEMIA SALINA) MODEL

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ABSTRACT
The bioactives and cytotoxicity studies of *Ficus asperifolia* and *Pyllanthus amarus* were investigated. The aqueous and ethanolic leaf extracts were used for pytochemical studies and Brine shrimps (*Artemia salina*) model was used for cytotoxicity while the leaf powders were used for mineral determination using standard methods. The results showed the presence of alkaloids,saponis,tannins,cardiac glycosides,anthocynins,terpenoids and triterpenes in aqueous extracts of F.asperiofolia(AqFa) and P.amarus(AqPa) while phenolics, alkaloids, flavonoids, saponin,coumarins,phlobatannins,glycosides,terpenoids,triterpe and fixed oil are present in ethanolic extracts F.asperiofolia (EtFa) and P.amarus(EtPa), flavonoid, steroids and coumarins were not detected in aqueous extract of both plant leaf. The findings further showed significant amount of total phenolics compound, alkaloids, flavonoids, saponins, tanins in aqueous extract of both plant leaf and concentration of coumarins, anthocynins, glycosides, steroids, terpenoids and, triterpenes in aqueous and ethanolic extracts of the two plants leave. The results also showed that both plant leaf have substantial amount of all selected major minerals K,Na,Mg,Ca) and little

amount of trace element Cr,Cu,Fe,Pb.Likewise the results obtained showed that percentage increase in lethality rate in ethanolic extract than aqueous extract in both extracts with increased in hours of exposure to brine shrimps. The leaf extracts AqFa, AqPa, EtFa, and EtPa with LC50 of 86.66, 44.51, 37.33 and 144.89µg/ml respectively were relatively safe when compared with reference potassium dichromate of LC5030.30 µg/ml. This study therefore, justified the use of *Ficus asperifolia* and *Phyllanthus* amarus to aid the cure ailment and physiological disorder amongst the people especially those in the rural communities where the use of these plants has become prevalence owing to easy accessibility to the plant and the relatively low cost of the preparations. These plants therefore could be a potential source of drugs if the active ingredients are identified and adequately elucidated and characterized.

Keywords: Bioctive, aqueous, ethanolic, ctytoxicity, lethality, asperiofolia, amarus, ethanlonic

EAT 027

IN VIVO ANTIPLASMODIAL EFFECT, ACUTE TOXICITY (LD_{50}) AND SUB-CHRONIC TOXICITY OF VERNONIA AMYGDALINA ETHYLACETATE EXTRACT

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ABSTRACT
Antimalarial plant *Vernonia amygdalina* ("bitter leaf" in English; "Shuwaka" in Hausa) (Asteraceae) is used for the management of malaria in Africa and other parts of the world with little or no scientific basis. It is thus the aim of this research to evaluate toxicological and antimalarial activity of *Vernonia amygdalina* (VA) ethylacetateextract against rodent malaria parasite *Plasmodium berghei*. The study assayed for *in vivo* antiplasmodial effect, acute toxicity (LD_{50}) and sub-chronic toxicity indices. The plant was found to be practically non-toxic (oral LD_{50}>5000mg/kg) with some signs of toxicity on the three organs tested (heart, liver and kidney) in sub-chronic study. The plant also showed a significant progressive reduction in parasitemia level with time when administered daily for four days. At the highest dose of administration (400mg/kg bw) VA produced 95.42% suppression of parasitemia which is almost similar to the 96.08% percentage suppression shown by the standard drug (Combisunate 20/120). In conclusion, *V. amygdalina* ethylacetate leaf extract contains some antimalarial compounds. Thus, the plant could serve as a source of antimalarial drugs and hence beneficial in the management of malaria as used traditionally.

Keywords: Antiplasmodial Effect, Acute Toxicity (LD_{50}), Sub-chronic Toxicity, *Vernonia amygdalina, in vivo.*

EAT 028

OCCURRENCE OF AFLATOXIN CONTAMINATION OF SOME FARM PRODUCE SOLD IN DEKINA LOCAL GOVERNMENT AREA OF KOGI STATE

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ABSTRACT

Farm produce such as *Zea mays* (maize), *Phassolus vulgaris* (beans), *Irvingia gobonesis* (ogbono) and *Citrollus colocynthesis* L (Egusi melon) are staple food and feed grain. Aflatoxins and mycotoxins produced primarily by the fungus A. Flavus and A. parasiticus respectively are very potent Carcinogens in both humans and livestock. A thin layer chromatography (TLC) Analyser was used to detect the extent of contamination in Zea mays, Phassolus vulgaris, Irvingia gobonesis and Citrullus colocynthesis L samples obtained from markets in Abocho, Anyigba, Dekina, Etutekpe, Iyale and Okura all within Dekina Local Government Area of Kogi State. AFB1 were detected in all the maize samples obtained from these markets ranging from (1.00±0.01ppb-2.89±0.10ppb). AFB1 were also detected in Ogbono from Abocho and Anyigba Markets with values of (4.65±0.01ppb and 6.82±0.10ppb) respectively. AFB1 were detected in egusi from all the market with value of (3.14±0.01ppb, 6.60±1.01ppb, 4.30±1.00ppb, 3.39±0.01ppb, 1.96±0.01ppb) exception of Okura market. The Sample of Egusi from Abocho, Anyigba and Dekina also had traces of AFG1 (6.18±1.10ppb, 4.01±0.10ppb, 6.12±0.01ppb) respectively. The beans samples from Dekina and Etutekpe markets had contamination of AFB1 of (1.50±0.01ppb and 1.75±0.01ppb). However, these values are below the normal range of contamination (20ppb). This could be attributed to proper environmental measures (pre and postharvest) such as early harvest, drying properly, good and conducive storage environment. Therefore, the samples are safe for consumption.

Keywords: *Phassolus vulgaris*, Aflatoxin, *Irvingia gobonesis*, *Citrullus colocynthis* L and *Zea mays*.

EAT 029

INVESTIGATION OF HEPATIC AND RENAL PARAMETERS, MINERALS AND HEAVY METALS CONTENT IN BLOOD SAMPLES OF SNUFF ADDICTED INDIVIDUALS IN GUSAU METROPOLIS

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ABSTRACT

Snuff consumption is a prevalent addictive habit with potential adverse effects on various organ systems, including the liver and kidneys. Additionally, the presence of heavy metals in snuff products raises concerns about systemic toxicity. This study aimed to investigate the hepatic and renal parameters, minerals and heavy metals in the blood samples of snuff-addicted individuals in Gusau Metropolis. A cross-sectional study design was employed, involving 50 snuff-addicted individuals and 50 non-snuff users as control. Hepatic and renal parameters were assessed using biochemical markers. In addition, the blood samples were analyzed for minerals and heavy metals using atomic absorption spectrometry. The results indicated that snuff-addicted individuals had significantly ($p < 0.05$), higher levels of Alanine transaminase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase (ALP), albumin, bilirubin and total protein compared to control group suggesting hepatocellular damage. Moreover, serum urea and creatinine levels were significantly ($p < 0.05$) elevated in snuff users, suggesting compromised renal function Analysis of minerals also demonstrated significant ($p < 0.05$) decrease in calcium, magnesium, and zinc levels in snuff-addicted individuals compared to control group. Furthermore, the heavy metal analysis revealed elevated concentrations of lead, cadmium, and mercury in the blood samples of snuff user. These findings indicated that snuff addiction is associated with hepatic and renal dysfunction, as well as altered mineral and heavy metal profiles in blood samples. The observed hepatocellular damage, compromised renal function and presence of heavy metals suggest the need for monitoring and intervention to prevent further progression of organ damage among snuff-addicted individuals.

SUB-THEME

BIOTECHNOLOGY (BTC)

BTC 001

MOLECULAR DETECTION OF FUNGI IN PERIWINKLES

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ABSTRACT
This investigation was carried out to isolate and identify fungi in periwinkles using molecular genetic tools. *Tympanotonus fuscatus var radula* were bought from markets in Nasarawa State. The Fungi were isolated on Sabouraud Dextrose Agar supplemented with Chloramphenicol.The isolates were observed under X40 microscope. Pure isolates were obtained and kept for further use under -4◦C. Species diagnostics of each isolate was achieved via the amplification and sequence analysis of the ribosomal DNA internal transcribed spacer region (ITS) using the (ITS 1 (5-TCCGTAGGTGAAOCTGCGG-3) and (ITS 4 (5-TCCTCCGCTTATTGATATGC-3) primers. The nucleotide sequences obtained were compared with the reference strains by a BLAST search within the NCBI gene bank.The BLAST sequence analysis showed the fungi isolated from *Tympanotonus fuscatus var radula* had high similarity to *Aspergillus terreus* isolate A2S4 (96.23%), *Meyerozyma gulliermondi* strain VV12(96.65%) and *Fusarium oxysporum* isolate E-225 1(99.38). The presence of fungi in the periwinkles causes spoilage and deterioration.Molecular genetic technique is the most accurate and reliable of identifying periwinkles to species level. This helps in selecting the best antifungal agent, reduce chemotherapeutic failure and drug resistance.

Keyword: Molecular, fungi, identification, *Tympanotonus fuscatus var radula.*

BTC 002

HALOPHILE AND ESSENTIAL TENTACLE OF INDUSTRIAL BIOTECHNOLOGY FOR ALLEVIATTING ECONOMIC AND SECURITY CHALLENGES IN NIGERIA

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ABSTRACT
Industrial biotechnology aims to compete as a stronger alternative ensuring environmental friendly microbial-based production. However, the high cost of bio-processing is a major drawback and therefore new approaches must be developed to overcome this challenge. Halophiles have recently shown potentials of overcoming these challenges and are of much

preference for unsterile and continuous contamination free bioprocessing due to their unique ability to grow in high salt concentration and alkali medium under high temperature. This paper is focused on and appraises the advances in genetic manipulations that have established to better the performance of Halophiles for industrial applications that have helped to produce a number of products such as Polyhydroxy Alkanoates (PHA), ectiones, biosurfactants, anti-oxidants from Halophiles and more researches to develop Halophiles as the foundation for low-cost bioprocessing. The paper recommends the appropriate use and application to include adequate regulatory measures public debate, Human resources development and training, public private sector collaboration, intellectual property management to ensure human safety and sustainability of the noble development.

Keywords: Halophiles, Application low-cost Production, Industrial biotechnology, Halophilic Advantages.

BTC 003

MOLECULAR MECHANISM OF BACTERIAL CARCINOGENESIS

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ABSTRACT
This work was aimed at analysing the molecular mechanism involved in bacterial carcinogenesis. Carcinogenesis, known as oncogenesis or tumorigenesis, is a process whereby normal cell are transformed into cancer cells. It involves changes at the cellular, genetic, and epigenetic levels and abnormal cell division. Spontaneous or environmentally induced mutation occurs in a proto-oncogene of a single cell, which then undergoes multiple cell divisions to form a tumour. Bacteria target various cellular pathways that participate in carcinogenesis; bacteria with such capabilities include *H. pylori, S. Typhimurium, B. fragilis, F. nuleatum, N. gonorrhoea, C. trachomatis* etc. These pathways are Direct and Indirect pathways. Indirectly pathway influenced through the use of immunosuppressant or a distant inflammatory response that releases inflammatory mediators and reactive oxygen species (ROS), events that contribute to uncontrolled cell growth and DNA damage. Bacteria can also promote carcinogenesis directly; for example, as a result of DNA damage that is caused by bacterial toxins. DNA repair mechanisms or alterations in p53 activity and the DNA damage response introduce mutations and deletions, which are hallmarks of cancer development, bacteria manipulate host signalling pathways, such as the signal transducer and activator of transcription 3 (STAT3), mitogen-activated protein kinase (MAPK), and phosphoinositide 3-kinase (PI3K)–AKT pathways, at some stage in their infectious cycle. These

pathways stimulate tumour progression, such as inflammation, angiogenesis, cell proliferation and epithelial-mesenchymal transition (EMT).Toxic Bacterial Metabolites Nitrosamines. Host cellular DNA damage from toxic bacterial metabolites is another method that can initiate oncogenesis. It is also obvious that the effects of chronic inflammation and the creation of ROS and RNOS by host immune cells in response to infection. RNOS are metabolized into N-nitrosamines, compounds that are strong mutagens. Bacteria themselves, however, can also generate N-nitrosamines as part of their metabolism. Some bacteria, such as *E. coli*, produce reductases which catalyze the conversion of nitrates into nitrites and allow the formation of N-nitrosamines.

Keywords: Bacteria, Carcinogenesis, Mutation, DNA, RNOS

BTC 004

NATURAL RADIOACTIVITY AND RADIOLOGICAL RISK ASSESSMENT OF CASSAVA (MANIHOT ESCULENTA) CULTIVATED AND CONSUMED IN WUKARI METROPOLIS TARABA STATE NIGERIA.

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ABSTRACT
Human food chain can become contaminated either by direct radionuclide deposition, absorption from radionuclide-polluted soil and water by plant roots and direct ingestion of polluted plants, soil or water by animals. Activity concentration of 238 U, 232 Th and 40 K in soil and Cassava (Manihot esculenta) cultivated and consumed in Wukari metropolis Taraba State North east Nigeria were measured using gamma spectrometric technique which employs 3"x3 " NaI (TI) detector. The degree of radiation exposure of the population was also assessed through computed radiological parameters. The results shows that the activity concentration of 238 U in cassava ranged from 0.04±0.01 Bq/kg to 0.45±0.18 Bq/kg with an average of 0.24±0.07 Bq/kg, 232 ranged from 0.15±0.08 Bq/kg to 1.26±0.46 Bq/kg with an average of 0.73±0.16 Bq/kg and 40 K ranged from 9.58±0.57 Bq/kg to 30.73±6.66, with a mean value of 18.77±2.51. Similarly for the soil sample, mean activity concentration of 238 U, 232 Th and 40 K are 4.70±0.64 Bq/kg, 8.41±1.44 Bq/kg and 395.85±28.04 Bq/kg respectively. These values are below the respective safety limits of 32 Bq/kg, 40 Bq/kg and 420 Bq/kg for 238 U, 232 Th and 40 K set by United Nation Scientific Committee on the Effect of Atomic Radiation. Computed mean absorbed dose rate for cassava is 1.33 nGy/h with the corresponding annual effective dose of 0.0016 mSv/y which are also less than the world safety threshold. Computed excess lifetime cancer risk due to cassava consumption is. Soil-to-cassava transfer factors are found to be 0.05, 0.09 and 0.05 respectively for 238 U, 232 Th and 40 K which are less than unity. The Cassava are therefore fit, not just forconsumption, but also for export to other nations from radiological point of view.

BTC 005

ETHICAL ISSUES IN BIOTECHNOLOGY RESEARCH, NIGERIA A CASE STUDY

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ABSTRACT
Advances in Biotechnology research has no doubt benefited mankind. It has helped the medical science by developing diagnostic tools and kits to diagnose various diseases and the most recent Covid. Embryo selection based on genetic diagnosis, repairs of damaged tissues and organs and conception at advanced age. Biotechnology has improved agricultural production by developing varieties of crops with resistance to pests with improved nutritional value. However, the question arises whether these advance will improve the happiness of mankind or sadness at the end of the day. This review discusses some of the ethical issues of this technology with reference to Nigeria.

BTC 006

AN OPTIMIZED GENOMIC DNA EXTRACTION PROCEDURE SUITABLE FOR PLANTS, BACTERIA AND FUNGI

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ABSTRACT
The establishment of authentic identities of biological molecules, which is key to molecular biology research, is rooted in isolation of good DNA. Variation in the biochemical environments of organisms have led to multiple protocols for their DNA extraction. In this work, a rapid common protocol was optimized for DNA extraction suitable for plant, bacterial and fungal specimens. The optimization was carried out with fresh and dry leaves samples from 3 plants (Maize, Millet and cassava), bacteria cultures from Escherichia coli and fungi mycelia from Aspergillus species using Cetyl trimethyl ammonium bromide (CTAB) method with careful modifications. This was followed by polymerase chain reaction using ITS 2F & ITS3R, 27F &1492R and ITS1F & ITS4R primers which are respective universal primers for plants, bacteria and Fungi. This optimized protocol is a simplified CTAB extraction procedure of Doyle and Doyle *et al.,* (1987). The extracted DNA from the various samples was of high yield (370ng/µl to 565ng/µl.), good quality ($O.D_{260/280}$ = 1.65-1.78) which was confirmed by sharp PCR amplifications. The modifications in this protocol makes it simple, inexpensive and more environmentally friendly as there is no need for liquid nitrogen, little or no need for long and

refrigerated centrifugations. The little adjustments to this common protocol among the three specimens is the combination of two antioxidants (PVP, and β-mercaptoethanol), double Chloroform: Isoamyl alcohol (CIA) treatment and ethanol wash for dry leaves and Aspergillus samples.

Keywords: Optimisation, DNA, CTAB, Plants, Bacteria, Fungi, C:I A, PCR

BTC 007

EFFECT OF ADANSONIA DIGITATA FRUIT PULP EXTRACT ON GLUT-4 GENE EXPRESSION IN TYPE 2 DIABETIC RATS

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ABSTRACT
One of the major features of type 2 diabetes (T2D) is insulin resistance which occurs due to defect in insulin signaling that prevent the translocation of GLUT-4 to the cell surface for glucose uptake leading to hyperglycemia. Adansonia digitata (Baobab) is a medicinal plant which fruit pulp (ADFP) is known for its hypoglycemic activities but the mechanism by which it exact its effect is still under investigation. In this study, the effect of ADFP on GLUT-4 gene expression was determined. Rats were divided into 5 groups (n=6); normal control(NC), diabetic control(DC), diabetic rats treated with 200mg/kg ADFP(AD200), diabetic rats treated with 400mg/kg ADFP(AD400) and diabetic rats treated with 250mg/kg Metformin(DMET). The rats were induced with T2D by administration of 10% fructose solution (adlibitum) followed by streptozotocin injection (40 mg/kg BW). After two weeks of treatment, the results obtained showed significant (P< 0.05) decrease in blood glucose level in all groups when compared with NC group. There was also significant decrease in insulin resistance level with no effect on beta cell regeneration in all the groups when compared with NC group. After measuring the insulin level, only groups treated with 400mg/kg AD and metformin 850mg/kg showed significant (P<0.05) increase when compared with DC group. The gene expression studies result showed significant increase in GLUT-4 gene in AD400 group only when compared with NC group. In conclusion, these results suggest that Adansonia digitata pulp may exert its antidiabetic effect by increasing the expression of GLUT-4 gene in type 2 diabetic rats.

Keywords: Adansonia digitata, GLUT-4 gene, Insulin resistance, Type 2 diabetes

BTC 008

MORPHOLOGY, MORPHOMETRY AND MOLECULAR DETECTION OF HAEMONCHUS CONTORTUS IN SHEEP SLAUGHTERED IN MAIDUGURI ABATTOIR, BORNO STATE

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ABSTRACT

Background and Objective: *Haemonchus contortus* is a blood sucking nematode parasite, predominantly occurring in the abomasum of sheep in ruminants in Maiduguri. The nematode is characterized by the presence of red and white striped appearance in the female called the barber pole worm in most tropical and tropical countries. A cross sectional study was conducted from July 2018 to February 2019 for determination of haemonchus contortus and investigation of associated potential risk factors in sheep. The main objective of this study was to provide molecular characterization of Haemonchus contortus in small ruminants slaughtered in Maiduguri abattoir using ribosomal DNA cluster (rDNA) of more conserved Internal Transcribed Spacer (ITS) regions and mitochondrial cytochrome oxidase subunit I (COI) gene. Materials and Methods: Adult samples were collected from Abomasum of infected sheep hosts during post mortem inspection. All the samples were subjected to DNA extraction for polymerase chain reaction. Results: A 521 bp fragment of COI and 503 bp ITS2 genes were amplified. The obtained sequence was compared to the corresponding sequences available in the GenBank. Phylogenetically, *Haemonchus contortus* resembles closely the other members of family *Haemonchus contortus* with high expectation value in the alignment. Conclusion: This study corroborates that the mitochondrial COI and ITS2 sequences could be used as species specific markers for characterization of *Haemonchus contortus* in sheep.

Keywords: *Haemonchus contortus*, Detection, Borno state, morphometry, Morphology, molecular characterization

BTC 009

ISOLATION AND MOLECULAR CHARACTERISATION OF MICROBE ASSISTED-PHYTOMEDIATING ENDOPHYTIC BACTERIA FROM THE ROOTS OF CHAMAECRISTA ROTUNDIFOLIA GROWING ON THE NIGERIAN AIR FORCE SHOOTING RANGE, KADUNA, NIGERIA

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ABSTRACT

Endophytes residing within the specific chemical environment of host plants, form unique group of microorganisms. Microbially unexplored native plants can have diverse and potential microbial association. This study was aimed at the isolation, biochemical and molecular characterization of endophytic bacteria associated with the root of *Chamaecrista rotundifolia* growing at the Air Force shooting range, Kaduna, Kaduna State, Nigeria. A total of three root system samples were collected. The roots collected were washed with both distilled water and 70% ethanol severally. Bacteria were isolated from the root in a nutrient agar and characterized biochemically through Gram staining, Catalase test, indole test, motility test, sporulation, methyl red, citrate test, Nitrate reduction test and Oxidase test. Furthermore, the bacteria isolated were identified using 16S rRNA sequencing analysis. The isolated bacteria were then screened for plant growth promoting traits, antibiotic sensitivity/resistance and heavy metal tolerance. Varied concentrations (0.00 mg/L, 0.05 mg/L, 0.15 mg/L, 0.25mg/L and 1mg/L) of the heavy metal salts which include; lead (Pb (NO_3), Manganese ($MnCl_2$), Chromium ($CrCl_3$. $6H_2O$) and Nickel ($NiCl_2$) were used to ascertain the tolerance level amongst the isolates. Based on the biochemical characteristics as well as the 16S rRNA gene sequencing, four (4) endophytic bacteria isolates were identified (*AerococcusViridans, Peribacillus simplex, Staphylococcus simplex and Pseudomonas aeruginosa*) from the roots of *Chamaecristarotundifolia. AerococcusViridans*, *Peribacillus simplex* and *Pseudomonas aeruginosa*strains were found to possess the ability of producing phytohormoneindole acetic acid (IAA), 1-aminocyclopropane-1-carboxylate (ACC) deaminase and solubilized phosphate while *staphylococcus epidermis* was negative for ACC deaminase production. The antibiotic sensitivity test indicated that the four isolates were mostly resistant (R) to perfloxacin (5µg), Septrin (30µg), Nalidixic acid R (10µg), Amoxacillin (30µg), Gentamycin (10µg), Ampiclox (30µg), Streptomycin (25µg), Erythromycin (15µg) and Zithromax (10ug) but sensitive(S) to ciprofloxacin (10 µg). The four isolates were all resistant to Lead (Pb), Nickel (Ni),

and Manganese (Mn) but susceptible to Chromium (Cr). The result suggests that the fourbacterial isolates are novel microbe assisted phytoremediators and good phytoaccumulators for plants and can be applied for the microbe remediation of ammunition polluted environments.

Keywords; endophytes, heavy metals, phytoremediators, phytoaccumulators, microbial association.

BTC 010

GENETIC STUDIES ON TICK-BORNE PATHOGENS OF SHEEP AND GOATS IN AFRICA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT
Tick-borne pathogens (TBPs) are a major impediment to the health, welfare and production of small ruminants across the world including Africa. In recent past, a number of individual studies investigating the prevalence and distribution of TBPs in small stocks have been published across the continent but no effort has been made synchronize findings from these studies into a single comprehensive report for easy reference. Therefore, the aim of this study was to determine the pooled prevalence through a meta-analysis of selected TBPs amplified from blood DNA using PCR in sheep and goats across Africa. Deep literature search was performed using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines on selected electronic databases. The search was performed with no restriction in time through to 18th January, 2023. Of the 63 full-text articles subjected for eligibility, only 30 articles met the eligibility criteria and were included in this review. Overall, the pooled prevalence of selected eight (8) TBPs varied considerably between host species (sheep vs goats), with *Anaplasma ovis* (44.50 vs 48.40%), *Ehrlichia ruminantium* (5.50 vs 2.00%), *Coxiella burnetii* (4.40 vs 1.70%), *Borrelia theileri* in sheep (5.20%), *Babesia ovis* (1.70% vs 1.90%), *Theileria ovis* (40.50% vs 10.00%), *T. separata* (1.00% vs 1.00%) and *T. lestoquardi* in sheep (8.40%). However, the prevalence of the selected TBPs was generally higher in sheep compared to goats. Several genetic loci were targeted in the characterization of tick-borne pathogens such as *16S rDNA, groEL* and *msp4* for *Anaplasma ovis*, *pCS20* for *Ehrlichia ruminantium*, Insertion Sequence (IS1111) for *Coxiella burnetii*, *flaB* (flagellin) and *16S rRNA* for *Borrelia theileri*, 5.8S rRNA and *18S rRNA* for *Babesia*/*Theileria*, as well as the utilization of numerous PCR variants including conventional PCR, nested-PCR, qPCR, LAMP and RLB. In conclusion, *A. ovis* was the most distributed and prevalent TBP of small ruminant within the continent. Hence, this warrants adequate attention

towards, early diagnosis and treatment of infected animals as well as the control of the tick vectors involved in their transmission.

Keywords: Tick-borne pathogens, Sheep, Goats, PCR, Prevalence, Africa

BTC 011

DIVERSITY AND PHYLOGENY OF ONE-HUMPED CAMELS (CAMELUS DROMEDARIUS) IXODID TICKS AND ASSOCIATED TICK-BORNE PATHOGENS IN NIGERIA

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ABSTRACT
Ticks are hematophagous arthropods of veterinary and medical importance. Current knowledge on species diversity of ticks infesting camels and tick-borne pathogens (TBP's) they are harbouring is limited in Nigeria. Therefore, the aim of this study was to unravel the status by characterizing ticks and tick-borne pathogens (TBP's) of camels in Nigeria. Blood samples (n = 176) and adult ticks (n = 593) were collected from one-humped camels (*Camelus dromedarius*) in three locations in north-western Nigeria and screened for the presence of *Rickettsia* spp., *Babesia* spp., *Anaplasma* spp. and *Coxiella*-like organisms using molecular techniques. All ticks were identified to species level. Firstly, seven (7) different species of ticks were confirmed in camels by morphological, phylogenetic and haplotype analysis using *12S* rRNA, *16S* rRNA and *cox*1 genes as *Hyalomma dromedarii* (78.4%), *Hy. truncatum* (14.7%), *Hy. rufipes* (3.2%), *Hy. impeltatum* (3.0%), *H. impressum* (0.3%), *Rhipicephalus evertsi evertsi* (0.2%) and *Amblyomma variegatum* (0.2%). The minimum infection rates of tick-borne pathogens in 231 tick pools (from camels) included *Babesia* species, (n = 4; 0.7%); *Rickettsia aeschlimannii* (n = 51; 8.6%); *Coxiella burnetii* (n = 17; 2.9%); and endosymbionts in ticks (n = 62; 10.5%). We also characterized for the first time in Nigeria, a novel specie of *Anaplasma* in camels named *Candidatus* Anaplasma camelli. Phylogenetic and haplotype analysis targeting the *16S* rDNA gene clearly showed that the novel pathogen was "*Cand.* A. camelii". Only one haplotype was found in this study and this haplotype differs slightly by a single mutation from *A. platys,* by 3 mutations from *A. phagocytophilium* and by 8 mutations from *A. marginale*. Furthermore, amplifying the *18S rRNA* gene, our PCR detected and characterized three species of *Babesia* (*B. occultans* (n = 2), *B. caballi* (n = 1) and *B. spp*. (n = 1) in blood fed *Hyalomma* ticks from camels. *Rickettsia aeschlimanii* belonging to the spotted fever *Rickettsia* was detected and characterized by amplifying *glt, omp*A and *omp*B genes. Additionally, *Coxiella burnetii* were characterized in blood fed ticks (*Hy. dromedarii* and *Hy. Truncatum*) by amplifying *16S* rDNA gene. Conclusively, we observed low to moderate prevalence of selected tick-borne pathogens.

Detection of *R. aeschlimannii*, a zoonotic pathogen emphasizes the need for robust tick control program taking into consideration the increasing interactions between humans and camels.

Keywords: Ticks, Tick-borne pathogens, PCR, Camels, Nigeria

BTC 012
METAGENOMIC PROFILING OF MICROBIOME FROM SAMPLES WITHIN THE UNESCO HERITAGE SITE: THE OSUN GROVE IN SOUTHERN NIGERIA.

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ABSTRACT
Water usage for both domestic and commercial activities are inevitable. In order to understand the make-up of microbial communities in varied samples, metagenomic profiling is a crucial tool. With it, It is feasible to identify the species present and even gauge the relative abundance of each creature by measuring the total DNA present in a sample. Therefore, the metagenomic profiling of the microbiome from samples gives new information about the functional roles played by microbial communities in their natural surroundings as well as potential relationships between pathogens and their hosts. This necessitated the investigation of microbiome population of the river water from the UNESCO heritage sites, the Osun Osogbo grove. Genomic DNA was extracted from water, sediment and soil samples. This was done using the Metagenomic DNA Isolation Kit. Subsequently, this was sequenced using an Illumina® MiSeq platform. This was made to target the 16S rRNA gene variable region V3-V4. The data obtained from Operational Taxonomic Unit (OTU) prediction of the Ilumina sequencing data indicates abundance of P*rosthecochloris* (58%), *Tsukamurella* (39%) and *Kitasatospora* (2%) in the water debris during the dry season with lower population during the rainy season: *Prosthecochloris* (12%), *Tsukamurella* (21%) and *Kitasatospora* (0.4%). The population of the *Prosthecochloris* and *Kitasatospora* in the sediment and soil sample was relatively lower when compared with water debris. However, the *Tsukamurella* (approximately, 33%) population appears consistent, irrespective of the season. The genus Prosthecochloris consist mainly the *Bacteroidetes/Chlorobi* group which are 100% *Chlorobiaceae* belonging to the taxon: 68336. *Tsukamurella* were mostly *Corynebacteriale* (taxon: 85007), Class Actinobacter (taxon: 1760), 85% of the *Kitasatospora*

were *K. grissseola, K. setae* (1%) while other class of *Kitasatospora* (13%). This study established varied microbiome population within sampling sites, season, as well as their interactions with public health and environment. It also established the presence of a biological augmentation system which can be effectively optimized to form fulate strategic microbiome engineering through bioaugmentation for a sustainable agricultural system within and outside Osun Osogbo ecosystem.

Keywords: Osun River, Metagenomics, 16S rRNA, Bacterial community, Public health

BTC 013

MOLECULAR CHARACTERIZATION OF BACTERIA ISOLATES FROM SELECTED EDIBLE HERBAL PRODUCTS IN GWAGWALADA AREA COUNCIL, ABUJA, NIGERIA

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ABSTRACT

The use of herbal products in therapeutics which is known as traditional or complementary medicine, co-exist with modern allopathic medicine in almost every country of the world. In many developing countries, a large proportion of the population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs.Most herbal medicines may be associated with a broad variety of microbial load which exert critical impacts on the overall quality of the products.Hence, there is need to ascertain the contaminant type and load in the products. The main objective of this study was molecular characterization of bacteria contaminants from herbal products sold and consumed in Gwagwalada area council. A total of one hundred different herbal samples (seventy liquid and thirty powdered) were randomly bought from six locations of Gwagwalada and transported to laboratory. The samples were serially diluted and plated on isolation agar media. Potential colonies were purified and stored in nutrient agar slant. Genomic DNA was extracted from the purified isolates characterized using 16S rDNA primersvia Polymerize Chain Reaction and sequenced. Molecular identification carried out revealed that the bacterial isolates belonged to *Serratialiquefaciens*CCMM B1269, *Staphylococcus saprophyticus* UTI-045, *Proteus mirabilis* WW278,*Bacillus subtilis* LTNo.1,*Eschericha coli* ENOSE11R, *Proteus mirabilis* sal12, *Proteus terrae* N5/687, *Pseudomonas cedrina*DH4, and *providenciavermicola*BSB8. This result is of public health worry as these bacteria which are known pathogens of foodborne illnesses and toxic syndrome, apparently contaminated the herbs through poor handling and preparation techniques.

Keywords: 16s rDNASequencing, DNA, PCR, Bacterial, Herbal medicine, Health

BTC 014

IMMUNO-EXPRESSIONS OF MOLECULAR MARKERS OF SPERMATOGENESIS AFTER ACUTE TESTICULAR TOXICITY OF ATRAZINE IN THE BALB/C MICE

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ABSTRACT

We studied the immuno-expression of molecular markers of mammalian testicular functions: SRY-related HMG BOX gene 9 (SOX-9), androgen receptor (AR), promyelocytic leukemia zinc finger (PLZF), inducible nitric oxide synthase (iNOS), Ki-67 proliferation index, VASA/DDX4 (DEAD-Box Helicase 4), in mice after a sub-acute gavage treatment with atrazine, a testicular toxin. After oral treatment of adult BalB/c mice with atrazine (50 mg/kg body wt.) for consecutive three days, we found high numbers of SOX-9 and AR and low numbers of iNOS, Ki-67, and PLZF immuno-positive cells in the seminiferous tubular regions of the testes. Additionally, immuno-staining for VASA/DDX4 was lower in the testis, as iNOS expression was in the epididymides of the treated animals relative to the control. Furthermore, tumour necrosis factor-alpha (TNF-α) levels in the testes but not epididymides were inhibited whereas interferon gamma were unchanged in the testes but increased in the epididymides after atrazine exposure. Interestingly, mice that were stimulated with lipopolysaccharide (LPS; 0.5 mg/kg b.w) following atrazine treatment had low concentrations of nitric oxide, TNF-α and interleukin-6 in the testes homogenates relative to LPS alone. We conclude that atrazine exerts anti-inflammatory effects in the testes of mice and that the immuno-expressions of these established molecular markers of spermatogenesis were altered during atrazine toxicity.

Keywords: BalB/c mice, immunohistochemistry, morphometry, testis, Sertoli cells, spermatogenesis, atrazine, lipopolysaccharide

BTC 015

MUTATIONS IN THE QUINOLONES RESISTANCE DETERMINING REGIONS OF GYRA IN NOSOCOMIAL STAPHYLOCOCCUS AUREUS AND SALMONELLA TYPHI

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ABSTRACT

In Nigeria, *Staphylococcus aureus* and *Salmonella typhi* are common causes of human infections and are also recognized as pathogens of public significance. This study therefore, sought to determine the incidence and extent of fluoroquinolones resistance of *S. typhi* and *S. aureus* isolated from patients in Nigerian Defence Academy Hospital. A total of 60 samples obtained from patients with request for stool microscopy, culture and sensitivity, wound swabs, indoor air of surgical wards and swabbing of working benches were analyzed for the presence of *S. aureus* and *S. typhi*. The bacterial isolates were then subjected to antibiotic sensitivity testing using a modified Kirby-Bauer disc diffusion method. The antibiotic susceptibility patterns of *S. typhi* revealed that some of the isolates were resistant to two or more fluoroquinolones namely: ciprofloxacin, sparfloxacin, ofloxacin and pefloxacin. S. aureus on the other hand, also showed resistance to fluoroquinolones. The isolates that showed resistance to more fluoroquinolones were taken for molecular analysis. The genomic DNA was extracted and amplified using specific primer for gyrA by PCR, visualized using agarose gel electrophoresis and then sequenced. The amplicon sizes were 251bp respectively for each of the isolates. The detection of resistant pattern responsible for fluoroquinolones resistance showed that mutation had occurred. Mutation in nucleotide sequence was detected in gyrA gene of the fluoroquinolone resistant strains. However, in this study, it could be suggested that extensive use and abuse of fluoroquinolone in human diseases could be responsible for the rapidly increasing quinolone resistance of *S. enterica* and *S. aureus* in this part of Nigeria as observed. Therefore, prescription of these drugs should be done only by medical personnel and appropriate dispensing techniques should be adopted in every hospital to avoid under dosage or over dosage.

Keywords: Agarose Gel Electrophoresis, Fluoroquinolones, gyrA Gene, Mutation, *S. aureus, S. typhi.*

BTC 016

BIOCHEMICAL STUDIES AND EXPRESSION OF ATG7/LC3 AUTOPHAGIC GENE MARKERS IN MELPHALAN-INDUCED TESTICULAR TISSUE DAMAGE

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ABSTRACT

Autophagy is an intracellular lysosomal degradation pathway and plays a very important role in maintaining intracellular homeostasis. This present study demonstrates the biochemical status and expression of ATG7/LC3 autophagic genes in Melphalan-induced testicular dysfunction. Twenty male Swiss albino mice were maintained under standard conditions of humidity (50 ± 5%), temperature (25 ± 2pC) with free access to food and water. The mice were divided into five groups (n=5 each) and treated by intraperitoneal injection as follows; Group I: vehicle-treated control; Group II:1mg/kg/bwt MEP; Group III:3mg/kg/bwt MEP; Group IV: 5mg/kg/bwt MEP. Histopathological and histochemical evaluation by light microscopy, biochemical assays and sperm parameters evaluation are the various investigation depicted in this study. Result shows a rise percentage of DNA damage and Tetratozoospermia Index (TZI); decrease of protein concentration and Total Antioxidant Capacity (TAC). Testosterone concentrations was depleted. The result also shows a significant decrease of Luteinizing Hormone (LH) level across the groups when compared to the control. This study confirms oxidative stress by increased ROS and MDA levels in the testes of the melphalan-treated mice and defective antioxidants response as evident from diminished activities of antioxidant enzymes. The autophagic gene markers showed an upstream Atg7 gene and downstream of LC3-II/LC3-I ratio. Autophagy is mediated by the expression of ATG7 and LC3 genes and these varying mRNA expression led to autophagic defects. The observed degeneration of spermatogenesis is also due to administration of Melphalan exposure

Keywords: Melphalan; Autophagy; Oxidative Stress; DNA Damage; Testes

BTC 017

THE EXTRACELLULAR REGION OF TRYPANOSOMA CONGOLENSE MEMBRANE BOUND ACID PHOSPHATASE INDUCES STRONG PROTECTION IN IMMUNIZED BALB/c MICE

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ABSTRACT

Towards development of vaccine against Animal African Trypanosomiasis (AAT), we have identified the Membrane-Bound Acid Phosphatase (MBAP; EC 3.1.3.2) of the bloodstream forms (BSFs) of trypanosomes as a promising antigen for vaccine design. The MBAP of BSFs is less susceptible to variation, plays a central role in molecular trafficking and has proven to be essential to the parasite by RNAi. In this study, we developed a DNA vaccine candidate targeting the extracellular region (EP) of *T. congolense* MBAP (*Tcon*MBAP) without its signal peptide (SP) using a native stabilate of the parasites and a Strep-tag/transin modified mammalian expression vector pVAX1. We showed the protective effects of the vaccine candidate against experimental infection with 10^4 *T. congolense* cells after two independent immunization trials. Each trial consisted of a prime and two boosts (100 µg/animal) regime during which sera were collected for Blood Incubation Test (BIT), immunoglobulin G (IgG), and cytokines (IL-10 and IFN-ɣ) assay by ELISA. The vaccine candidate contributed to a net significant increase ($P<0.05$) of circulating IgG and an increased pre-patent period of up to 3 days in the vaccinated cohorts. And significantly increased levels of IL-10 ($P<0.05$) and no effect on IFN- ɣ ($P>0.05$) in all trials thereby creating a type II cytokines environment for the survival of the animals. This was reflected by the relatively low parasite load in the vaccinated cohorts characterized by multiple waves with the intermittent clearing of parasites to no detectable levels, and extension of the lifespan of up to 45.45% with a complete survival of 20% of mice in the second trial. This study suggests that EP-SP/pVAX1 has tremendous immunological potential.

Keywords: *Trypanosoma congolense, Tcon*MBAP, IFA, BIT, IgG, IL-10, IFN-ɣ

BTC 018

MOLECULAR DETECTION OF ADULTERANTS IN INDUSTRIALLY MADE SAUSAGES AND SHAWARMA IN GUSAU, ZAMFARA STATE NIGERIA

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ABSTRACT
The adulteration of food products presents significant risk to both consumer well-being and the overall reputation of the food industry. Quality and authenticity of industrially manufactured sausages are imperative for consumer protection. This research aimed to authenticate sausage produced by industrial means and Shawarma. The Sausage and Shawarma samples were obtained from a super market in Gusau Metropolis, Zamfara state. A multiplex-Polymerase Chain Reaction (PCR) technique was utilized in this study to target specific genetic markers within sausages and Shawarmas that could detect the presence/absence of inappropriate ingredients. The genetic markers included specific conserved regions of DNA sequences originating from various meat sources, such as pork, beef, and chicken. The experimental process involved the extraction of DNA from Sausage and Shawarma samples using commercial kits (Bioneer, USA.). The extracted DNA was then subjected to multiplex-PCR amplification using primers designed for pork, beef, and chicken detection. Gel electrophoresis was employed to analyze the resulting amplified DNA fragments and determine the presence or absence of adulterants. The result of multiplex-PCR indicated the amplification of 400 base pairs (bp) of chicken DNA from the samples but no amplification of 295-bp pig mitochondrial DNA detected from both samples. This confirmed the absence of pork contamination in Sausage and Shawarma samples tested. The findings of this study demonstrated the effectiveness of multiplex-PCR technique in detecting adulteration in different food products. Continue monitoring is recommended to ensure food safety and address consumer preferences, especially religious concerns.

BTC 019

CHLOPHENIRAMINE INDUCES HNMT GENE EXPRESSION IN BROILER CHICKS

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ABSTRACT
Chronic respiratory diseases (CRD) are common occurrences in poultry during harmattan season in Northern Nigeria and excessive use of antibiotics for CRD treatment poses risk of antibiotic

resistance. This study was designed to examine the effect of chlorpheniramine malaete (CPM) as histamine suppressant in broiler chicks maintained on potato based diet. Inclusion levels of 2 mg/kg and 4 mg/kg CPM in formulated diet were fed to day old chicks for 21 days. The birds were sacrificed and lung tissue was harvested and homogenized for extraction of total RNA using commercial kits. Forward and reverse primers for HNMT gene were used for qPCR estimation of HNMT gene expression levels. The results indicated increased expression of HNMT genes in the CPM feed supplemented groups and was significant in the group that received 4 mg/kg CPM suggesting dose dependent expression. HNMT enzymes inactivate histamine by methylation. The observed CPM induced expression of HNMT genes could probably play a role suppressing histamine mediated responses to allergy related CRD in poultry.

Key words: Chlorpheniramine malaete, Chronic Respiratory Diseases, HNMT, Broiler, qPCR

BTC 020

DNA VACCINE ENCODING *TRYPANOSOMA BRUCEI* MAJOR SURFACE PROTEASE-B INDUCED IGG RESPONSE AND CONFERRED PARTIAL PROTECTION IN IMMUNIZED BALB/C MICE

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ABSTRACT

Trypanosoma brucei major surface protease-B is a surface-localized enzyme that catalyzes proteolytic removal of old variant surface glycoprotein (VSG) for expression of new one, an important stage-specific function that allows the parasite to survive in its host, thus making it an attractive candidate for vaccine development. Herein, the potential of *Trypanosoma brucei* MSP-

B as a DNA-based vaccine was evaluated in BALB/c mice. *Tbmsp-b* gene was cloned into a modified *pVAX-1* plasmid to produce *pVAX-1-Tbmsp-b* construct for DNA vaccine trials. Mice were vaccinated by intradermal injection with 100 µg dose of the vaccine thrice on days 0, 21 and 42, then challenged with 2000 parasites at day 56. Anti-trypanosoma specific antibody (IgG) and cytokine (γ-IFN) were monitored by enzyme-linked immunosorbent assay (ELISA) from sera of vaccinated and unvaccinated mice. Vaccinated mice showed significantly higher ($p < 0.05$) IgG response and had lower parasitaemia (by 75% and 51.2% of parasitaemic scores on first and fifth week of infection) and longevity by up to 22 days compared to unvaccinated mice. The results revealed that the *pVAX-1-Tbmsp-b* DNA vaccine construct provided partial protection to virulent *T. b. brucei* (Federe strain) infection in susceptible BALB/c mice suggesting the potentials for using MSP-B as an antigen in DNA vaccine development against African trypanosomiasis. MSP-B induced humoral response by enhancing immunoglobulin levels and conferred partial protection by increasing longevity and reduced parasitaemia in experimentally infected mice.

Key words: *Trypanosoma brucei brucei*, Major Surface Protease-B, DNA Vaccine, Vaccination, Immune response.

BTC 021

MOLECULAR CHARACTERISATION OF DERRMATOPHYTES AMONG *ALMAJIRAI* IN KADUNA, NIGERIA

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ABSTRACT

Dermatophytes are fungi that have the capacity to invade keratinised tissues of humans and animals to produce an infection. Samples were collected from the *almajirai* that had lesions on their scalps. Sites of infection were cleaned with 70% alcohol before collection of scalp scrapings using sterile scalpel blades. Sabouraud's dextrose agar (DibenDiagnostics, U.K) was used. Primers which contained the ITS1-2, 18S rRNA and 28S rRNA regions were used. From PCR result, bands were obtained for *Microsporum canis, Microsporum audouinii, Trichophyton rubrum, Trichophyton tonsurans and Trichophyton mentagrophytes* using a dermatophyte specific primer (ITS1-2). Using 18S ribosomal RNA primer, approximately 500 base pairs band on ITS1-2 was observed in *M. canis, T. rubrum and T. tonsurans* while band patterns of 560 base pairs band on ITS1-2 were observed in *M. audoinii* and *T. mentagrophytes. M. canis and T. verrucosum* were visible around 200 base pair long band. A 300 base pair long band was identified with the 28S ribosomal RNA primer PCR on *M. canis, T. violaceum, T. verrucosum and M. gypseum.* A 300 base pair-long was observed in *M. audouinii, T. rubrum and M. fulvum* on the 18S ribosomal RNA primer. It is necessary the *Mallams,* parents/guardians and the *almajirai* are educated on maintaining personal, community and environmental hygiene.

Keywords: Dermatophytes, Almajirai, Molecular characterisation, *Tsangaya*, PCR

SUB-THEME
ETHNOPHARMACOLOGY (EPH)

EPH 001

EFFECT OF ORAL ADMINISTRATION OF AQUEOUS EXTRACT OF PSIDIUM GUAJAVA LEAF ON SERUM LIPID PROFILE AND CARDIAC ENZYMES IN ADRENALINE INDUCED HYPERLIPEDEMIC RATS

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ABSTRACT

The study was designed to evaluate the effect of oral administration of aqueous extract of Psidium guajava leaf (AEPGL) on serum lipid profile and cardiac enzymes in adrenaline induced hyperlipedemic albino rats. Seventy two albino rats (weighing 100-130g) were used in the study and were grouped into six groups consisting of twelve rats each. Groups II to VI were induced with hyperlipdemia using 100µl adrenaline intraperitoneally for five days. Lipid profiles, creatine kinase, lactate dehydrogenase, aspartate amino transferase and heart weight were determined twenty four hours after the fifth dose. Followed by one and two week(s) treatment with different doses of AEPGL for groups III –V and Atenolol for group VI rats. LDL-cholesterol, triglycerides, aspartate amino transferase, creatine kinase, lactate dehydrogenase and heart weight were significantly increase ($P<0.05$) in groups II- VI when compared to group I (normal control). ADMINISTRATION OF AEPGL and atenolol decrease significantly ($P<0.05$) serum levels of total cholesterol, LDL-cholesterol, triglycerides, lactate dehydrogenase, creatine kinase, heart weight and significantly increased ($P<0.05$) serum level of HDL-cholesterol. The result thus indicates that consumption of AEPGL produce great hypolipemic effect.

Keywords: Adrenaline, Atenolol, Psidium guajava, Hyperlipidemic.

EPH 002

COMPARATIVE WOUND HEALING POTENTIAL OF MITRACARPUS HIRTUS OINTMENT AND HONEY IN DIABETIC ALBINO RATS BY COLLAGEN ASSESSMENT SPERMATOGENESIS INDEX IN CAFFEINE TREATED RATS

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ABSTRACT

The present study evaluated the protective effect of fluted pumpkin seed (FPS) against caffeine (CAFF) induced testicular injury in rats. Thirty young healthy male Wistar rats (96 ± 12 g) were

randomly divided into five groups of six rats in each group: control, caffeine (CAFF; 50 mg/kg body weight) and FPS co-treatment groups (CAFF + 50 mg FPS, CAFF + 100 mg FPS and CAFF + 200 mg FPS/kg b.w). CAFF and FPS were administered daily and twice per week respectively by oral gavage for 45 days. CAFF treatment decreased testicular lactate dehydrogenase enzyme activity level which was attenuated on co-treatment with FPS at 50 and100 mg /kg b.w ($p < 0.05$). Furthermore, CAFF treatment decreased seminiferous epithelia thickness and spermatogenesis index and increased the number of tubules with abnormal histological features which were prevented on co-treatment with FPS at 50 mg /kg b.w much more than at the higher doses ($p < 0.05$). The Johnsen score index in rat's co-treated with FPS at 200 mg/kg b.w was not significantly different from CAFF values ($p > 0.05$).Furthermore, FPS co-treatment at the higher doses increased glutathione andglutathione peroxidase activities which were not affected after CAFF treatment. Similarly, CAFF treatment alone or with FPS co-treatment did not alter malondialdehyde concentrations, whereas catalase activity was found to reach a maximum level at 100 mg FPS/kg b.w and remained higher than CAFF values in the CAFF + 200 mg FPS/kg b.w group. In conclusion, FPS is able to minimize the CAFF-induced testicular injury.

EPH 003

ANTIDIARRHOEAL ACTIVITY OF PILIOSTIGMA THONNINGII LEAVES IN FEMALE WISTAR RATS

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ABSTRACT

The hydroethanolic extract of *Piliostigma thonningii* leaves was evaluated for its secondary metabolites and its acclaimed Antidiarrhoeal activity at 50, 100, and 200mg/kg body weight in female Wistar rats. In each of the diarrhoeal models, female Wistar rats were assigned into five groups (I, II, III, IV, and V) containing five animals each such that rats in group I and II were the positive and negative controls respectively while those in group III, IV and V received 50, 100, and 200 mg/kg body weight of the extract respectively. The extract contains secondary metabolites with flavonoid (13.87mg/g) occurring the most and steroid (0.8mg/g) was the least. Also, the extract contains eight minerals with calcium (3.40mg/L) being the most abundant and zinc (0.05mg/L) were the least. In castor oil-induced diarrhoeal model, the extract significantly ($p<0.05$) and dose dependently prolonged the onset time of diarrhoeal, it also decreased water content, fresh weight, and total number of wet faeces in a dose-dependent manner, and increased the percentage inhibition of defecation. The extract produced dose-specific changes on intestinal superoxide dismutase, glucose, reduced glutathione whereas the level of Na+/K+ ATPase, intestinal alkaline phosphatase, catalase, intestinal protein, and nitric oxide were significantly ($p<0.05$) increased in castor oil-induced diarrhoeal model. The extract dose-dependently

decreased the masses and volume of intestinal fluid with corresponding increase in inhibition of intestinal fluid like those of atropine treated diarrhoeal rats in the castor oil enteropooling model. The study concluded that the hydroethanolic extract of *Piliostigma thonningii* leaves possess antidiarrhoeal activity in chemical induced diarrhoeal models and thus justifies its age long folkloric use in managing diarrhoea.

Keywords: Gastrointestinal Motility; Anti-diarrhoea; *Piliostigma thonningii;* Fabaceae; Sodium-Potassium-Exchanging ATPase; Diarrhoeal models; Loperamide hydrochloride

EPH 004

ANTI-INFLAMMATORY EFFICACY OF CORCHORUS OLITORIUS AND EFFECTS ON SOME BIOCHEMICAL AND HAEMATOLOGICAL PARAMETERS IN EGG ALBUMIN-INDUCED PAW OEDEMA MODEL RAT

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ABSTRACT

Corchorus olitorius is a leafy vegetable often consumed daily and has broad therapeutic uses. The findings investigated the anti-inflammatory activity and its toxicological effects on some biochemical parameters in rats. Twenty (24) male Wistar rats were grouped into Control (received normal saline), Diclofenac group (received 1.43 mg/kg diclofenac), and the treatment groups treated with 200 and 400 mg/kg crude extract *Corchorus olitorius* respectively, one hour before induction of inflammation. The paw volume was then measured at 30 min intervals for three hours consecutively after induction of oedema. Inflammatory (paw volume, NLR, PLR, and PMR), biochemical (alkaline phosphatase (ALP), alanine aminotransferase (ALT), aspartate aminotransferase (AST), protein, bilirubin, urea, creatinine, catalase, and superoxide dismutase) and haematological (packed cell volume (PCV), white blood cells (WBCs), haemoglobin (Hb), Platelet count, red blood cells (RBCs), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), Neutrophils, lymphocytes, and Monocytes) parameters were then assessed. The result showed a significant decrease in the paw volume of rats treated with 400 mg/kg Corchorus olitorius which is indicative of extract anti-inflammatory potency. Also, a decrease in liver marker enzymes, as well as urea and creatinine levels, were observed with a corresponding increase in superoxide dismutase and catalase activities. The extract showed an immunomodulatory effect by increasing WBCs, and platelets with corresponding decreases in NLR, PLR, and PMR. It could be concluded that *Corchorus olitorius* seed extract has anti-inflammatory, antioxidant, and immunomodulatory potentials with a non-toxic effect on the tissue.

Keywords: Anti-inflammatory, *Corchorus olitorius*, biochemical parameters

EPH 005

ANTIOXIDANT AND ALPHA AMYLASE INHIBITORY POTENTIAL OF METHANOL EXTRACT OF UNRIPE PLANTAIN WITH DRIED HUSK

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ABSTRACT
The study aimed at evaluating the antioxidant and alpha amylase inhibitory potential of methanol extract of plantain flour with dried husk. Qualitative phytochemical screening, DPPH free radical scavenging activity, FRAP scavenging activity, alpha amylase inhibitory potential and the mode of inhibition of methanol extract of unripe plantain with dried husk were determined using standard methods. Tannins, cardiac glycosides, phenols, flavonoids, reducing sugar and alkaloids were present while saponin was absent. The DPPH IC 50 of the plantain with dried husk flour was comparable with the standard; ascorbic acid. The percentage inhibition of dried plantain flour with husk at 2.50 mg/mL and 10.0 mg/mL were greater than 50% (67% and 73%). Acarbose at 1.25 mg/mL, 2.50 mg/mL and 10 mg/mL had a percentage inhibition of 61%, 67% and 70% respectively. The Vmax for unripe plantain with dried husk extract (inhibitor) was 1.25 while that of the no inhibitor was also 1.25. The Km for the inhibitor was 1.43, while that of the no- inhibitor is 0.77. The findings of this study concluded that the methanol extract of unripe plantain with husk has high antioxidant ccapacity, owing to the presence of phenols and flavonoids. It also inhibits alpha amylase in a competitive way. It therefore can be used in the treatment of type II diabetes.

EPH 006

BIOCHEMICAL STUDIES OF THE IMPACT OF COULA EDULIS NUT ETHANOL EXTRACT ON SOME MALE REPRODUCTIVE FUNCTION IN OBESE WISTAR RATS

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ABSTRACT
This study evaluated the biochemical studies of the impact of Coula edulis (C.E) nut ethanol extract on some male reproductive function in obese Wistar rats. Fifty-four Wistar rats weighing

between 150 - 170g body weight were divided into 9 groups of 6 rat each as follows: Normal Control, Obese Control group received high fat diet (HFD) for 9 weeks, HFD + orlistat group was fed high-fat diet for 9 weeks + 30mg/kg orlistat from week 5-9, C.E + HFD (1000mg/kg) -HFD for 9 weeks + treatment with 1000mg/kg of C.E from week 5-9, C.E + HFD (2000mg/kg) – HFD for 9 weeks + treatment with 2000mg/kg of C.E from week 5-9, HFD + normal diet (ND) control-HFD for 4 weeks + ND from week 5-9, HFD + ND + Orlistat - HFD for 4 weeks + ND alongside treatment with 30mg/kg orlistat from week 5-9, C.E + ND (1000mg/kg)- HFD for 4 weeks + ND alongside treatment with 1000mg/kg of C.E from week 5-9 and C.E + ND (2000mg/kg) - HFD for 4weeks + ND alongside treatment with 2000mg/kg of C.E from week 5-9. At the end of 9 weeks the animals were sacrificed using ketamine anaesthesia. Testes were harvested and preserved for subsequent biochemical analyses. Results indicated that the administration of C.edulis extract significantly decreased GSH, GPx and MDA levels in the testes at (p< 0.05) as well as increased levels of FSH, LH and testosterone. In conclusion, C.edulis significantly improved HFD-induced alterations in testicular function.

Keywords: Coula edulis, biochemical indices and obese Wistar rats

EPH 007

A COMPARATIVE STUDY OF THE EFFECTS OF AQUEOUS EXTRACTS OF TAMARINDUS INDICA FRUIT PULP AND ZINGIBER OFFICINALE RHIZOMES ON CCL_4 –INDUCED OXIDATIVE STRESS IN RATS.

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ABSTRACT
Tamarind tree is a multipurpose tree of which almost every part finds at least some use, either nutritional or medicinal. Due to its pleasant acidic taste and rich aroma, the pulp is widely used for domestic and industrial purpose. Ginger is known to ease oxidative stress due to stimulation of superoxide dismutase, catalase, glutathione peroxidase and reduced glutathione activities. They are believed to protect against cancer, artherosclerosis, heart diseases and several other diseases. A comparative study was carried out to evaluate the effect of Tamarind and Ginger extracts intake in CCl_4 induced oxidative stress wistar albino rats. The Proximate, antinutrient, and phytochemical of both ginger and tamarind extracts were analyzed using standard AOAC methods while mineral contents were determined using atomic absorption spectrometry. Oxidative stress markers were also analyzed using colorimetric assay kit. Serum oxidative stress markers were compared between the normal and test groups. Experimental rats were divided into seven groups:

Normal control group, negative control (CCl_4) group, standard drug (Vitamin C) group, tamarind low and high dose group, ginger low and high dose group. At the end of the experiment, significant increase in malondialdehyde level (18.52 ±1.69) and decrease in superoxide dismutase (2.77±0.69), catalase (3.840±4.36), reduced glutathione (14.06±3.03) and glutathione peroxidase (8.95±5.23) activities were recorded in CCl_4 exposed rats as compared to control group which had (10.57±4.36), (11.96±1.62), (12.20±4.23), (34.86±9.19) and (36.23±7.07) respectively. In the tamarind and ginger supplemented groups, the level of MDA along with the activities of SOD, CAT, GSH and GPx were comparable with the apparently healthy control rats ($p>0.05$). Thus, it appears that ginger and tamarind extracts ameliorate the effect of CCl_4-induced oxidative stress; suggesting that consumption of natural compounds with an antioxidant profile may be a preventive measure to those diseases associated with oxidative stress.

Keywords: Ginger extract, carbon tetrachloride, Oxidative stress, ameliorate, antioxidant

EPH 008

EFFECTS OF AQUEOUS EXTRACT OF MILLETTIA ABOENSIS LEAVES ON LIPID PROFILE AND LIVER MARKER ENZYMES OF MALE WISTAR ALBINO RATS

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ABSTRACT

This study investigated effects of aqueous extract of *Millettia aboensis* leaves on liver marker enzymes activities and lipid profile of male Wistar albino rats. Phytochemicals analyses of the aqueous extract of *M. aboensis* leaves were carried out using standard analytical protocols. Effects of aqueous extract of *M. aboensis* leaves on liver marker enzymes activities and lipid profile were determined with 18 male Wistar albino rats. The rats were divided into 3 groups of 6 rats each. Group 1 served as normal control that received normal saline only while groups 2 and 3 received 100 and 1000 mg/kg b. wt. of the extract respectively for 28 days.The results of phytochemical analyses showed reducing sugars, tannins, and flavonoids in high concentrations.Alkaloids, glycoside and steroids were found in moderate concentrations while terpenoids were not detected. Non-significant differences (p > 0.05) were observed in total cholesterol, LDL, HDL and TAG concentrations in all the extract treated groups when compared with the normal control. Significant increase (p < 0.05) in AST and ALT activities in groups 2 and 3 rats were observed

when compared with the normal control. The findings of this study suggest that the extract is rich in pharmacologically important phytochemicals and has positive effects on lipid profile that could play vital role in the prevention of hypercholesterolemia, arteriosclerosis and their associated health effects. The extract could be hepatotoxic, thus should be consumed with caution.

Keywords: *Millettia aboensis*, phytochemicals, liver marker enzymes, acute toxicity, lipid profile.

EPH 009

PREVENTIVE EFFECT OF GARDEN EGG LEAVE EXTRACT ON SOME SERUM BIOCHEMISTRY CHANGES OF WISTAR RAT INDUCED WITH COPPER TOXICITY

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ABSTRACT
The study investigated the preventive effect of methanolic leaves extract Solanum incanum in cupper induced serum biochemistry changes. Animals were divided into four groups: A Control (maintained on food and water only), B treated with 300 mg/kg S. incanum leaves extract, C treated with 200 mg/kg CuO , and D treated with 300 mg/kg leaves extract and then 200 mg/kg CuO. Serum electrolytes (sodium, potassium, chloride, bicarbonate) and kidney functional test (urea, creatinine, and erythropoietin) were evaluated using enzyme-linked immunosorbent assay (ELISA). The result of electrolytes assays showed significant decrease (P<0.05) with sodium, chloride, and bicarbonate concentration between the control groups 137.00 ± 4, 100.00 ± 3.46, 9.33 ± 3.18 compared with the group exposed to CuO only 93152.00 ± 1.00, 110.00 ± 2.04, 21.33 ± 0.88 (mmoL/L). The kidney function test show no significantly difference between the control group and group treated with S. incanum methanol extract and then CuO. Because of the presence of significant protective effect of electrolyte and as well kidney function, S. incanum is a potential source of remedy against CuO poisoning.

Keywords: Cupper ii Oxide, Electrolytes, kidney function and Solanum incanum, serum biochemistry changes

EPH 010

PREVENTIVE EFFECTS OF CANNABIS 80% LEAVE EXTRACT ON THE SERUM BIOCHEMICAL PARAMETERS OF WISTAR RATS INDUCED WITH COPPER TOXICITY.

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ABSTRACT
The aim of this investigation was to study the protective effect of cannabis 80% leave extract on hematological parameters of Wistar rats induced with copper toxicity. Twenty (20) rats were randomly divided into four groups of five rats each. Group A (negative control) received water only for 15 days, Group B received copper at 200 mg/kg for five days, Group C received cannabis 80% leave extract at 300 mg/kg for ten days copper and then exposed to 200 mg/kg for five days and Group D received cannabis at 300mg/kg only for ten days. All the rats were sacrificed on day sixteen and blood was collected through cardiac puncture and analyzed. Results shows decrease in PVC, RBC, and WBC in a group treated with only copper. Leucopenia, lymphopenia, monocytopenia, and eosinopenia were also observed. However, there was an increase in MCHC, MCH, and MCV. In conclusion, copper caused changes in hematological parameters that lead to anaemia, and cannabis 80% leave extract relative increase in hematological parameters which was not significant enough to reverse the effect. However, cannabis only was able to cause polycythemia.

Keywords: Cannabis, cupper ii Oxide, heart, hematology and Wistar rat

EPH 011

COMPARATIVE ANALYSIS OF ANTI-PROLIFERATIVE EFFECT OF ZINGIBER OFFICINALE (GINGER) AND SOLANUM LYCOPERSICUM (TOMATOES) ON TESTOSTERONE INDUCED BENIGN PROSTATIC HYPERPLASIA IN MALE ALBINO WISTAR RATS.

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ABSTRACT
Benign Prostatic Hyperplasia (BPH) is an enlargement of the prostate and tissues surrounding it. It is a debilitating condition that affects men mostly from their 50's. It has been thought to be as a result of normal condition of aging, hormonal changes or environmental influences. This inflammatory process can lead to uncontrolled passage of urine, incomplete urine flow, dribbling at the end of urine stream, haematuria, inability to ejaculate etc. The use of natural products that are easily accessible, safe and effective is proposed in this study. This can prevent untold

inflammation of the prostate and other structures around hence protecting the urinary outflow and reproductive function of the male folks. *Zingiber officinale* (Zo) is known to have anti-proliferative, anti-oxidant effect, anti-inflammatory effect on the prostate (Obisike *et al*., 2020). *Solanum lycopersicum* (Sl) a night-shade plant has also been said to have an anti- oxidant effect on the prostate (Edinger et al., 2015). **Keywords:** Benign Prostatic Hyperplasia, *Zingiber officinale* (Zo), Solanum lycopersicum (Sl), Dutasteride.

EPH 012

MODULATION OF IMMUNOLOGICAL RESPONSES BY AQUEOUS EXTRACT OF DATURA STRAMONIUM L. SEEDS ON CYCLOPHOSPHAMIDE-INDUCED IMMUNOSUPPRESSION IN WISTAR RATS

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ABSTRACT

Aim: The study investigated the immunomodulatory effects of aqueous seed extract of *Datura stramonium* L. (ASEDS) on Wistar rats Methodology: Thirty Wistar albino rats of both sexes (180 – 200 g) were randomised into sixgroups (n = 5). Groups 1, 2 and 3 served as normal, negative and standard controls respectively while groups 4 – 6 were the test groups. Group 1 received distilled water. Group 2 were untreated, while groups 3 – 6 received 5 mg/kg body weight (b.w) levamisole, 60, 90 and 120 mg/kg b.w ASEDS orally for 28 days respectively. Immunosuppression was inducedusing 10 mg/kg bw cyclophosphamide orally for 27 days. The effect of ASEDS on immune cells, immunoglobulins and antioxidant status of the rats were evaluated. Results: ASEDS indicated moderate contents of carbohydrates, glycosides, saponins, tannins, terpernoids and high contents of alkaloids, flavonoids and phenols. Cyclophosphamide triggered significant (p < 0.05) reduction in total leucocyte count and diffrentials, IgA, IgG, high density lipoprotein (HDL), catalase, superoxide dismutase, glutathione peroxidase, vitamins A, C and E levels of untreated rats. Treatment with ASEDS led to significant (p < 0.05) improvement in immune cell counts, immunoglobulin synthesis, HDL concentration, and

antioxidant status of rats in the test groups. Conclusion: The results of this study showed the immunomodulatory effect of ASEDS thereby indicating its potential in immunostimulatory of drug discovery.

Keywords: Medicinal plants; *Datura stramonium* L.; immune cells; immunoglobulins; levamisole; cyclophosphamide.

EPH 013

EFFECT OF THE LEAF EXTRACT OF WALTHERIA AMERICANA IN LPS - INDUCED NEUROINFLAMMATION IN THE STRIATUM, PREFRONTAL CORTEX AND HIPPOCAMPUS IN MALE WISTAR RATS

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ABSTRACT

Neurodegenerative disorders are linked with neuroinflammation in specific areas of the brain. *Waltheria americana* is a plant that is used in traditional medicine to relieve pain and inflammation. Most drugs used in managing neuroinflammation are expensive and associated with adverse effects thereby necessitating the need for safe, potent and affordable agents. This study, therefore, investigated the neuroprotective activities of methanol extract of *Waltheria americana* leaf (MEWA) in laboratory rodents. *W. americana* leaves were collected in the College of Agriculture in Kabba, Kogi State, and validated at the Forestry Research Institute of Nigeria's Herbarium in Ibadan (FHI:111064). The leaves were macerated in methanol and then concentrated. Neuroinflammation was intra-peritoneally induced with lipopolysaccharide (2 mg/kg) in 15 rats which were grouped (n=5) as follows: Group1 (MEWA 200 mg/kg), Group 2 (Quercetin 50 mg/kg), Group 3 received vehicle only (control 10 mL/kg) while another group (not induced) received vehicle only. The treatment was done for 30 days. Memory function was assessed using Y Maze Test (YMT). At the end of the experiment, the striatum, prefrontal cortex, and hippocampus were all sectioned. Spectrophotometry was used to determine the levels of acetylcholinesterase, glutathione, nitrite, and malondialdehyde. Neuronal morphology was evaluated using Nissl stains. Data were analysed using ANOVA at $\alpha_{0.05}$. The MEWA (200 mg/kg) significantly increased the percentage alternation (82.88±3.0 vs 54.26±4.85). The

MEWA (200 mg/kg) significantly increased the glutathione level (µmol/g tissue) in PFC (67.38±7.11) and hippocampus (105.40±4.80) compared to control PFC (39.75±8.30), hippocampus (55.54±2.0) and significantly decreased the malondialdehyde level (ηmol/g tissue), acetylcholinesterase activity (µmol/min/g tissue), in striatum (52.69±7.95, 7.96±0.31), PFC (57.94±3.81, 23.81±0.37), hippocampus (111.0±12.90, 68.01±0.73), compared to control striatum (83.51±3.85, 13.21±0.78), PFC (146.30±7.71, 32.27±1.49) and hippocampus (151.40±8.80, 73.85±1.40), respectively. The MEWA 200 mg/kg preserved neuronal morphology. *Waltheria americana* leaf extract attenuated neuroinflammatory activity in striatum, prefrontal cortex and hippocampus by decreasing the levels of free radicals, acetylcholinesterase and preventing neuronal damage in laboratory rodents.
Keywords: *Waltheria americana*, Neuroinflammation, oxidative stress, acetylcholinesteras

EPH 014

COMPARATIVE WOUND HEALING POTENTIAL OF MITRACARPUS HIRTUS OINTMENT AND HONEY IN DIABETIC ALBINO RATS BY COLLAGEN ASSESSMENT

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ABSTRACT
Comparative wound healing potential of *Mitracarpus hirtus* ointment and honey in diabetic albino rats by collagen assessment. All human beings experience some type of wounds in every lifetime. Most wounds heal quickly with little or no attention, but many people suffer from complex and/or persistent wounds, therefore posing a burden. This study was designed to assess the efficacy of *Mitracarpus hirtus* (L.) DC ointment against honey in diabetic rats. To achieve this, percentage wound closure and collagen assessments were used to express treatment efficacy. Results show that on day 21, the albino rats treated with *M. hirtus* ointment had the highest percentage closure (94.5%) while honey treated and non-treated recorded 90.0% and 83.3% respectively. Similarly, a significant difference ($p < 0.05$) was observed on day 21 in the total collagen deposited in wounds of diabetic rats (10.57 ± 0.7) and *M. hirtus* ointment treated wounds (11.77 ± 0.4) as compared with the non-treated diabetic rats. *M. hirtus* ointment was efficacious in healing wounds in diabetic rats and heals wound faster than honey and may hold potential for wound healing in diabetes mellitus sufferers. However, the wound healing mechanism of this ointment needs further investigation.

Keywords: Collagen, diabetic rats, honey, *Mitracarpus hirtus*, ointment, wound healing

EPH 015

ANTIDIABETIC POTENTIAL OF WATERMELON SEEDS (CITRULLUS LANATUS) ON ALLOXAN-INDUCED DIABETIC MICE

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ABSTRACT

The current study was aimed at investigating the antidiabetic effect of watermelon seed extracts of Citrullus lanatus in alloxan-induced diabetic mice. Twenty mice were used for this study. They were grouped into five groups of four mice each. Group 1 served as the normal control, while group 2,3,4 and 5 were induced with alloxan. Group 2 was left untreated while group 3 was treated with glibenclamide. Group 4 and 5 were treated with 500mg/kg and 1000mg/kg body weight (b.w) of extract respectively. The fasting blood glucose concentration and serum lipid profile of the rats were measured by enzyme hydrolysis methods. Hyperglycemic mice treated with different doses of the extract showed evidence of reduced blood glucose compared with the untreated group. The result obtained after 4th dose of treatment with the extract showed a significantly higher serum level of glucose in diabetic control mice ($p < 0.05$) when compared with the normal control mice. Of the two groups orally administered with different doses of the extract, there was no significant difference between the drug-treated group and the group that received the higher dose of the extract. Findings of this research showed that *Citrullus lanatus* seed extract increased High Density Lipoprotein (HDL)level, while Triglycerides (TG),Low density Lipoprotein (LDL) and Very Low Density Lipoprotein (VLDL) remained significantly high in the diabetic untreated groups. The findings of this study indicated that the seed extracts exerted its antidiabetic effect by lowering blood glucose in alloxan-induced diabetic mice. The study has established the basis for the use of the plant locally in the management of diabetes.

Keywords: Antidiabetic, Alloxan, *Citrullus lanatus*.

EPH 016

IN VITRO ANTIOXIDANT EFFECTS OF ADANSONIA DIGITATA SEED EXTRACT IN 2, 2- AZOBIS (2-AMIDINOPROPANE) DIHYDROCHLORIDE (AAPH) INDUCED OXIDATIVE STRESSED RED BLOOD CELLS

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ABSTRACT

Adansonia digitata L. (Mal Fluted Pumpkin Seeds Extract Improves Testicular Morphometry And Johnsen's

Spermatogenesis Index in Caffeine Treated Ratsvaceae, Baobab) is used traditionally for the treatment of a wide range of diseases. The leaves, stem bark, fruit pulp, and roots have been extensively studied. However, the seeds are less studied. A. digitata seeds are used in the preparation of condiments and are eaten as snacks. The aim of the present study is to determine the in vitro antioxidant effects of aqueous seed extract of *A. digitata* using 2,2-azobis(2-amidinopropane) dihydrochloride (AAPH) induced oxidative stressed red blood cells (RBCs) model. The total tannins content (TTC) of *A. digitata* seed was 698.33±272.93 mg QE/g while the total phenolics content (TPC) was 0.37±0.23 mg GAE/g. The antioxidant activities of A. digitata seed indicated that the extract possesses lower hydroxyl radical scavenging activities at higher concentrations (500 mg/mL) compared with vitamin C. More so, the seed extract did not protect RBCs in AAPH induced oxidative stressed red blood cells, expressing no significant differences (p>0.05) in catalase (CAT) activities and malondialdehyde (MDA) concentrations at 1.5 and 2.5 mg/mL after 40 minutes of incubation. However, a significant increase (p<0.05) was observed in total protein content at 1.5 – 2.5 mg/mL compared with vitamin C and superoxide dismutase (SOD) activities at 2.5 mg/mL after 40 minutes incubation. The study concludes that *A. digitata* seed extract did not protect cells against AAPH induced oxidative stress in vitro, at the concentrations and duration evaluated. However, contains appreciable content of TTC and TPC, which could be further assessed for their antioxidant benefits.

Keywords: Adansonia digitata; Seed; Oxidative stress; RBC; In vitro; Tannin; Phenolic

EPH 017

ANTIOXIDANT EVALUATION OF FRACTIONS OF ETHANOL EXTRACT OF ZIZIPHUS MAURITIANA LEAVES

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ABSTRACT

This research work was aimed at investigating the antioxidant potential of fractions of ethanol leaf extract of *Ziziphus mauritiana* plant and also identifying the antioxidant component(s) of the plant. Extraction of crude ethanol extract were carried-out using soxhlet extractor while the fractions were obtained using preparative thin layer chromatography. Invitro antioxidant potentials were evaluated using 1,1-diphenyl-2-picrylhydrazyl radical scavenging assay (DPPH)

and Ferric Reducing Antioxidant Power (FRAP) assay while the phytochemicals in each fraction were identified with Liquid chromatographic mass spectrophotometer (LCMS) equipment. The result obtained showed various yields of the fractions as follows; 0.2365g (fraction 1), 0.0212g (fraction 2), 0.0431g (fraction 3) and 0.0186g (fraction 4). Fraction II shows the lowest IC 50 (64.6986 µg/ml) while the highest IC 50 was fraction I (108.5600 µg/ml) also fraction II exhibits highest activities in FRAP assay and fraction I was the lowest. Various phytoconstituents were also identified in respective fractions and they are largely flavonoids such as Cyanidin 3-(6'-acetoyl) glucoside, Apigenin and Feruloylquinic acid (Fraction I), Hedysarimcoumestan E and F, Hedysarimcoumestan G and H, (Fraction II) Bevachalcone , Ananaflavoside C (Fraction III), Pelargonidin Chloride, Eriodictyol-7-o-glucoside (Fraction IV). Fractions of ethanol extract of *Ziziphus mauritiana* posseses antioxidant potential and may explain the ameliorating bioactivities in antidiabetic and anti-inflammatory conditions reported by other researchers.

Keywords: Bevachalcone, Ananaflavoside C, DPPH, LCMS

EPH 018

ANTIBACTERIAL EFFICACY OF ADAMSONIA DIGITATA STEM BARK CRUDE EXTRACTS AGAINST STAPHYLOCOCCUS AUREUS AND SHIGELLA DYSENTERIAE

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ABSTRACT
This research was conducted to determine the antibacterial efficacy of *Adamsonia digitata* crude stem bark extracts against *Staphylococcus aureus* and *Shigella dysenteriae*. Disc diffusion method was used to determine the antibacterial activity of the ethanol and aqueous crude extracts of *Adamsonia digitata* stem bark against *Staphylococcus aureus* and *Shigella dysenteriae*. The crude extracts were effective with all the concentrations (10, 30, 50 and 70 mg/ml) used on the test bacteria. The ethanol crude extract shows high antibacterial efficacy of 6.0, 12.0, 16,0, 16.0mm and 10.0, 16.0, 16.0 and 16.0mm with all the concentrations used against *Staphylococcus aureus* and *Shigella dysenteriae* respectively while the aqueous crude extract shows activity of 6.0, 12.0, 16,0, 20.0mm and 12.0, 16.0, 16.0 and 16.0mm with all the concentrations used against *Staphylococcus aureus* and *Shigella dysenteriae.* Ciprofloxacin antibiotic was used as positive control which indicates activity of 18.0 and 20.0 against *Staphylococcus aureus* and *Shigella dysenteriae*. The minimum inhibitory concentration (MIC) and the minimum bactericidal study of ethanol and aqueous stem bark crude extracts of Adamsonia digitata against Staphylococcus aureus and Shigella dysenteriae indicates that the plant part used is potent against the test bacteria

under study. The phytochhemical screening of the stem bark crude extracts of the plant showed the present of alkanoids, saponins, tannins, flavonoids, terpeniods, glycoside and Anthraquinose. This is a pointer of the possible used of *Adansonia digitata* crude stem bark extracts as remedy for the treatment of infections or disorders cause by these microbes under study.

Keywords: Adansonia digitata, antibacterial, efficacy, *Staphylococcus aureus, Shigella dysenteriae*, diffusion, determine.

EPH 019

EFFECT OF ALCHORNEA CORDIFILIA LEAF EXTRACT ON CARBON TETRACHLORIDE-INDUCED LIVER DAMAGE ON WISTAR RAT

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ABSTRACT

The effects of *Alchornea cordifolia* leaf extracts on Carbon tetrachloride (CCl 4)-induced liver damage of Wistar rats were investigated. Twenty albino rats weighing 100 – 250g of about four months old were used in the study. Rats were grouped into five groups, each group containing four rats per group. Group 1 served as normal control. The remaining 16 rats were administered orally with CCl4 mixed with olive oil as carrier solvent in a ratio of 1:1 at a dose of 1500mg/kg and were grouped into group II: CCl4 – induced without treatment, while group III, IV and V were treated with Alchornea cordifolia extract at concentration of 100mg/kg, 150mg/kg, and 200mg/kg daily based on their body weight for two weeks. At the end of treatment, animals from each group were sacrificed and liver and blood samples were collected. Blood was collected via cardiac puncture and was collected into anticoagulant (lithium heparin) bottle. Both blood and liver were taken for histological investigation. The liver enzymes, Aspartate transaminase (AST), Alanine transaminase (ALT), and Creatinine, Urea and Glucose were increased after the administration of CCl4. Treatment with *Alchornea cordifolia* leaf extract reveals a dose dependent significant reduction (p<0.05). The result of this study suggests that the extract of *Alchornea cordifolia* can be used in ameliorating raised ALT,AST, urea, glucose and creatinine in CCl4 – induced liver damage in albino wistar rat.

EPH 020

EFFECT OF AQUEOUS EXTRACT OF MORINGA OLEFERA LEAVES ON SOME SERUM ENZYMES OF WISTAR RATS WITH CARBON TETRACHLORIDE-INDUCED LIVER DAMAGE

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ABSTRACT
The study was aimed at evaluating the hepatoprotective effect of *Moringa oleifera* leaf extract against liver damage induced by carbon tetrachloride (CCl4). Twenty five (25) Wistar albino rat were used. They were administered orally with CCl 4 in a ratio of 1:1 at a dose of 1500mg/kg and allowed for five days before treated with Moringa oleifera leaf extract at concentrations of 50mg/kg, 100mg/kg, and 150mg/kg daily for one week. Alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatese (ALP), gammaglutamyltransferase (GGT), and total protein (TP) in the blood cells were determined. The study lasted for 18 days. The liver enzyme, ALT, and TP were increased after injection with CCl4. Treatment with *Moringa Oleifera* leave at various dose reveals a significant reduction (p<0.05). AST was increased after treatment with CCl4. Treatment with *Moringa oleifera* leaf reveals a dose-dependent significant reduction (p0.05). No significant reduction occurred at ALP in comparison to only CCl4 -treated group, but in comparison with the normal control, the result of this study shows that aqueous *Moringa oleifera* leaf extract may have hepatoprotective action against CCl4 -induced liver damage.

EPH 021

EFFECT OF AQEOUS EXTRACT OF MORINGA STEM BARK ON SOME BIOCHEMICAL PARAMETERS OF PARACETAMOL-INDUCED LIVER INJURY IN WISTAR RATS

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ABSTRACT
The effect of aqueous extract of *Moringa oleifera* stems bark on some biochemical paremeters of paracetamol-induced liver injury in wistar rats was investigated. The animals were fed ad libitum. The animals were divided into five group: positive control, negative control, paracetamol + 100mg/kg, paracetamol + 1500mg/kg and paracetamol + 200mg/kg Moringa stem bark. Blood was collected through cardiae puncture, and biochemical indices assay (Glucose, AST, ALT,

Urea, and Creatinine) were carried out using automated chemical analyzer. The study revealed that the serum parameters (Glucose AST,ALT, urea, and creatinine) in the positive control were; 3.98+ 0.50,8.00+ 0.30 and 74.25+7.22 respectively. Paracetamol-induced group gave the following results: 7.08+0.22, 51.50+3.42, 47.00+3.83, 8.65+0.60, and 162.25+5.32 respectively. The results for 100mg/kg *Moringa oleifera* stem bark extract were: 7.03,+0.24,39.25,+4.99,38.50+2.65,+0.60, and 155.75+4.35 respectively. The result for 1500 mg/kg *Moringa oleifera* stem bark extract were: 7.08+0.78, 33.5+1.73, 34.00+3.27, 7.65+0.31, and 142.50+4.51 respectively. For 2000mg/kg *Moringa oleifera* stem bark extract, the values were: 713+0.52, 29.75+0.96, 25.75+1.71, 7.08+0.25, and 137.50+3.11 respectively. It was observed that aqueous extract of the plant stem bark provided an ameliorating effect to paracetamol toxicity; hence, it could be used for the management of paracetamol induced hepatotoxicity in rat.

EPH 022

EFFECTS OF AQUEOUS EXTRACT OF GUIERA SENEGALENSIS LEAVES ON (PCV, HB AND ALT) OF TRYPANOSOMA BRUCEI BRUCEI INFECTED ALBINO RATS

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ABSTRACT

This study was carried out to investigate the effects of aqueous extract of *Guiera senegalensis* leaf on *Tryponosome brucei brucei* infected albino rats. A total of forty-nine Swiss Wistar rats were used in the experiment. The rats were divided into seven groups (A-G) of seven rats each. Group A-D were infected and treated with graded dose of the extract at 100mg, 200mg and 400mg respectively while group D was treated with a single dose of Berenil® at 3.5mg/kg. Group E was administered 400mg of the extract only; Group F was infected and untreated and finally Group G was uninfected control. Following inoculation of the treatment group, parasitaemia was detected on day 4 post infection. This led to a decrease in the Packed Cell Volume (PCV), (extract 100mg 40.5±0.71, extract 200mg 41.0±1.41 and extract 400mg 42.5±0.71) and Haemoglobin (Hb) concentration (extract 100mg 12.85±0.21, extract 200mg 12.95±0.1 and extract 400mg 13.1±0.14) and an increase in the levels of Alanine amino transferase (ALT) (extract 100mg 56.5±0.71, extract 200mg 53.5±0.71 and extract 400mg 52.0±1.41). The packed cell volume (extract 100mg 41.55±0.71, extract 200mg 42.55±0.71 and extract 400mg 42.75±0.95) and Hb concentration (extract 100mg 12.18±0.21, extract 200mg 11.25±0.35 and extract 400mg 11.5±0.42) markedly improved by day 8 post infection to a significant level ($p< 0.05$) with the administration of the extract in a graded dose manner suggesting that the extract had an effect in the reduction of parasitaemia. Alanine amino transferase (ALT) in a similar vein, markedly

decreased on administration of the extract in a dose dependent manner (extract 100mg 46.75±0.35, extract 200mg 24.0±1.41 and extract 400mg 27.75±0.35) compared with the infected untreated group. The result confirms the probable folkloric application of the extract in the treatment of Trypanosomosis in animals. Further investigation is however needed to optimize the effectiveness of the extract.

Keywords: Guiera Senegalensis, PCV, Hb, ALT, Trypanosoma brucei brucei.

EPH 023

ANTIOXIDANT POTENTIAL OF MONODORA MYRISTICA SEEDS (AFRICAN NUTMEG)

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ABSTRACT
Antioxidant potential of *Monodora myristica* seeds (African nutmeg) was evaluated. *Monodora myristica* extract was obtained through using cold merceration extraction using ethanol. The aim of the research is to evaluate the antioxidant potential of *Monodora myristica* seed. The parameters determined were Total phenolic content, total flavonoid content, hydrogen peroxide, and DPPH radical scavenging activity and FRAP radical scavenging activity using standard methods. The result obtained were: Total flavonoid content; 3.60mg, total phenolic content; 6.10mg, DPPH; 40.83%, FRAP; 34.10% and hydrogen peroxide; 74.82%. The results obtained were relatively high in both total flavonoid and the total phenolic content in the present study which indicates the significance of the inclusion of this plant in our meals.

Keywords: Antioxidant, Radical Scavenging Activity, African Nutmeg, DPPH, FRAP

EPH 024

HAEMATINIC AND IMMUNOMODULATORY EFFECT OF LEAF EXTRACT OF GONGRONEMA LATIFOLIUM FOLLOWING THE ONSLAUGHT OF MUCOSA ULCERATION IN WISTAR RATS

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ABSTRACT
Helicobacter pylori (H. pylori) infection is a global public health problem; a higher burden of the infection was reported in developing countries including Nigeria. It has been associated with several gastrointestinal diseases, and recently implicated in some haematological abnormalities.This research was carried out to determine the effect of ethanol extract of *Gongronema latifolium* on haematological parameters of ulcerated Wistar rats. Thirty (30) healthy Wistar rats of weight ranging from (180-200) g were used for this study. The rats were divided into six groups. Group A served as the control, Group B, was administered with 100mg/kg body weight of extract of *Gongronema latifolium,* Group C was administered 200mg/kg body weight of extract of *Gongronema latifolium*. The extracts were administered orally through intubation method for 14 days. After 14 days of administration the rats were fasted for 12 hours, sacrificed and blood collected through cardiac puncture. Blood samples collected in the EDTA bottles were analyzed for haematological parameters using a haematology analyzer (Sysmex, Kobe, Japan) following the manufacturerers instructions. The extract showed a significant increase in ($p<0.05$) in LYM, RBC, PLT, PCT, MXD, Hb, of the ulcerated rats when compared with the normal and standard control. However, the extracts of G. latifolium showed a significant decrease in ($p>0.05$) in WBC and HCT when compared with the normal control. This present study the suggests that the extract of *Gongronema latifolium* following the onslaught of mucosa might fight against foreign infection possibly by phagocytosis or by generating antibodies that might enhance immune response possibly by imunomodulatory or suppressant or adjuvant action or by generating antibodies that might enhance immune response and might be a panacea to anaemic condition following mucosa ulceration.

Keywords: Adjuvant, anaemia, immunomodulators, immunosuppressant, mucosa onslaught,

EPH 025

ANTIDIABETIC AND ANTIOXIDANT EFFECTS OF FIXED-DOSE RECIPE OF AQUEOUS SEEDS EXTRACTS OF ACACIA NILOTICA AND LEAVES OF BAUHINIA RUFESCENS IN STREPTOZOCTOCIN-INDUCED DIABETIC RATS

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ABSTRACT
Diabetes is a chronic metabolic disorder characterized by high blood glucose levels. Use of conventional drugs in diabetes management is expensive, thus, unaffordable to most patients.

Furthermore, most of these conventional drugs are associated with undesirable side effects. Incorporation of herbal medicine into conventional healthcare system may significantly improve the overall management of diabetes. The diabetic potential of the extracts was studied by screening the hypoglycaemic activities of the aqueous extracts of the individual plants and their recipe in experimental rats by oral administration of different doses of the extracts to normoglycaemic and streptozoctocin-induced diabetic rats and monitoring the effects on blood glucose over a period of 3 hours. Different doses of the extracts were also administered to diabetic rats for a period of 28 days to evaluate the long-term safety and antidiabetic potentials of the extracts. The antioxidant study included an *in-vitro* DPPH scavenging activity of the extracts and *in-vivo* effects of the extracts on catalase and lipid peroxidation activities. Phytochemical screening of the extracts revealed the presence of alkaloids, glycosides, saponins, flavonoids and carbohydrates in the extracts and the recipe. Screening for hypoglycaemic study in the normoglycaemic rats showed *Acacia nilotica* producing a maximum fasting blood reduction of 14.4%,*Bauhinia rufescens* 26.1% and 35.2% for the recipe. The percentage reductions in sreptozoctocin-diabetic rats were respectively 14.4%,13% and 35.2% for *Acacia nilotica*, *Bauhinia rufescens* and the recipe. In the long-term anti diabetic study, the recipe produced the maximum percentage reduction of 48% after the 28days experimental period. This percentage reduction was higher than 31% reduction observed with the rats administered the standard drug glibenclamide. The 28 days of administration of the extracts did not significantly alter the catalase and lipid peroxidation of the experimental rats. ALAT, ASAT and ALP were also not affected by the extracts administration. It is thus concluded that the recipe comprising *Acacia nilotica* and *Bauhinia rufescence* has more anti diabetic potential than the individual plants and warrants further investigation for possible use as a drug candidate to manage Type 2 diabetes mellitus.

Keywords: Diabetes mellitus, Antioxidants, Phytochemistry, Hypoglycaemic.

EPH 026

PHYTOCHEMICAL CONSTITUENTS, ACUTE TOXICITY AND ANALGESIC ACTIVITY OF DICHROSTACHYS CINEREA LEAVES METHANOL EXTRACT

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ABSTRACT

Although steroidal and non-steroidal anti-inflammatory drugs are currently used in the treatment of pain and inflammation, however, the use of such drugs is associated with certain adverse effects. Consequently, it is necessary to discover new, effective and safe drugs for the treatment of pain and inflammation. The aim of the present study was to investigate the analgesic activities of

Dichrostachys cinerea leaves methanol extract. Phytochemical screening was done using standard procedures, the acute toxicity of was evaluated using OECD guideline 423 while the analgesic activity was done using acetic acid induced writhing and hot plate induced models. The results of the acute toxicity study of *Dichrostachys cinerea* leaves methanol extract (DCME) revealed that the extract was not toxic up to 3000 mg/kg, thus, the tested extract was found to be within the safe margin. The result of acetic acid induced writhing shows a dose dependent significant reduction in the number of writhes compare to the negative control group. Also, For the hot plate, the extract produced a significant ($p<0.01$) increase in latency time at a higher dose of 400 mg/kg at the 90th and 120th minute compare to the control group. Also, Diclofenac (100mg/kg) produced a significant ($p<0.01$) increase in latency time from the 30th to the 120th minute. These activities may be due to the strong occurrence of phytochemical compounds such as alkaloids, flavonoids, tannins, glycosides, phenols, etc. This study justifies the traditional use of *D. cinerea* leaves in the treatment of pain and inflammation.

Keywords: Analgesic, phytochemicals, acute toxicity, *Dichrostachys cinerea,* diclofenac.

EPH 027

EFFECT OF METHANOL LEAVES EXTRACT OF CHANCA PIEDRA (PHYLLANTHUS NIRURI LINN.) ON CARBON TETRACHLORIDE-INDUCED HEPATOTOXICITY IN WISTAR STRAIN RATS

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ABSTRACT
This research aims to investigate the effect of methanol leaves extract of Chanca piedra (*Phyllanthus niruri* Linn.) on CCl_4-induced liver damage in Wistar strain rats. The sample was collected from Maiduguri, Borno State, Nigeria. Phytochemical analysis, acute toxicity studies and evaluation of the liver marker enzymes were all conducted on the extract using standard laboratory techniques. The quantitative phytochemical analysis showed that the extract contained alkaloids, tannins, flavonoids, cyanogenic glycosides and phenols at 13.60±0.06 (%), 1917.3±23.36 mg/100g, 0.5400±0.00 mg quo/g, 3242.0±0.58 mg/100g and 1.520±0.06 mgGAE/ml, respectively. The acute toxicity study showed that no mortality was recorded at various doses of the methanol leaf extract up to a maximum dose of 5000 mg/kg body weight of rats. A significant increase in aspartate aminotranferase (AST), 83.17±3.87 IU/L, alanine aminotransferase (ALT), 67.67±9.15IU/L and alkaline phosphatase (ALP), 79.83±9.17IU/L

activities were observed upon treatment with carbon tetrachloride (CCl_4) compared to rats in normal control group, which indicates liver injury. However, treatment with various doses of 100, 200 and 400 mg/kg body weight of the methanol leaf extract of Chanca piedra (*Phyllanthus niruri* Linn.*)* caused a significant decreased in aspartate transaminase (AST) 33.17±5.36 IU/L, alanine transaminase (ALT) 42.17±3.81 IU/L and alkaline phosphatase (ALP) activity69.30±7.60IU/L, respectively as compared to rats in positive control groups (34.33±10.12, 39.00±0.00, 64.87±6.41 IU/L, respectively). Furthermore, a significant difference ($p<0.05$) existed among the groups. As a result, the methanol leaves extract of Chanca piedra (*Phyllanthus niruri* Linn.*)* demonstrated ameliorating effect of liver damage caused by carbon tetrachloride (CCl_4).

Keywords: Chanca piedra (*Phyllanthus niruri* Linn.*)*, liver injury, CCl_4, acute toxicity.

EPH 028

AMELIORATIVE EFFECT OF JATROPHA CARCUS METHANOL SEED EXTRACT IN LOPERAMIDE-INDUCED CONSTIPATED RATS

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ABSTRACT

The laxative effect of methanolic seed extract of *Jatropha carcus* was evaluated in loperamide-induced constipated albino rats for the period of 7 days. Constipation was induced by oral administration of loperamide (3 mg/kg body weight). The constipated rats were orally treated daily either with 50, 100, 200 mg/kg body for 7 days while the normal control group received distilled water. The feeding characteristics, body weight, faecal properties and gastrointestinal transit ratio were monitored throughout the study period. The activities of liver and kidney function parameters were also determined in the serum of the animals. There was significant decrease ($p< 0.05$) in the number of faecal pellets of constipated rats when compared with the normal control while body weight increased. The loperamide significantly ($p<0.05$) reduced the feed intake and the fecal parameters. Administration of the extract at 100 and 200 mg/kg body weight to the constipated rats significantly ($p<0.05$) normalized their body weight gain, number of faecal pellets and gastrointestinal ratio when compared with the normal control. There were no significant ($p< 0.05$) change in serum levels of ALP, AST and total protein when compared with the control. The extract at 200 mg/kg body weight significantly ($p <0.05$) increased total protein when compared with control. There was no significant change in the kidney function parameters of all the administered groups when compared with normal control. The methanol seed extract of *J. carcus* possess laxative activity in loperamide induced constipated rats.

Keywords: *Jatropha carcus,* Constipation, Loperamide, Gastrointestinal transit ratio

EPH 029

ANTICANCER EFFECT OF HIBISCUS SABDARIFFA LEAVES IN OVARIAN CANCER

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ABSTRACT

Unsuccessful approach towards treating cancer triggers the frequent emergence of less response to treatment or therapeutic resistance. This has increased the interest of researchers towards exploring other alternative remedies including traditional herbs, to discover and develop anticancer drugs. Plant-based therapies are getting more popular for the management and treatment of diseases including cancers particularly in the developing countries not only due to their lower cost but also fewer side effects compared to conventional drugs. Traditional plant are known to possess various biological and pharmacological activities hence are regarded as promising pharmacological agents which are relatively non-toxic and so have no significant side effects. The main aim of this research was to investigate the anticancer effects of crude extracts of *Hibiscus sabdariffa.*The dried powdered was exhaustively extracted with ethanol, water, and methanol successively and the phenolic and antioxidant contents was estimated using phytochemical analysis at different concentrations of 100mg/L, 500mg/L and 1000mg/L. The cell cytotoxicity assay was determined using the extracts to which human ovarian adenocarcinoma cell lines OVCAR3 and OVCAR4 was treated at doses of 0.03125, 0.0625, 0.125, 0.25, 0.5 and 1.0 mg/ml for 72 h. Reactive oxygen species (ROS) was determined using H_2DCFDA assay, total NRF2 protein expression was determined using western blot. Phytochemical analysis revealed that the phenolic contents in all the extracts are proportional to the antioxidant capacity. Moreover, ethanol and methanol extracts increased the cytotoxicity towards both OVCAR3 and OVCAR4 by 90% and at doses of 1mg/ml. ROS analysis revealed both ethanol and methanolextracts induced ROS and treatment of cells with N-acetyl cysteine (NAC) reversed cytotoxicty and reduced the ROS induced by extracts at 1mg/ml in all the cell lines, proving an ROS dependent cell death in ethanol and methanol extracts treatments. The anticancer activity of these extracts could be attributed to possible presence of phytochemicalsin high concentration. Both ethanoland methanol extracts were found to inhibit NRF2 expression even at low concentration. The results suggest that ethanol and methanol extracts have a promising while water extract have a partial anticancer activity even at higher doses, but all the extracts are capable of increasing cytotoxicity in all the cell lines

Keywords: *Hibiscus sabdariffa*; extracts; cytotoxic activity; NRF2; ROS, NAC

EPH 030

NEURO-THERAPEUTIC EFFECT OF TAMARINDUS INDICA AQUEOUS FRUIT PULP EXTRACT ON THE NEURO-BEHAVIOURAL DEFICIT IN ALBINO RATS INDUCED WITH TRAUMATIC BRAIN INJURY

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ABSTRACT

Tamarindus indica pulp extract is an exogenous antioxidant that can be used to quench Reactive Oxygen Species (ROS) in neurodegeneration. Its antioxidant properties have been reported in some neurodegenerative conditions in rats. In this study, the neuro-therapeutic effects of tamarind fruit pulp extract in Traumatic Brain Injury (TBI)-induced rats was evaluated. Six groups of five rats each were used for this study. Group I, II, III, IV were induced with TBI and treated with tamarind fruit pulp extract at a dosage of 100, 200, 400, 800mg/kg respectively, orally. Group V was traumatized but not treated (TNT) and group VI was non-traumatized and non-treated rats. Treatment started 30 minutes after Traumatic brain injury (TBI) and lasted for 21 days. The fruit was extracted using water while the phytochemicals were quantified by HPLC. Neurological severity score and novel object discrimination tests were carried out. Histological appearance of the brain tissue was also evaluated. Tamarind fruit pulp extract improved Neurological and memory function in the treated groups compared to group V which did not show improvement. Histopathological result showed few lesions in the traumatized and treated group while in the TNT group, massive and diffused lesions were observed. This study has shown that *Tamarindus indica* fruit contains neuro-therapeutic substances which may benefit TBI patient by improving their neurological and memory function.

Keywords: *Tamarindus indica,* Reactive Oxygen Species (ROS), Traumatic Brain Injury (TBI), Histopathology.

EPH 031

PHYTOCHEMICAL AND GAS CHROMATOGRAPHY –MASS SPECTROMETRIC (GC-MS) ANALYSES OF CURCUMA LONGA (TURMERIC) FLAVONOID RICH EXTRACT

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ABSTRACT

The present study was undertaken to investigate the bioactive compounds of methanol *Curcuma longa* (turmeric) flavonoid rich extract. The GC-MS and phytochemical composition were determined using standard methods. The preliminary phytochemical analysis of methanol turmeric extract showed the presence of phenols, alkaloids, steroids, saponins and flavoniods. The result showed high concentrations of flavoniods (29.03 ± 0.26), alkaloids (24.93 ± 0.31), steroids (11.31 ± 0.34), tanins (1.35 ± 0.11), and saponins (0.44 ± 0.17) g/100 g. Flavonoid rich turmeric extracts contained 42 identified compounds. Hexadecanoic acid, ethyl oleate, 9-Octadecanoic acid, nonanoic acid, tetradecanoic acid, eicosanoic acid, butyl caprylate, tetradecane, glutaric acid, fumaric acid Linoelaidic acid, and pentadecane, are the most abundant compounds. While methanol turmeric extract contained 48 identified compounds with multiple occurrence of some compounds. 2,4-decadienal,(E, E) Trichloromethane, nonanal, tetradecane, naphthalene,1,6-dimethyl, hexadecane, dichloroacetic acid, acetic acid, oleic acid, 9-Octadecanoic acid, 5-eicosene,(E), cis-vaccenic acid, and palmtoleic acid are the most abundant compounds. The presence of these diverse bioactive constituents may be responsible for the medicinal properties of *Curcuma longa.*

Keywords: (GC-MS) Analyses, Bioactive compound, Methanol extract, Flavonoid rich extract, *Curcuma longa.*

EPH 032

QUANTITATIVE PHYTOCHEMICALS, MINERAL COMPOSITION AND ANTIBACTERIAL STUDIES OF AQUEOUS FRUIT EXTRACT OF MORINDA CITRIFOLIA (NONI)

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ABSTRACT

Morinda citrifolia Linn Rubiaceae known commercially as Noni grows widely throughout the Pacific and is one of the most significant sources of traditional medicines among Pacific island

societies. The Noni plant is used in combinations for herbal remedies. Antibiotics have remained the mainstay of clinical therapy of infectious diseases worldwide. Many clinical bacterial isolates including *Escherichia coli* and *Staphylococcus aureus* however are becoming increasingly resistant to most of these agents. The study is aimed at investigating the quantitative phytochemicals, mineral Composition and antibacterial studies of aqueous Fruit extract of *Morinda citrifolia* (Noni). The objectives of the present study was to determine the quantitative phytochemicals in aqueous fruit extracts of *Morinda citrifolia* (Noni), to determine the Mineral Composition of aqueous fruit extract *Morinda citrifolia* (Noni), to determine the Antibacterial activity aqueous fruit extract *Morinda citrifolia* (Noni) against *Escherichia coli* and *Staphylococcus aureus* and to determine the Minimal Inhibitory Concentration of aqueous fruit extract *Morinda citrifolia* (Noni) against *Escherichia coli* and *Staphylococcus aureus.* The quantitative phytochemical analysis of aqueous and methanol fruit extracts of *Morinda citrifolia* (Noni) revealed alkaloid content in the aqueous extract (5.55±0.01) expressed mg AE/100ml of the extracts. The flavonoid content was gotten as (3.35±0.13) for aqueous extract expressed as mg QE/100ml of extract. The tannin content in the aqueous fruit extract was gotten as (18.2 ± 0.10), expressed as mg GAE/100ml of extract. The saponin content in aqueous fruit extract was gotten as (6.70. ±0.11) expressed as mg DE/100ml of extract. The polyphenol content in the aqueous fruit extract was gotten as (32.1±0.06) expressed as mg GAE/100ml of extract. The mineral composition was determined by Atomic Absorption Spectroscopy. The results revealed manganese at 26.46±0.010ppm, potassium 6186.05± 0.001ppm, calcium 2321.08±0.001ppm, iron 292.30 ± 0.001ppm, copper 112.6 ± 0.100ppm and chromium 24.42 ± 0.001ppm. Agar well diffusion method and macro broth dilution method were employed in determining the zone of inhibition (ZI) and minimum inhibitory concentration (MIC) of the extracts respectively. Different concentrations of 25, 50, 75 and 100 mg/ml of the extracts were used for the antibacterial activity against the test organisms. The result revealed that the aqueous fruit extracts exhibited an antibacterial activity. The aqueous fruit extract gave the highest zone of inhibition of 14.0±0.0 mm for *E. coli* at 50mg/ml and 17.0±1.0 mm for *S. aureus* at 100 mg/ml. The MIC of the extract for *E. coli* is at 75mg/ml and that for *S. aureus* is at 25mg/ml. The aqueous fruit extracts of *Morinda citrifolia* (Noni) contains a considerable amount of Phytochemicals. *Morinda citrifolia* can be harnessed to produce broad-spectrum antibiotics and can be a potential source of new classes of antibiotics that could be useful for infectious diseases caused by the test organisms

Keywords: *Morinda citrifolia*, Phytochemicals, Mineral composition, Antibacterial activity

EPH 033

TOXICITY PROFILING, ANTIPYRETICS AND ANTIINFLAMMATORY EFFECT OF ZIZIPHUS MAURITIANA LAM. LEAF AND STEM BARK

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ABSTRACT

This project work aimed at screening for the presence of phytochemicals, acute toxicity, antipyretic and inflammatory effects of *Ziziphus mauritiana.* The extracts of the leaf and stem bark were screened for phytochemicals using standard procedures. Acute toxicity study using Lorke's method, antipyretic and anti-inflammatory effect was carried out in Wistar strain rats. The phytochemical studies of the methanol leaf and stem bark extracts of *Ziziphus mauritiana* revealed the presence of flavonoids, cardiac glycosides, tannins, steroids, saponins, alkaloids and anthraquinones. The *i.p* median lethal dose value for the methanol leaf and stem bark extracts found to be 3807.8mg/kg and 2154.06 mg/kg respectively. The antipyretic activity of the methanol leaf and stem bark extract of *Ziziphus mauritiana s*howed result that was dose dependent when extract doses of 200, 400 and 800 mg/kg was administered orally (39.56, 38.00 and 36.79^{o}C and 38.54, 37.51 and 36.00^{o}C respectively). Although, both the leaf and stem bark extracts had an effect in decreasing the rectal temperature of yeast-induced pyrexia, the methanol leaf extract was more effective at 500 mg/kg with highest percentage decrease in rectal temperature, compared to non-treated rats, and paracetamol (a standard synthetic drug). The leaf and stem bark extracts dose of 200, 400 and 800 mg/kg 40.10%, and 52.59%; 45.10% and 61.78%; 48.50% and 69.90% inhibitions respectively, all against 78.7% inhibition of the 60mg/kg aspirin (+ve control). Thus this provides scientific justification of the use of *Ziziphus mauritiana* in the treatment of fever and inflammation.

Keywords: *Ziziphus mauritiana*; Fever; Inflammation; Secondary Metabolites; Acute Toxicity;

EPH 034

ASSESSMENT OF ANTIPLASMODIAL ACTIVITY OF STERCULIA SETIGERA CRUDE LEAF EXTRACT ON PLASMODIUM BERGHEI

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ABSTRACT

The growing resistance of malaria parasite to currently available antimalaria drugs remains a critical problem in the global public health, and so, leads to search for novel effective drugs. *Sterculia setigera* belongs to the family sterculiaceae. It is a deciduous tree that often thrives well in hills, rocky, poor soils of north-guinea savannahs. The boiled leaves have been used in the treatment of malaria. The present study aims to evaluate the antiplasmodial potential of *S. setigera* leaf extract on *Plasmodium barghei* infected mice to establish a scientific evidence rationalizing its use in the management of malaria. The Phytochemical evaluation of the extract revealed the presence of flavonoids, tannins, steroids, and tritepenes while, cardiac glycosides and Anthraquiones were absent. The toxicity study was carried out according to Lorke, and a single oral dose of 5000mg/Kg was found not to be toxic after several observations. The rodent malaria parasite *P. berghei* was used to inoculate healthy Swiss albino mice weighing 15-35g. the crude extract in doses of 150mg/Kg, 300mg/Kg and 1200mg/Kg were administered to different group of mice, with chloroquine (10mg/Kg) and distilled water administered as positive and negative controls respectively. The parameters of body weight, packed cell volume and parasitemia were determined using Ranes' and Peters test. The results revealed significant increase in body weight and packed cell volume while a reduction in parasitemia in all treatment groups with a mean increase of body weight; 15.7±0.54, to 19.0±0.04, 13.6±0.68 to 22.0±0.64, and 22.0 ± 0.03 to 25.7±0.29 for packed cell volume; 55.0±0.63 to 59.3±0.6, 59.0±0.5 to 59.3±0.6, and 50.3±0.7 to 67.7±0.6 and for parasitemia reduction; 17±0.6 to 2.17±0.03, 21±0.4 to 2.18±0 and 19±0.5 to 0.8±0.12 for 150mg/Kg, 300mg/Kg and 1200mg/Kg respectively. Since the crude extract prevents loss of weight, increase packed cell volume and reduced parasitemia, this study suggests that the leaf extract of *S. setigera* possesses antiplasmodial activity against *P berghei* in dose dependent manner and could be the basis for its traditional usage for the treatment of malaria.

EPH 035

EFFECT OF METHANOL LEAVES EXTRACT OF CHANCA PIEDRA (PHYLLANTHUS NIRURI LINN.) ON CARBON TETRACHLORIDE-INDUCED HEPATOTOXICITY IN WISTAR STRAIN RATS

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ABSTRACT

This research aims to investigate the effect of methanol leaves extract of *Chanca piedra* (*Phyllanthus niruri* Linn.)on CCl_4-induced liver damage in Wistar strain rats. The sample was collected from Maiduguri, Borno State, Nigeria. Phytochemical analysis, acute toxicity studies and evaluation of the liver marker enzymes were all conducted on the extract using standard laboratory techniques. The quantitative phytochemical analysis showed that the extract contained alkaloids, tannins, flavanoids, cyanogenic glycosides and phenols at 13.60±0.06 (%), 1917.3±23.36 mg/100g, 0.5400±0.00 mg quo/g, 3242.0±0.58 mg/100g and 1.520±0.06mgGAE/ml, respectively. The acute toxicity study showed that no mortality was recorded at various doses of the methanol leaf extract up to a maximum dose of 5000 mg/kg body weight of rats. A significant increase in aspartate aminotranferase (AST), 83.17±3.87 IU/L, alanine aminotransferase (ALT), 67.67±9.15IU/L and alkaline phosphatase (ALP), 79.83±9.17IU/L activities were observed upon treatment with carbon tetrachloride (CCl_4) compared to rats in normal control group, which indicates liver injury. However, treatment with various doses of 100, 200 and 400 mg/kg body weight of themethanol leaf extract of *Chanca piedra* (*Phyllanthus niruri* Linn.) caused a significant decreased in aspartate transaminase (AST) 33.17±5.36 IU/L, alanine transaminase (ALT) 42.17±3.81 IU/L and alkaline phosphatase (ALP) activity69.30±7.60IU/L, respectively as compared to rats in positive control groups (34.33±10.12, 39.00±0.00, 64.87±6.41 IU/L, respectively). Furthermore, a significant difference ($p<0.05$) existed among the groups. As a result, the methanol leaves extract of *Chanca piedra* (*Phyllanthus niruri* Linn.) demonstrated ameliorating effect of liver damage caused by carbon tetrachloride (CCl_4).

Keywords: Chanca piedra (*Phyllanthus niruri* Linn.), liver injury, CCl_4, acute toxicity.

EPH 036

PHYTOMEDICINE APPROACH FOR MANAGEMENT OF DIABETES MELLITUS: AN OVERVIEW OF SCIENTIFICALLY CONFIRMED MEDICINAL PLANTS WITH ANTIDIABETIC ACTIVITIES AND THEIR PROBABLE MECHANISM OF ACTION

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ABSTRACT

Diabetes mellitus is a metabolic disorder that can lead to various complications affecting the heart, kidneys, and eye. Several synthetic and natural products have been used for the treatment, but the disease still remains a challenge globally. The use of plants as an alternative treatment has been on the rise. Regrettably, a comprehensive repository is scarce to guide future research in the aspect of plants with related mechanisms of action for the development of an effective drug. This study therefore identified medicinal plants frequently used with proven scientific anti-diabetic properties and their possible modes of action. This was done through a literature search of scientific databases using search tools like PubMed, ScienceDirect, DOAJ, and Google Scholar. Search Keywords included medicinal plants, diabetes mellitus treatment, phytochemicals, and diabetes management. The study excludes plants used in disease treatment other than diabetes mellitus. From the search, 557 authenticated medicinal plants with anti-diabetic properties were obtained and grouped according to their reported probable mode of action. Precisely 18.9% of the plants exhibited their anti-diabetic effect via prevention of oxidative stress; 10.8% acted through stimulation of insulin secretion, inhibition of insulin degradation, and reduction of insulin resistance. Also, 11.3% inhibit enzymes of carbohydrate gastrointestinal digestion, 2.5% are postulated to regulate enzymes of glucose metabolism, and 56.6% act via multiple means as well as those whose anti-diabetic mode of action is yet to be identified. This study has shown that the exact mechanisms and modes of action of the majority of plants with antidiabetic effects are yet to be explored. Scientists would therefore find this paper useful in their future research. This paper

may also serve as a potential lead for the easy harmonization of plants with a related mode of action in the drug discovery process targeted at the management of diabetes mellitus.

Keywords: Medicinal plants; Diabetes itus; Diabetes management; Anti-diabetes; Mode of actions

EPH 037

ANALGESIC AND ANTI-INFLAMMATORY POTENTIALS OF ANTHOCLEISTA GRANDIFLORA WOOD BARK IN ALBINO RATS

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ABSTRACT

Pain is an unpleasant sensation induced on the body in response to inflammation of tissues. To reduce or stop a painful sensation, a group of drugs broadly classified as pain relievers are administered. The current study aimed at evaluating the analgesic and anti-inflammatory properties of the methanol extract of Anthocleista grandiflora wood bark using albino rats as the animal models, as a possible alternative to commercially available pain relieving drugs. The phytochemical composition of the plant extract as well as the analgesic and anti-inflammatory properties were analyzed following standard procedures. Results of the phytochemical analysis showed the presence of tannins, flavonoids, phenols, terpenoids and cardiac glycosides in large amounts. Saponins and steroids were present in small amounts while alkaloids, glycosides, anthraquinones, phlobatamins and anthracyanine were absent. The results showed a significantly ($p<0.05$) high analgesic potential of different doses of the extract (50mg/kg bw) and 100mg/kg bw when analyged at 0, 1, 2, 3, 4 and 5 hours compared to the control group. Analysis of anti-inflammatory potential showed a significantly higher anti-inflammatory properties by the extracts (50mg/kg and 100mg/kg bw) compared to the control. The outcome of this study revealed that the methanol extract of A. grandiflora wood bark may possess good analgesic and anti-inflammatory properties which may be due to its richness in active phytochemical compounds.

Keywords: Inflammation, Pain, Phytochemicals, Drugs, Immune response.

EPH 038

IN VITRO AND IN VIVO ALPHA AMYLASE AND ALPHA GLUCOSIDASE INHIBITORY EFFECTS OF AQUEOUS WHOLE PLANT EXTRACTS OF ANISOPUS MANNII LINN

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ABSTRACT

Anisopus mannii Linn have been used by herbalists/traditionalists in Maiduguri, Borno State, Nigeria to manage conditions such as fever, cough and Diabetes mellitus. Several studies have reported the hypoglycemic potentials of the plant *A. mannii*. This study therefore investigated the α-amylase and α-glucosidase inhibition effects of the aqueous whole plant extract of *A. mannii*. The in vitro α-amylase inhibitory property of the plant was investigated using starch-iodine method, while α-glucosidase inhibitory potential was investigated by measuring productive glucose following incubation of the extract with maltose or sucrose and α-glucosidase obtained from the brush border of the small intestine of a healthy Wistar albino rat. For the in vivo inhibitory studies, 200, 400 and 800 mg/kg body weight of the aqueous extract was co-administered to normal and alloxan-induced diabetic rats with starch for the amylase inhibition and maltose and sucrose for maltase and sucrase inhibitions. The standard drug used for comparison was acarbose (100 mg/kg). The plant was found to contain saponins, tannins, flavonoids, alkaloids, phenols, carbohydrates and terpenoids. The aqueous extract of A. mannii showed a concentration-dependent inhibition against the activities of α-amylase and α-glucosidase. The 8 mg/ml concentration showed a 52.9% inhibition of the α-amylase. However, the percentage inhibition of the standard drug Acarbose was 86.8%. In the in vitro α-glucosidase inhibition study, 1 mg/ml concentration of the aqueous extract of *A. mannii* produced an inhibition of 19.8% for maltase and 15% inhibition for sucrase. In the in vivo study, 400 mg/kg of the whole plant extract produced the highest reduction of 12.3% of blood glucose concentration for α-amylase in normoglycaemic rats. However, in diabetic rats, the 800 mg/kg dose produced maximum reduction of 16.7% of α-amylase activity. Administration of 400 mg/kg of the aqueous whole plant extract to diabetic rats for α – glucosidase study indicated significant reduction in blood glucose level by 14.2 % for maltose inhibition, while in sucrase inhibition study, 200 mg/kg of the whole plant aqueous extract produced maximum reduction of 11.3 %. The result of the study therefore, indicated that the whole plant aqueous extract of *A. mannii*. hypoglycaemic activity may be related to inhibition of α – amylase and α – glucosidase activities.

Keywords: Diabetes mellitus, hypoglycaemic, α-amylase, α-glucosidase.

EPH 039

METABOLIC PROFILE AND HEPATOPROTECTIVE EFFICACY OF CARICA PAPAYA LEAVES

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ABSTRACT

Carica papaya is a specie of *caricaceae* family. The leaves concoction is used in treatment and management of several ailments in ethno-medicinal practice in Nigeria. This study aimed at determining the bioactive metabolites and to evaluate probable hepatoprotective efficacy of *carica papaya leaves extracts* against CCL4 induced oxidative stress in albino mice. The metabolic profile of *C. papaya* extract was analysed by LC-MS/MS based on their full spectra obtained in positive mode. ALT, AST, ALP, total protein, albumin and bilirubin were assessed. Liver tissues were used for histopathology and their homogenates for determining Malondialdehyde, catalase, superoxide dismutase, and Glutathione S-Transferase activities. mRNA expression of hepatic tissue GSTP1 using qRTPCR was performed. Free radical scavenging activity of the extract was assessed by using various in-vitro models. DPPH quenching assay, FRAP and H2O2 scavenging test. Thirty-five compounds were identified, their structures annotated as alkaloids, amino acids, anthroquinone, benzoic acid, phenolic acid derivatives, fatty acids, flavonoids, glycosides, saponins. CCL4 caused drastic weight loss, induced liver damage through elevating marker enzymes, significant ($p<0.05$) decrease in catalase and superoxide dismutase activities and marked increase in serum MDA level. *C.* papaya leaves extract effectively ameliorated the toxic effect CCL4. Glutathione-S transferase mRNA expression of hepatic tissue and histopathological results also supported the biochemical findings. The extract exhibited concentration dependent free radical scavenging activity. *C. papaya* leaves extract was beneficial in modulating the alteration induced in liver and serum variables of mice under the effect of CCL4 induced oxidative stress.

Keywords: *Carica Papaya*, Hepatoprotective, Metabolic profile.

EPH 040

POTENTIAL ROLE OF BORASSUS AETHIOPUM (AFRICAN PALM) AND SYZYGIUM GUINEENSE (WATER PEAR) LEAF EXTRACT IN INHIBITION OF ADVANCED GLYCATION END PRODUCTS AND DPPH RADICAL

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ABSTRACT

Non-enzymatic glycation is the addition of free carbonyl group of a reducing sugar, to the free amino group of proteins, which results in the formation of advanced glycation end-products (AGEs). Glycation reaction is profoundly associated with diabetes and its secondary complications. Therefore, inhibition of AGEs formation is of paramount importance. The present research was designed to evaluate the phytochemicals, antioxidant and antiglycation activity of aqueous, methanol, chloroform and ethyl acetate extracts of *Borassus aethiopum* and *Syzygium guineense* leaves. Phytochemical screening was conducted using qualitative analysis. Antioxidant activity (*Invitro*) of the extracts was conducted using DPPH free radical scavenging assay. BSA-glucose glycation model was employed to assess the *in-vitro* inhibition of protein glycation, using spectrofluorescent assay. Phytochemicals identified includes alkaloids, phenols, flavonoids, steroids, triterpenes, cardiac glycosides, saponins and anthraquinones. The extracts demonstrated a significantly ($p < 0.05$) low antioxidant and antiglycation activity, except the aqueous extract of *Borassus aethiopum* leaves, which displayed a significantly ($p < 0.05$) high antiglycation ability (97% inhibition) at 0.25mg/ml. In conclusion, both plants have potential effect towards lowering oxidative stress and protein glycation and thus should be exploited for further research in the area of drug discovery and design.

Keywords: Antioxidant, Antiglycation, *Borassus aethiopum*, *Syzygium guineense* and Phytochemicals

EPH 041

IN VITRO SUPPRESSION OF AFRICAN ANIMAL TRYPANOSOME MOTILITIES BY SANSEVIERIA SENEGAMBICA BAKER LEAVES METHANOLIC AND AQUEOUS EXTRACTS

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ABSTRACT

Drawbacks associated with the currently available trypanocides prompted the continuous search for promising agents. Medicinal plants serve as an important source of a plethora of natural products with potential antitrypanosomal efficacies. *Sansevieria senegambica* Baker is an ornamental plant with pharmacologically active compounds widely used for traditional medicinal in tropical and sub-tropical Africa. This study investigated the phytochemical constituents, antioxidant activity and in vitro antitrypanosomal efficacy of methanolic and aqueous extracts of Sansevieria senegambica Baker leaves. Qualitative and quantitative investigations of the extracts revealed the presence of saponins, tannins, alkaloids, and flavonoids with the levels of the phytochemicals significantly ($P< 0.05$) higher in the methanolic extract. There was no significant ($P>0.05$) difference observed in the DPPH and H_2O_2 scavenging activities between the two extracts. Investigation of the antitrypanosomal efficacies of the extracts on *Trypanosoma brucei brucei, T. congolense and T. evansi* showed both extracts at different concentrations suppressed the motility of the parasite in a dose dependent manner. Both extracts showed significant suppression ($P<0.05$) on *T. congolense* and T. evansi, while the suppression on *T. brucei brucei* was <70% compared to the other parasites after incubation with both extracts. Also, the IC50 values of the extracts were higher on *T. brucei brucei* (14.70 mg/mL for the methanolic extract and 5.794 mg/mL for the aqueous extract) compared to the other parasites further supporting the efficacies of the extracts on the latter parasites. In conclusion, the methanolic and aqueous extracts possessed natural ingredients with in vitro antitrypanosomal effects.

Keywords: Trypanosomiasis, phytochemicals, *Sansevieria senegambica* Baker, antioxidant potentials

EPH 042

ANTI- HYPERGLYCEMIC AND HYPOLIPIDEMIC EFFECT OF FRUITS AND SEEDS EXTRACT 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 activity of aqueous and ethanolic fruits and seeds extract of calotropis procera in alloxan-induced diabetic rats. Diabetes was confirmed after 3 days of single intraperitoneal injection of alloxan (140mg/kg) in Wistar albino rats. Aqueous and Ethanolic extracts (100 and 200mg/kg) and glibenclamide (10mg/kg) were orally administered daily for 21 days, At the end of the experiment the rats were sacrificed after an overnight fasting, blood samples were collected and centrifuged to obtain the serum for biochemical analysis. Data were analyzed using SPSS software and expressed as mean±standard deviation. The aqueous and ethanolic extract of both the concentrations exhibited a significant reduction in the blood glucose level in normal and diabetic rats. Similarly, the extract significantly decreased serum total cholesterol, triglyceride, LDL-Cholesterol and at the same time increased HDL-cholesterol. Based on the experimental results, it was concluded that the extracts of calotropis procera may possess antidiabetic and antihyperlipidemic activities.

Keywords: Diabetes mellitus, Anti-hyperglycemic, hypolipidemic, alloxan induces diabetes

EPH 043

ANTIDIABETIC AND ANTIOXIDANT EFFECTS OF FIXED DOSE RECIPE OF AQUEOUS SEED EXTRACTS OF ACACIA NILOTICA AND WHOLE PLANTS OF ANISOPUS MANNI IN STREPTOZOCTOCINE INDUCED DIABETIC RATS

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ABSTRACT

Diabetes is increasingly affecting a growing number of patients and seriously reducing their quality of life. Use of conventional drugs in diabetes management is expensive, thus, unaffordable to most patients. Furthermore most of these conventional drugs are associated with undesirable side effects. Incorporation of herbal medicine into conventional healthcare system may significantly improve the overall management of Diabetes. Evaluation of efficacy and safety by

scientific method is necessary to validate herbal medicine utilization. In most cases even where efficacy of the plants has been established the standard dosage required to bring about healing is vague. This study evaluated two plants (*Acacia nilotica and Anisopus manni*) and there recipe for their efficacy and the combined effects of the plants as recipe in streptozotocin induced diabetic rats. In the evaluation for efficacy, the rats were divided into seven groups of five rats each. Diabetes was induced using streptozotacine and each group was treated with a specified dose of the plant extracts and there recipe. The results were compared to those obtained from the group treated with conventional drug Insulin and glibenclamide through. Standard procedures were used in determination of phytochemical content of the plant extracts. Phytochemical analysis was done by use of standard procedures. Biochemical and antioxidant capacity was also determined using standard laboratory procedures. Results of the phytochemical revealed the presence of alkaloids, Tannins, Saponnins, and Flavonoids which could be the reason behind the antidiabetic activity of all the plants and there recipe at varying levels .*Acacia nilotica* was the most effective with blood sugar lowering ability of 17.08 %. However, the activity of the recipe supersede that of the two plant extracts with a lowering ability of 17.69%. *Anisopus manni* showed the lowest hypoglycemic activity 13.64% reduction. Quantitative and qualitative phytochemical analysis revealed the presence of, Tannins, Saponins, Flavonoids, Phylobatanins and Saponins. In the normoglyceamic studies, the extract of *Acacia Nilotica* and *Anisopus manni*, and their recipe exhibited a lowering glucose effect. For the biochemical parameters, reduction in the activities of ALT, AST and ALP in the serum of group administered plants extract and their recipe was obsereved.).From the scavenging activity of samples towards the DPPH radicals, it was observed that there was a linear relationship between the increasing sample concentrations and percentage inhibition of radicals (i.e. as concentration increases so also does the inhibition of radicals. In conclusion, the aqueous extract of *Acacia nilotica, Anisopus manni* and their recipe possesses the ability to control blood glucose in diabetes. Its antihyperglycemic, antihypolipidemic and free radical scavenging properties have potential to prevent diabetic associated complication. Therefore, this current investigation supports the traditional use of the seeds of *Acacia nilotica*, whole plants of *Anisopus manni* and their recipe in the treatment of diabetes.

Keywords: Diabetes Mellitus, Antioxidants, Hypoglyceamic, Phytochemistry

EPH 044

IN-VIVO ANTIPLASMODIAL ACTIVITY OF MANGIFERA INDICA LEAF CRUDE EXTRACT ON PLASMODIUM BARGHEI INFECTED ALBINO MICE

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ABSTRACT

The menace of malaria has been and is still one of the most devastating in the world. Chemotherapy, the key control strategy is being threatened due to the parasite's development of resistance to currently available antimalarial drugs. Hence, the search for new compounds with novel mechanism of action and targets to treat malaria is inevitable, as nature remains an ever-evolving source of compounds of medicinal importance. The present study aims to evaluate the toxicological and in vivo antiplasmodial effects of extract of *Mangifera indica* on *Plasmodium berghei* infected albino mice. No toxicity was observed at maximum dose of 4000mg/Kg. A four-day curative test was carried out using mice with $1x10^7$/ml parasitized erythrocytes intraperitoneally inoculated, chloroquine (10mg/Kg) and distilled water (untreated) were administered as positive and negative control respectively, while the extracts 150mg/Kg, 300mg/Kg and 1200mg/Kg of the plant extract were administered to treatment groups orally. The average parasitemia were found to reduce from 14.5±0.29 to 3.6±0.49, 15.1±0.15 to 2.1±0.10, and 13.2±0.53 to 0.8±0.03 respectively and packed cell volume was found to increase; 54.3±1.1 to 56.4±0.6, 50.3±0.5 to 59.0±0.2 and 57.7±0.2 to 67.7±0.6 respectively. The crude extract also prevented loss of weight; 16.3±0.4 to 20.1±0.1, 20.3±0.7 to 24.3±0.6 and 19.4±0.2 to 25.7±1.2 respectively, on the last day of treatment. The crude extract of *M. indica* showed a significant antiplasmodial activity reliant on dosage against *P. berghei*.

EPH 045

EFFECT OF ORAL ADMINISTRATION OF AQUEOUS EXTRACT OF PSIDIUM GUAJAVA LEAF ON SERUM GLUCOSE IN ADRENALINE INDUCED HYPERGLYCEMIC RATS.

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ABSTRACT

Psidium guajava L. commonly known as guava (family myrtaceae) has some medicinal uses in treatment of anti-spasmodic, anti-inflammatory, anti-diarrheic and in management of

hypertension, obesity and diabetes mellitus. This study was designed to evaluate the effect of oral administration of aqueous extract of *Psidium guajava* leaf (AEPGL) on serum glucose in adrenaline induced hyperglycaemic (AIHG) albino rats. Seventy albino rats were used in the study and were grouped into six groups consisting of twelve rats each. 100µl of adrenaline was injected to the rats in group's 2 - 6 intraperitoneally for five days. Induction with adrenaline for five days was found to significantly ($p<0.05$) increased serum glucose and heart weight no significant ($p>0.05$) change was observed in the body weight between AIHG rats and control rats. The AIHG rats were administered with different doses of AEPGL (50mg/kg, 100mg/kg, 200mg/kg) and 0.714mg/kg atenolol for fourteen days. Administration of AEPGL and atenolol decreased significantly ($p < 0.05$) serum level of blood glucose, heart weight and body weight. The result of this study indicates that the consumption of aqueous leaf extract of *Psidium guajava* at 200mg/kg for two weeks produced greater hypoglycaemic effect.

Keywords: Hyperglycemic, Aqueous extract *Psidium guajava*, Adrenaline.

EPH 046

ANTISICKLING ACTIVITIES AND SAFETY EVALUATION OF SELECTED MEDICINAL PLANTS FOUND IN SOME PARTS OF NORTHERN NIGERIA

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ABSTRACT

Globally, sickle cell disease (SCD) affects many individuals that inherit the allele from parents. The disease modifying therapies are quite expensive and often come with lot of challenges. Hence, there is need to search for alternatives from plant resources. Therefore, this research was aimed at evaluating the antisickling activities and ascertain the safety of some selected medicinal plants. Medicinal plants used for the treatment/management of SCD in some Northern parts of Nigeria were documented and collected through ethnobotanical survey. *Carica papaya* leaf, *Prosopis africana* stem-bark, *Guiera senegalensis* leaf, *Syzygium aromaticum* seed and *Boswellia dalzielli* stem-bark were selected and their methanol extracts were subjected to *in vitro* antisickling activities using sodium metabisulphite. Mixture of *C. papaya* and *G. senegalensis* leaves extract was used for the safety evaluation using Albino rats. The extract's LD_{50} was determined using up and down method, while, sub-chronic toxicity test was conducted using extract doses between 100 to 1,500mg/kg body weight for 28 days. The plant extracts and their combinations exhibited antisickling activities with varying degrees of efficacy. *C. papaya* leaf, *P. africana* stem-bark and *G. senegalensis* leaf extracts were the most potent that reduced sickling of red blood cells (RBCs) to 3.87±2.73, 8.38±1.06 and 28.35±2.07% respectively compared to the control with 96.57±1.23% sickling. The LD_{50} of *C. papaya* and *G. senegalensis* leaves mixed

extracts was >5,000mg/kg b.wt. The sub-chronic toxicity profile revealed no any significant (P>0.05) alteration in the levels of the hepatic, renal and hematological parameters tested at the extract doses used compared to the normal control. Histopathological examinations presented normal hepatic and renal architectures. Based on the findings, the plants extracts tested may be used as alternative to hydroxyurea in combating sickling of human HbS containing RBCs. The mixed extract of *C. papaya* and *G. senegalensis* leaves is relatively safe at the doses used.

Keywords: Sickle Cell Disease, Antisickling, Medicinal plants, Sodium metabisulphite, Safety

EPH 047

PHYTOCHEMICAL SCREENING AND ANTIOXIDANT POTENTIAL OF OIL EXTRACT FROM CITRULLUS LANATUS (WATERMELON) SEED

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ABSTRACT
Oxidative stress and tissue oxidative damage are common consequences of some chronic human diseases, like diabetes mellitus (DM). Persistent hyperglycaemia causes increased production of free radicals as a result of glucose auto-oxidation and protein glycosylation. Therefore, consumption of some plant originated substances with antioxidant potentiality may help in the management of those chronic illnesses. Hence, this research was aimed at evaluating the phytochemical composition as well as in vitro antioxidant activity of oil extract from Citrullus lanatus seed. The oil was extracted using soxhlet extracting method. Phytochemical screening was conducted according to some standard methods, while antioxidant potential was assayed using ferric reducing antioxidant power assay (FRAP). The qualitative phytochemical screening revealed the presence of alkaloids, flavonoids, steroids, saponin and phenols while quantities of alkaloids, flavonoids, tannins, saponins and steroids were 3.21, 1.64, 0.08, 12.93 and 0.35 %w/w respectively. The ferric reducing antioxidant power (FRAP) of Citrullus lanatus oil extract and that of the vitamin E (standard control) were estimated to be 210.62 and 0.35 respectively. Hence, these findings suggest that, Citrullus lanatus seed oil extract can be recommended to patients with some chronic conditions like DM due to the presence of potent antioxidant phytochemicals in it as well as its antioxidant capability.

Keywords: Watermelon, Seed, Oil, Phytochemical, Antioxidant

EPH 048

COMPARATIVE ANALYSIS OF THE ANTIOXIDANT ACTIVITY OF DIFFERENT VARIETIES OF ONIONS (ALLIUM CEPA) CULTIVATED IN NORTHWESTERN NIGERIA

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ABSTRACT

Onion has numerous pharmacological properties. Its consumption improves antioxidant capacity, and decreases oxidative stress effects. This study was aimed at evaluating the antioxidant activities of fresh and locally preserved red and white onions. Proximate, phytochemicals, antioxidant vitamins, mineral elements, antioxidant activity, amino acids, and total pungency were evaluated using standard methods. The outcome of the study shows that white onion has significantly higher ash (1.737%) and carbohydrate (1.467%) content compared to the red variety, while lipid (88.758%) and protein (0.293%) were higher in the red variety. Flavonoids, saponin, alkaloid, and glycoside (0.420 g/100g, 0.162 g/100g, 0.822 g/100g, and 0.894 g/100g respectively) were higher in red onion compared to white variety. White onion had significantly higher content of mineral elements such as Se, Zn, Ca, and K (8.760 ppm, 8.143 ppm, 68.177 ppm, and 88.757 ppm respectively). Whereas, Fe, Mg, and Na (22.757 ppm, 15.667 ppm, and 12.313 ppm respectively) were higher in the red onion. Red onion had higher levels of vitamin A (11.557 mg/dl), C (142.660 mg/dl), and E (127.167 mg/dl), as well as ferric ion reducing antioxidant power (FRAP) (17.697 mgTE/100g of FW), and pungency (27.214 µmoles/mL). Thiobarbituric acid (TBA) (448.433 mM/g) was higher in white onion. Compared to fresh samples, the preserved samples showed a significant decrease in the levels of most mineral elements, antioxidant vitamins, and pungency. Both red and white onions are vital sources of endogenous antioxidants, although their level varies possibly due to genotype, growth location, and other environmental factors. Local preservation also affects the antioxidant contents of onion samples.

Keywords: Red onion, White onion, Antioxidants, Vitamins, Minerals.

EPH 049

EFFECT OF ETHYL ACETATE FRACTIONS FROM MENTHA PIPERITA LEAVES ON THE COPPER AND ZINC LEVELS IN THE LIVER AND BRAIN TISSUES OF INDUCED HYPERLIPIDEMIC RATS

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ABSTRACT

Hyperlipidemia is a condition when abnormally high levels of lipids are high in the blood. It has been known to induce a state of imbalance between the antioxidants and free radicals in the body. This research was conducted to investigate the effect of ethyl acetate fractions from *Mentha piperita* leaves on Copper and Zinc levels in the liver and brain tissues of poloxamer 407 induced hyperlipidemic rats. Ethyl acetate leaf extracts (30g) was chromatographed over silica gel in a packed column and different fractions (F1-F12) were collected base on solvent elution system of n-hexane and ethyl acetate. A total of 60 Wistar rats were divided into 15 groups. Groups 1-14 were induced with poloxamer 407 (500mg/kg body weight) intraperitoneally once in every 48hrs for 21 days. Group 1 served as the hyperlipidemic control. Atorvastatin was the standard drug used (20mg/kg body weight) given to the rats in group 2. Groups 3-14 received the different fractions (F1-F12) of ethyl acetate extracts of *Mentha piperita* leaves (100mg/kg). Group 15 was the normal control. At the end of the 21 days period, the rats were sacrificed, the liver and brain tissues were collected for homogenization and centrifugation. The supernatant was digested using Conventional Wet Digestion Method (CDM). Copper and Zinc levels were determined using flame atomic absorption spectrophy (FAAS). From the results obtained, there was a significant ($p<0.05$) increase in the level of Copper and Zinc in liver and brain tissues of rats that received the fractions compared with the hyperlipidemic group. In conclusion, ethyl acetate fractions of *Mentha piperita* leaves have protective antioxidant properties against hyperlipidemia-induced oxidative stress in the liver and brain tissues.

Keywords; Hyperlipidemia, Antioxidant, Copper, Zinc, *Mentha piperita* leaves, Liver and Brain tissues.

EPH 050

EVALUATION OF THE TOTAL ANTIOXIDANT CAPACITY, TOTAL POLYPHENOL CONTENT, AND TOTAL FLAVONOIDS CONTENT IN ETHANOL FRUIT EXTRACT AND DETERMINATION OF THE CORRELATION BETWEEN THE ANTIOXIDANT EFFECTS AND THE PHYTOCHEMICAL CONTENTS

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ABSTRACT

Raphia hookeri popularly known as Raphia palm has played important roles as antipyretic and analgesic, anti-inflammatory, anti-diabetics and as well as herbal medicine for the treatment of stomach-ache in Nigeria. This study was aimed at evaluating the total antioxidant capacity (TAC), total polyphenol content (TPC), and total flavonoids content (TFC) in ethanol fruit extract and determine the correlation between the antioxidant effects and the phytochemical contents. Extraction of the fruit was done using absolute ethanol, followed by fractionation with different solvent combination of varied polarity via column chromatography beginning from n-hexane, chloroform, ethyl acetate, methanol, ethanol and finally water. The fractions were subjected to total antioxidant capacity screening using 1, 1-diphenyl-2-picryhydrazyl (DPPH) assay. The total polyphenol content and total flavonoids content were analysed by Folin-Ciocalteu and Aluminium Chloride ($ALCl_3$) spectrophotometric methods respectively. The results revealed that fraction 24b (Ethyl acetate: Methanol) was the best fraction for the elution since it shows the highest antioxidant activity (0.912 mg/mL), while fraction 10b (n-hexane: chloroform) had the lowest antioxidant activity of (0.14 mg/mL). The results also showed that fraction 10a (n-hexane: chloroform) had the highest phenolic content (0.256 mg/mL), while fraction 16b (chloroform: Ethyl acetate) had the lowest phenolic content (0.0035mg/mL). The result of total flavonoids content was in the same manner; fraction 20b (chloroform: Ethyl acetate) had the highest concentration of total flavonoid content (1.3115 mg/mL), while fraction 14b shows the lowest concentration (0.015 mg/mL). Linear correlations between total antioxidant capacity, total polyphenol content and total flavonoids content were shown to be a positive correlation between total antioxidant capacity and total flavonoid content TAC/TFC (R^2 = 0.0399), while a negative correlation between total polyphenol content and flavonoids content TAC/TPC (R^2 = -0.027) was observed. Fraction 24b with the highest antioxidant activity was subjected to further analysis using Gas Chromatography – Mass Spectroscopy (GC-MS) analysis and 27 compounds were

identified. This implies that flavonoids are to a very large extent responsible for the antioxidant activity exhibited by the ethanolic fruit extract of *R. hookeri.*

Keywords: *Raphia hookeri*, phytochemical analysis, total antioxidant capacity, total polyphenol content total flavonoids content.

EPH 051
AMELIORATIVE EFFECT OF JATROPHA CARCUS METHANOL SEED EXTRACT IN LOPERAMIDE INDUCED CONSTIPATED RATS

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ABSTRACT
The laxative effect of methanolic seed extract of *Jatropha carcus* was evaluated in loperamide-induced constipated albino rats for the period of 7 days. Constipation was induced by oral administration of loperamide (3 mg/kg body weight). The constipated rats were orally treated daily either with 50, 100, 200 mg/kg body for 7 days while the normal control group received distilled water. The feeding characteristics, body weight, faecal properties and gastrointestinal transit ratio were monitored throughout the study period. The activities of liver and kidney function parameters were also determined in the serum of the animals. There was significant decrease ($p< 0.05$) in the number of faecal pellets of constipated rats when compared with the normal control while body weight increased. The loperamide significantly ($p<0.05$) reduced the feed intake and the fecal parameters. Administration of the extract at 100 and 200 mg/kg body weight to the constipated rats significantly ($p<0.05$) normalized their body weight gain, number of faecal pellets and gastrointestinal ratio when compared with the normal control. There were no significant ($p< 0.05$) change in serum levels of ALP, AST and total protein when compared with the control. The extract at 200 mg/kg body weight significantly ($p <0.05$) increased total protein when compared with control. There was no significant change in the kidney function parameters of all the administered groups when compared with normal control. The methanol seed extract of *J. carcus* possess laxative activity in loperamide induced constipated rats.

Keywords: *Jatropha carcus,* Constipation, Loperamide, Gastrointestinal transit ratio

EPH 052

ANTIDIABETIC AND ANTIOXIDANT EFFECTS OF FIXED-DOSE RECIPE OF AQUEOUS SEEDS EXTRACTS OF ACACIA NILOTICA AND LEAVES OF BAUHINIA RUFESCENS IN STREPTOZOCTOCIN-INDUCED DIABETIC RATS

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ABSTRACT

Diabetes is a chronic metabolic disorder characterized by high blood glucose levels. Use of conventional drugs in diabetes management is expensive, thus, unaffordable to most patients. Furthermore most of these conventional drugs are associated with undesirable side effects. Incorporation of herbal medicine into conventional healthcare system may significantly improve the overall management of diabetes. The diabetic potential of the extracts was studied by screening the hypoglycaemic activities of the aqueous extracts of the individual plants and their recipe in experimental rats by oral administration of different doses of the extracts to normoglycaemic and streptozoctocin-induced diabetic rats and monitoring the effects on blood glucose over a period of 3 hours. Different doses of the extracts were also administered to diabetic rats for a period of 28 days to evaluate the long term safety and antidiabetic potentials of the extracts. The antioxidant study included an *In-vitro* DPPH scavenging activity of the extracts and *In-vivo* effects of the extracts on catalase and lipid peroxidation activities.Phytochemical screening of the extracts revealed the presence of alkaloids,glycosides,saponins,flavonoids and carbohydrates in the extracts and the recipe.Screening for hypoglycaemic study in the normoglycaemic rats showed *Acacia nilotica* producing a maximum fasting blood reduction of 14.4%,*Bauhinia rufescens* 26.1% and 35.2% for the recipe. The percentage reductions in sreptozoctocin-diabetic rats were respectively 14.4%,13% and 35.2% for *Acacia nilotica*,*Bauhinia rufescens* and the recipe. In the long term anti diabetic study,the recipe produced the maximum percentage reduction of 48% after the 28days experimental period. This percentage reduction was higher than 31% reduction observed with the rats administered the standard drug glibenclamide. The 28 days of administration of the extracts did not significantly alter the catalase and lipid peroxidation of the experimental rats.ALAT,ASAT and ALP were also not affected by the extracts administration.It is thus concluded that the recipe comprising *Acacia nilotica* and *Bauhinia rufescence* has more anti diabetic potential than the individual plants and warrants further investigation for possible use as a drug candidate to manage Type 2 diabetes mellitus.

Keywords: Diabetes mellitus,Antioxidants, Phtochemistry, Hypoglyceamic

EPH 053
HYPOGLYCAEMIC EFFECT OF LEPTADENIA HASTATSA FRIUT METHANOL EXTRACT IN NORMOGLYCAEMIC RATS.

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ABSTRACT
Leptadenia hastata [asclepiadaceae] is a widely distributed tropical African herb used as vegetable. It is also used traditionally in the management of diabetes mellitus and treatment of stomach ache. This study evaluated the hypoglycemic effect of methanol extract of *Leptadenia hastata* fruit extract in normoglycaemic rats. A total of 16 albino rats were divided in to 4 groups [1-4] group 1 serve as control which they were not given the extract, while group 2, 3, and 4 was given the extract at different dose of 200mg/kg, 400mg/kg and 800mg/kg respectively. The phytochemical constituent of the extract were determined, where it shows the presence of alkaloids carbohydrate cardiac glucoside, saponin and terpenoids. The rats were fasted for 18hours and then blood sample was collected from the tail for determination of blood glucose level (mg/dl) at 0hrs, 30minutes, 1hour, 2hours 4hours and 6hours time intervals and then the result are expressed in mean ± SEM where it gives 83.00±0.75, 74.18±4.18, 63.45±5.71, 53.15±5.19, 45.09 ±3.68 for group 3 and group 4 is 64.95±6.00, 57.75 ± 3.83, 50.75±5.67, 42.25±5.85 and 31.25±3.46. The result shows significant $p<0.05$ decrease in blood glucose after 1hour, 2hours and 4hours. Post administration of the extract for 77 days also shows significant $p<0.05$ decrease in blood glucose, and also decrease the body weight of the experimental animals. The result of the study demonstrated the hypoglycemic effect of methanolic *Leptadenia hastata* fruit extract in normal rats.

Keywords: *Leptadenia hastata* fruit extract shows significant decrease in blood glucose levels.

EPH 054
ESTIMATION OF IC_{50} OF OCIMUM GRATISSIMUM AND TITHONIA DIVERSIFOLIA LEAF METHANOL EXTRACT AGAINST TRYPANOSOMA BRUCEI BRUCEI

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ABSTRACT
INTRODUCTION: African Trypanosomiasis (AT) is one of the Neglected Tropical Diseases that have negatively affected growth and development in African nations. AT is majorly of two types;

the Human African Trypanosomiasis (HAT) and African Animal Trypanosomiasis (AAT). AT is caused by the bites of Tse-tse fly which transmit the parasite trypanosomes through blood meal. Therapeutic approach that has been used to kill the parasites has faced the challenges of cost ineffectiveness, drugs inaccessibility, negative side effect and development of drug resistant parasites. These challenging situations have led to a search for other means of eradicating the disease by the use of the available natural products within our immediate environment. This work attempts to harness the antitrypanosomal potentials of two Nigerian medicinal plants; *Tithonia diversifolia* and *Ocimum gratissimum* to curb the menace of the disease. OBJECTIVE: The objectives of this study is to estimate Inhibition Concentration (IC_{50}) of *Tithonia diversifolia* and *Ocimum gratissimum* leaf methanol extract against *Trypanosoma brucei brucei*. METHODS: The plant leaves were collected, dried and pulverized. Extraction was carried out by cold maceration for 72 hours. Extract was filtered and concentrated by rotary evaporator. The IC_{50} of crude extract was estimated through in vitro assay using rat infected with *T. brucei brucei*. RESULT: The extracts showed IC_{50} 1.37±0.91 mg and 1.23±1.23 mg for *Tithonia diversifolia* and *Ocimum gratissimum* respectively. CONCLUSSION: The plants extracts are trypanocidal with relatively close IC50. Their trypanocidal activity should be considered for ethnomedicinal value and utilized in the fight against Trypanosomiasis in Nigeria.

Keywords: *Trypanosoma brucei brucei, Tithonia diversifolia, Ocimum gratissimum* and IC_{50}

EPH 055

ANTIMALARIAL EFFICACY OF COLUMN CHROMATOGRAPHIC SUBFRACTIONS OF GLYPHAEA BREVIS LEAVES EXTRACT AGAINST CLINICAL ISOLATES OF PLASMODIUM SPECIES

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ABSTRACT

Malaria remains a severe parasitic disease that poses a significant threat to human life; efforts to control and eliminate it are ongoing worldwide. The objective of this study was to assess the susceptibility of *Plasmodium falciparum* and *Plasmodium berghei* to various antimalarial agents, as well as specific subfractions of *Glyphaea brevis* leaf extract obtained through column chromatography. The susceptibility of patients' blood samples to the selected antimalarial agents was determined using both the Trager and Jensen method and the World Health Organization (WHO) standardized in vitro micro-test system. Eleven (11) pooled fractions were obtained through column chromatographic process, and FTIR and GCMS were used to identify functional

groups and phytochemicals, respectively. The results revealed that the IC_{50} range of the tested *P. falciparum* clinical isolates was 1.03-7.63 µg/ml, while the IC_{50} range against P. berghei was 4.32-7.89 µg/ml. Subfraction 8 (SF8) exhibited the lowest IC_{50} of 4.32 µg/ml. FTIR analysis for SF8 indicated the presence of isoprenoid, alcohol, phenol, alkane, alkenes, ester, carboxylic acids , aromatics, and nitro compounds, while GCMS identified several compounds, including Dodecanoic acid, methyl ester; Carotol; Hexadecanoic acid, methyl ester; 9-Octadecenoic acid (Z)-, methyl ester (Oleic acid); Methyl stearate; and Heptadecanoic acid, 16-methyl-, methyl ester, all known for their antimalarial properties. In conclusion, *Glyphaea brevis* shows significant potential for the development of antimalarial drugs as it inhibits schizont growth and contains phytochemicals with reported antimalarial effects.

Keywords: Malaria; *Plasmodium falciparum*; *Plasmodium berghei;* **FTIR; GCMS; Susceptibility**

EPH 056

EFFECT OF COLUMN CHROMATOGRAPHIC FRACTIONS OF METHANOL EXTRACT OF CURCUMA LONGA LINN RHIZOME ON LIVER AND KIDNEY PARAMETERS IN ALLOXAN-INDUCED DIABETIC RATS.

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ABSTRACT

Medicinal plants traditionally have shown to play key role in healing and its ingredients have served as a source of encouragement for several major pharmaceutical drug. The present study was conducted to evaluate the effect of column chromatographic fractions (FI-FVI) of methanol extract of *Curcuma longa* Linn rhizome on alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), gamma glutamyl transferase (GGT), total bilirubin (TB) and direct bilirubin (DB) levels as well as urea, creatinine and electrolytes (Na^+, Cl^-, K^+, HCO_3^-) levels in alloxan-induced diabetic rats. The fractions (FI-FVI) were screened at dose of 200 mg/kg body weight using a total of forty-five (45) rats which were grouped into nine (9) groups of five (5) rats each. The alloxan was administered intraperitoneal at a dose of 100 mg/kg per body weight. The administration of the fractions lasted for 21 days. There was significant ($p<0.05$) increase in weight of animals orally administered with fraction II, decrease in feed and water intake. Administration of fraction II also lowers significantly elevated activities of ALT, AST, ALP, GGT, TB and DB in diabetic rats as well as increases protection

against renal dysfunction as was shown by reduced urea, creatinine, Na^+ and K^+ levels. The fractions possesses no toxic effect as indicated by lowered AST and ALP levels and may be used for the management of diabetes mellitus.

Keywords: Kidney enzymes; Liver enzymes; Column chromatography; Fractions; *Curcuma longa* Linn

EPH 057

IN-VITRO AND IN-VIVO ANTIOXIDANT CAPACITY AND FREE RADICAL SCAVENGING ACTIVITY OF OKRABASED ANTIDIABETIC NUTRACEUTICAL FORMULATION FROM ABELMOSCHUS ESCULENTUS (L.) MOENCH (EX-MARADI VARIETY)

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ABSTRACT

Nutraceuticals with high antioxidant capacity is considered a potential strategy in delaying various oxidative-related dysfunctions. The aim of this study was to evaluate the antioxidant properties of the developed Okra-Based antidiabetic nutraceutical formulation made from *Abelmoschus esculentus* (Ex-maradi Variety). Total phenolic and flavonoid contents (TPC and TFC), DPPH, ABTS, and H_2O_2 radical scavenging assays were assessed by in-vitro chemical analyses, while Carbon Tetrachloride (CCl_4) induced hepatic injuries (lipid peroxidation, SOD Catalase and glutathione contents) in male Wister albino rats was used to access the in-vivo antioxidant activities through various standard procedures. The results of in-vitro analyses showed that; total phenolic contents (101.9±2.1 mg GAE/g) and total flavonoid contents (56.9 ±3.2 mg RTE/g) for the formulation were found be relatively high as compared to the standards used. The EC_{50} values based on the DPPH (37.0±1 µg/ml), ABTS (12.0±0.7 µg/ml) and Hydrogen peroxide radicals (74.0±3 µg/ml) for the formulation were generally lower showing potential antioxidant properties. A significant but marginal positive correlation was found between TPC and EC_{50} values for DPPH, and ABTS. Results of in-vivo experiment revealed that administration of CCl_4 caused a significant increase in lipid peroxidation (TBARS) while decrease in GSH contents of liver. In contrast, the nutraceutical formulation (200 mg/kg bw) effectively prevented these alterations and maintained the antioxidant status. In conclusion, the data obtained from the present study revealed that the developed Okra-Based antidiabetic nutraceutical formulation made from Abelmoschus esculentus (Ex-maradi Variety) can act as an effective antioxidant agent due to its free radical scavenging and cytoprotective activity.

Keywords: *Abelmoschus esculentus*, Nutraceutical formulation, Antioxidant, Oxidative stress, Albino rats and Carbon Tetrachloride (CCl_4)

EPH 058

MYOCARDIAL INFARCTION IN WISTAR RATS: PROTECTIVE POTENTIALS OF POLYALTHIA LONGIFOLIA LEAF PHENOLIC EXTRACT

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ABSTRACT

Polyalthia longifolia leaf is widely used in the management of heart-related diseases in Africa, but little is known about the role of its phenolic content. This study evaluated the protective potentials of Polyalthia longifolia leaf phenolic extract (PLLPE) in isoprenaline-based Wistar rats' model of myocardial infarction. Thirty male Wistar rats weighing 115±4.34 g were randomized into six groups of five animals each and orally pretreated thus: Groups 1 and 2 received 1 ml of distilled water, group 3 α-tocopherol 60 mgkg -1 body weight (bw) while groups 4, 5 and 6 received 100, 200 and 400 mgkg -1 bw of PLLPE respectively, daily for 21 days. Groups 2-6 were then intraperitoneally administered 85 mgkg -1 bw of isoprenaline (in phosphate buffer 100 mM, pH 6.8) once daily for two days (days 22, 23). The animals were sacrificed on day 24 after an overnight fast. Activities of heart ATPases, aminotransferases, and concentrations of biomarkers of inflammation, oxidative stress and heart function were determined using standard methods. Administration of isoprenaline caused significant increase in serum activities of AST, ALT, ACP, creatine kinase, lactate dehydrogenase, myeloperoxidase and concentrations of interleukin-6, TNF-α, malondiadehyde, troponin-I, LDL-c and triglyceride of the isoprenaline-induced water-pretreated rats (group 2) while rats pretreated with α-tocopherol and PLLPE had significantly reduced levels. The level of HDL-c was significantly reduced in the serum of group-2 animals while the concentration was significantly increased in the pretreated animals. Thus, PLLPE contains bioactives with promising cardioprotective potentials that could be explored for the prevention of myocardial infarction.

Keywords: Myocardial infarction, *Polyalthia longifolia*, phenolic extract, Isoprenaline

EPH 059

HYPOGLYCAEMIC AND HYPOLIPIDEMIC POTENTIALS OF FRESH AND COOKED VIGNAUNGUICULATA (BLACK-EYED BEAN) IN ALLOXAN-INDUCED DIABETIC ALBINO WISTAR RATS

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ABSTRACT
Vigna unguiculata and its related species are speculated to enhance health and ward off several diseases. This study examined the hypoglycaemic and hypolipidemic effects of *V. unguiculata* in alloxan-induced diabetic albino Wistar rats. Fifty-four (54) albino Wistar rats weighing 100-230 g were used, divided into 9 groups of 6 rats each. This experiment was carried out in two phases. In phase I, except group 1 (negative control), groups 7 and 8, all groups were intraperitoneally induced with 150 mg/kg body weight of alloxan after the rats had fasted for 48 hours. In phase II, groups 3 and 4; groups 5 and 6 were treated with (180 and 250 mg/kg doses) of fresh and cooked V. unguiculata extracts respectively. Groups 7 and 8 were treated with 250 mg/kg fresh and cooked V. unguiculata extracts respectively. Group 9 was treated with the standard drug (Glibenclamide), all for four days. Phase I results revealed that levels of blood glucose (BG), low density lipoprotein (LDL), triacylglycerol (TAG), total cholesterol (TC), very low density (VLDL), atherogenic risk index (ARI) and coronary risk index (CRI) increased significantly ($p < 0.05$), while 3-Hydroxy-3-methylglutaryl (HMG) coenzyme A (CoA) reductase (HMGCR) activity, total protein (TP) and high density lipoprotein (HDL) decreased significantly ($p < 0.05$) when groups 2 to 9 were compared with the control. In phase II, after treatment with *V. unguiculata* extracts and glibenclamide, there was significant ($p < 0.05$) increase in HMGCR activity, HDL and TP, and significant ($p < 0.05$) decrease in BG, LDL, TAG, TC, VLDL, ARI and CRI. Thus, we conclude that *V. unguiculata* and glibenclamide could serve an effective management therapy for hyperlipidaemia and truncate several disease conditions.

KEYWORD: Hypolglycemic, Hypolipidemic, Lipid profile, *Vigna unguiculata*, Glibenclamide, Blood glucose.

EPH 060

ANTI-ULCEROGENIC POTENTIALS AND CHARACTERIZATION OF BIOACTIVE COMPOUNDS IN METHANOL FRACTION OF CLEISTOPHOLIS PATENS LEAVES

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ABSTRACT

This work was aimed at investigating the anti-ulcerogenic potentials and characterization of bio-active compounds in methanol fraction of *Cleistopholis patens* leaves. Phytochemical constituents and LD 50 of C. patens leaf extract were determined using standard methods. Albino rats of either sex weighing (120 - 321 g) were used for the study. Twenty four (24) rats randomly grouped into 6 of 4 rats each were used for the study. Gastric ulcers were induced with 50 mg/kg b.w of diclofenac sodium. Groups 1 to 6 were the normal control, positive control and those treated with Std drug and different concentrations of the extract. In vitro assay for ATPase activity using different concentrations of standard drug (omeprazole) and the extracts were carried out using standard methods. The effect of MFCP leaves on some gastric indices such as gastric ulcer index, pH and volume were carried out. Data were expressed as the mean ± S.D and statistical significance between the groups were determined using one way analysis of variance (ANOVA). Mean values $p \leq 0.05$ were considered statistically significant. The phytochemical analysis of C. patens leaf extract showed that the extract is rich in flavonoids, terpenoids, steroids, tannin, reducing sugar and phenol. Up to 5000 mg/kg b.w. of the extract did not produce any observable sign of toxicity. The MF (IC 50 50.10 ± 10.52 µg/ml) had the highest inhibitory effect on H +/ K + -ATPase activity in vitro. Treatment with MFCP leaf extract in this model caused, in a dose-dependent manner, a reduction in total ulcer, increase in pH and decrease in volume.

Keywords: Anti-ulcer, *Cleistopholis patens*, H +/ K + -ATPase, Bioactive compounds.

EPH 061

EFFECT OF ORAL ADMINISTRATION OF AQUEOUS EXTRACT OF (K. AFRICANA, F. PLATYPHYLLA, C. SINESIS, B. DALZIELLII AND G. SENEGALENSIS) ON KIDNEY FUNCTION INDICES

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ABSTRACT

Some kidney function indices such as Urea, Creatinine and serum electrolyte were investigated in rats after one week oral administration of the aqueous extract of *K. africana, F. platyphylla, C. sinensis, B. dalziellii* and *G. senegalensis*. A total of twenty-five (25) rats (100g) were used in this study, and they were divided into five equal groups. Rats in the first group were used to serve as control. Rats in Group B-C were orally administered with 100mg/kg, 150, 200, and 250mg/kg respectively twice for one week. The animals were sacrificed after one week and the Urea, Creatinine and Serum electrolyte (Potassium, Sodium, Chloride and bicarbonate) showed no significant difference in almost all the parameters analyzed and the phytochemical constituent revealed the presence of flavonoid, saponins, glycosides and resin while tanins was absent.

Phytochemical analysis was conducted for resin and saponin using Saforowa method while alkaloid, tannin and glycoside using Trease and Evans method.

Keywords: Creatinine, urea, electrolyte, phytochemical, alkaloid, tannin, glycoside

EPH 062

IN-VIVO ANTIPLASMODIAL ACTIVITY OF MANGIFERA INDICA LEAF CRUDE EXTRACT O PLASMODIUM BARGHEI INFECTED ALBINO MICE

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ABSTRACT

The menace of malaria has been and is still one of the most devastating in the world. Chemotherapy, the key control strategy is being threatened due to the parasite's development of resistance to currently available antimalarial drugs. Hence, the search for new compounds with novel mechanism of action and targets to treat malaria is inevitable, as nature remains an ever-evolving source of compounds of medicinal importance. The present study aims to evaluate the toxicological and in vivo antiplasmodial effects of extract of *Mangifera indica* on *Plasmodium berghei* infected albino mice. No toxicity was observed at maximum dose of 4000mg/Kg. A four-day curative test was carried out using mice with 1x10 7 /ml parasitized erythrocytes intraperitoneally inoculated, chloroquine (10mg/Kg) and distilled water (untreated) were administered as positive and negative control respectively, while the extracts 150mg/Kg, 300mg/Kg and 1200mg/Kg of the plant extract were administered to treatment groups orally. The average parasitemia were found to reduce from 14.5±0.29 to 3.6±0.49, 15.1±0.15 to 2.1±0.10, and 13.2±0.53 to 0.8±0.03 respectively and packed cell volume was found to increase; 54.3±1.1 to 56.4±0.6, 50.3±0.5 to 59.0±0.2 and 57.7±0.2 to 67.7±0.6 respectively. The crude extract also prevented loss of weight; 16.3±0.4 to 20.1±0.1, 20.3±0.7 to 24.3±0.6 and 19.4±0.2 to 25.7±1.2 respectively, on the last day of treatment. The crude extract of *M. indica* showed a significant antiplasmodial activity reliant on dosage against *P. berghei*.

EPH 063

ORAL GLUCOSE TOLERANCE AND ANTIOXIDANT DETOXIFYING EFFECTS OF XYLOPIA AETHIOPICA SEED EXTRACT ON 2, 2-AZOBIS (2-AMIDINOPROPANE) DIHYDROCHLORIDE (AAPH) INDUCED OXIDATIVE STRESS

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ABSTRACT

In Nigeria, *Xylopia aethiopica* (Annonaceae) is locally used in the treatment of constipation and in local tea and beverages. They are used as a tonic after pregnancy delivery, to facilitate the removal of clotted blood in the system. This study aims to evaluate the oral glucose tolerance and protective effects of *X. aethiopica* seed extract on 2,2-azobis(2-amidinopropane) dihydrochloride (AAPH) induced oxidative stress in red blood cells (RBCs). Glucose (2 g/kg body weight) was administered orally to 14 hour fasted mice, and plasma glucose was evaluated after 0, 0.5, 1, 2, and 4 hours. Antioxidant activities were evaluated using prepared RBCs from mice after pretreatment with AAPH. Significant increases ($p<0.05$) were observed in glucose level of all treated mice after 30 minutes, which was gradually decreased to 11.41%, 16.52%, and 14.19% for metformin (14.5 mg/kg bwt) and aqueous *X. aethiopica* seed extract (250 and 500 mg/kg bwt) compared with baseline glucose levels. The antioxidant activities of aqueous *X. aethiopica* seed extract indicated that the extract possesses higher hydroxyl radical scavenging activities compared with vitamin C. More so, *X. aethiopica* seed extract protected cells against AAPH induced oxidative stress in cells by decreasing the amount of catalase (CAT) generated and malondialdehyde (MDA) after 40 minutes of incubation at 2.5 mg/mL compared with vitamin C. Furthermore, the aqueous seed extract increased protein secretion in cells against AAPH induced oxidative stress in vitro at 1.5 and 2.5 mg/mL respectively. However, no significant difference ($p>0.05$) was observed in superoxide dismutase (SOD) activities during the incubation period. The total tannin content (TTC) and total phenolic content (TPC) of the aqueous seed extract of X. were found to be 509.16±192.13 mg QE/g and 1.59±0.63 mg QAE/g respectively. The study concludes that aqueous extract of *Xylopia aethiopica* seed possesses glucose-lowering and antioxidant detoxifying properties against 2,2-azobis(2-amidinopropane) dihydrochloride (AAPH) induced oxidative stress in vitro. Further investigation is needed to ascertain the in vivo antioxidant capacity of the seed.

Keywords: *Xylopia aethiopica*; Seed; Oxidative stress; Antioxidant; Detoxification

EPH 064

ANTI-OXIDATIVE STRESS CAPABILITIES OF ETHANOLIC LEAF-EXTRACT OF CAJANUS CAJAN AGAINST ETHANOL-PROVOKED OXIDATIVE STRESS IN WISTAR RATS

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ABSTRACT

Objectives: The antioxidative stress capabilities of ethanolic leaf-extract of Cajanus Cajan (linn) against ethanol-provoked oxidative stress in Wistar rats were determined by examining the levels of Superoxide Dismutase (SOD), Catalase (CAT), Malondialdehyde (MDA) and histopathology of the Wistar rats' liver. Study design: Experimental Design. Place and Duration of Study: This study was carried out in Biochemistry laboratory of Federal University of Health Sciences, Otukpo and Morbid Anatomy laboratory of Federal Teaching Hospital Abakaliki (FETHA), Nigeria from November 2021 to March, 2022. Methodology: Thirty (30) Wistar rats were randomized into 6 groups of A-F with each group having 5 rats per cage. Rats in cage A (Normal control group) was given normal saline. Cage B was given 5mg/kg body weight of Silymarin as standard control group; rats in cage C was given 3.7g/kg body weight of 99.7% ethanol only as positive control group. Rats in cage D were given 200mg/kg, E received 400mg/kg and F 600 mg/kg body weights of the leaf-extract. Groups B and (D, E, F) were given 3.7g/kg body weight of absolute ethanol (99.7%), 3 hours later, Silymarin and leaf-extract were given respectively for 21 days. Oxidative stress indices and histopathological studies were both done using standard procedures. Results: SOD and CAT were significantly (P<0.05) decreased in rats in cage C when compared to the levels seen in cages B and A while MDA level significantly (P<0.05) increased in rats in cage C relative to levels observed in cages B and C. However, rat groups that received the leaf- extract of Cajanus cajan (D, E, F) showed significant (P<0.05) reversal in the trend of these parameters to levels comparable to those observed in rats in cages B and A.Conclusion: We therefore conclude that ethanol leaf-extracts of Cajanus cajan contains importantantioxidants which could prevent alcohol-induced oxidative stress in wistar rats' liver.

Keywords: Alcohol; Catalase; Cajanus Cajan; Malondialdehyde; Oxidative Stress; Wister rats

EPH 065

EVALUATION OF THE THERAPEUTIC EFFECTS OF MORINGA OLEIFERA SEED OIL ON CADMIUM AND HERBAL ALCOHOLIC INDUCED PREFRONTAL CORTEX DAMAGE IN WISTAR RATS

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ABSTRACT

The use of *Moringa oleifera* seed oil in the prevention of neurodegenerative diseases is on an increasing trend. Cadmium is one of the most toxic environmental pollutants causing many known damages to the brain. The consumption of herbal alcoholic beverages is known to cause neurodegeneration. The aim of this study was to investigate the ameliorative effects of *Moringa oleifera* seed oil on the damage to the frontal cortex of Wistar rats by cadmium and herbal alcoholic beverages. Eighty Wistar rats were divided into eight groups of 10 rats each. Group A served as control which received 2.5mg/kgbw phosphate buffer intra-peritoneally, while group F served as *Moringa*-treated control and received oral administration of 2.0 mg/kgbw*Moringa oleifera* oil. Groups B1, B2, D and E were injected intra-peritoneally with 3.5mg/kgbw $CdSO_4.8H_2O$ single dose. Group C1, C2 and D received oral administration of 0.5 ml HAB and group B2, C2and E were administered orally with 2.0mg/kgbw*Moringa oleifera* oil for four weeks. All animals were sacrificed followed on day 29. Results: Results showed that cadmium and HAB administration caused significant increase in AchE, SDH, CAT, GPx and MDA levels and decrease in SOD level. Conversely, there were significant decrease in AchE, SDH, CAT, GPx and MDA and increased SOD level upon administration of *Moringa oleifera* oil. *Moringa oleifera* seed oil has natural antioxidant constituents that ameliorated damages caused by Cd and HAB.

Keywords: Cadmium, herbal alcoholic beverages, *Moringa oleifera* seed, frontal cortex

EPH 066

ANTIOXIDANT POTENTIAL OF PTEROCARPUS ERINACEUS EXTRACTS ON CCL4-INDUCED HEPATIC OXIDATIVE DAMAGE IN RATS

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ABSTRACT

Liver disease is still a great health challenge due to its high cost of treatment and drug toxicity. It remains one of the most important causes of death worldwide. Liver diseases are usually associated with oxidative stress, and have been a major focus for research studies. Pterocarpus erinaceus is one of the medicinal plants used as traditional remedies for the treatment of several diseases associated with oxidative stress. On this basis, the present study aimed at evaluating antioxidant potential of Pterocarpus erinaceus parts on CCl4- induced oxidative stress in rat's liver. Leaves, stem and root of Pterocarpus erinaceous after collection were air-dried and pulverized. Each of them were extracted with methanol and the methanolic extracts were used. Phytochemicals were screened, in vitro and in vivo antioxidant studies were conducted. Rats were grouped into; Group 1: Normal control (liquid paraffin, vehicle 1ml.kg), Group 2: Negative control (received 1ml/kg CCl4), Group 3: Positive control (received 1ml/kg CCl4 +100ml/kg Silymarin), Group 4-6: Extract treated rats (received 1ml/kg CCl4 + varied doses of Extracts at 100, 200, and 400mg/kg body weight of rats). The treatment was done daily via oral mean for 14 days period. The results of the study showed Pterocarpus erinaceus rich in different phytochemicals which possess free radicals scavenging properties. In vivo study reveals the antioxidant activity of the plant may be probably via modulation of endogenous antioxidant molecules. In conclusion, the study found that the leaves of Pterocarpus erinaceus exert better antioxidant activity hence its recommendation for further study to identify the active molecules.

Keywords: Antioxidant, activity, hepatic, methanolic extracts, Pterocarpus erinaceus

EPH 067

AGERATUM CONYZOIDES METHANOL LEAF EXTRACT: PHYTOCHEMICALS WITH ANTIDIABETIC POTENTIAL VIA ANTIOXIDANT ACTIVITY.

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ABSTRACT

Background and Objectives: *Ageratum conyzoides* L. is a traditional herbaceous plant which belongs to the family Asteraceae. The folk and traditional uses of the plant include, sleeping sickness, anti-inflammatory, insecticidal, etc. The present study aimed at exploring the possible antidiabetic activity of A. conyzoides through its antioxidant potential in search of new hit compounds. Materials and Method: The crude extract after maceration was subjected to solvent-solvent fractionation using chloroform, ethyl acetate and ethanol, in increasing order of polarity, followed by quantitative phytochemical estimation. Antioxidant activity was carried out using DPPH radical scavenging assay method. Antidiabetic activities were determined using alloxan-

induced diabetic rats; 150mg of alloxan per kg body weight was given intraperitoneally. All statistical analyses were performed using the SPSS statistical package with data reported as the mean ± SEM. Results: Ethylacetate fraction had the highest value of TPC (46066.87±1350mg GAE) and TFC (29912.50±6230mg QuE) per gram dry samples respectively. Similarly, the ethylacetate fraction had the best relative antioxidant activity (IC 50 of 0.75µg/ml). Both crude and the fractions given in different doses exhibited good blood-glucose- lowering effect with statistically significant difference (p<0.05) between the means of the different groups (and control). The chloroform and ethylacetate fractions had a better anti-diabetic effect as all administered doses had their average glucose level below the diabetic index (250mg/dl). Conclusion: This research showed that A. conyzoides methanol leaf extract has high flavonoid and phenolic contents. It equally demonstrated good antioxidant and antidiabetic activities, especially the ethylacetate fraction. As various researchers have documented its ethno-medicinal potentials, this plant could be a very good low-cost alternative source of phytoconstituents for development of drugs for treatment of various debilitating diseases such as diabetes mellitus, cancers, CVDs and many free radical aggravating illnesses like aging.

Keywords: Antidiabetic, antioxidant, phytochemicals, *Ageratum conyzoides*, maceration, fractionation, flavonoids.

EPH 068

PHYTOCHEMICAL ANALYSIS, MICROBIAL SCREENING AND MOLECULAR ANALYSIS OF *COMBRETUM MICRANTUM* ON SELECTED MICROORGANISMS

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ABSTRACT

The decoction of the stem bark and leaves of *Combretum micranthum* is used in Traditional Medicine for various ailments such as cough, smallpox, skin lesions, bronchial ailments, diabetes mellitus, cancer and toothache without knowledge about its potential effect. The study was aimed at establishing a safety profile, evaluating phytochemical constituents and some Pharmacological properties of methanol stem bark extract of *Combretum micranthum*. Evaluation of the powdered sample (chemomicroscopic, physicochemical parameters),qualitative and quantitative phytochemical analysis, microbial screening and molecular analysis of the microbial genome using standard methods. Chemomicroscopic characters present included; cellulose cell wall, lignified cell wall, tannins, starch, calcium oxalate and cutin. Various Researches were carried out on toxicological effect of the *Combretum micranthum*, but there is no research that investigates molecular effect of the *Combretum micranthum* .Thus, the Phytochemical Analysis, Microbial Screening and Molecular Analysis of the *Combretum micranthum* will help in controlling hidden effects of the plant at molecular level.

Keywords: Phytochemicals, *C. micranthum*, molecular analysis, microbial screening, Chemomicroscopic characters

EPH 069

PHYTOCHEMICAL AND ANTIMICROBIAL STUDIES OF THE AQUEOUS LEAVES EXTRACT OF PHYSALISPERUVIANA.

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ABSTRACT

Physalisperuviana Linnaeus, a plant in solanaceae family used in folklore traditional medicine, which is a medicinal plant used in treatment of bacterial, fungal, and viral diseases. The plant has been reported to have possessed ethno pharmacological properties including antifungal, anti-cough, anti-inflammatory and analgesic activities. Some active phytochemical components from Physalis species have been investigated. In this study, Physalis minima was prepared and evaluated for its phytochemical properties and antimicrobial activities, dry and powdered leaves of Physalisperuviana were subjected to aqueous extraction. The extract was examined for the phytochemical components present in them. The phytochemical analysis of the preparation revealed the presence of some secondary metabolites which include: steroids, terpenes, tannins, flavonoids, alkaloids, saponins, phlobatannins, and cardiac glycosides. The antimicrobial analysis of the crude extract and aqueous extract of the Physalisperuviana was analyzed. The extract showed antibacterial activities against the test organisms with different zones of inhibition, the bacterial analysis of the aqueous extracts were found active against bacteria viz. S. aureus, K. pneumoniae, E. coli, P. vulgarius, P. fluroscens. The minimum inhibitory concentration (MIC) of the aqueous extracts was between 200-500mg/ml. The investigation indicated that the aqueous extracts inhibited the growth of microbes. The ability of the crude extracts of Physalisperuviana to inhibit the growth of the microbes is an indication of its antimicrobial potential; which may be employed in the management of microbial infections. The observations on the antimicrobial activities of the plant extracts indicated the reasons of their applications in herbal drug dispensation.

Keywords: Phytochemical, Anti-microbial, Physalisperuviana, Aqueous.

EPH 070

EFFECT OF METHANOLIC PLANT LEAF EXTRACT OF HYPHEANE THEBAICA (L) MART ON SOME BIOCHEMICAL AND HISTOPATHOLOGICAL PARAMETERS IN WISTAR ALBINO RATS

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ABSTRACT

The effect methanolic plant leaf extract of *Hyphane thebaica* (L) Mart on some hematological and histopathological parameters were assayed in wistar albino rats. Twenty wistar albino rats were

divided into four (4) groups of five rats each. Group 1 serve as control while group 2, 3, and 4 were administered daily through oral intubation of 95% methanolic plant leaf extract of *Hypheane thebaica* (L) mart using 200 mg/kg, 400 mg/kg and 800 mg/kg body weight dosages. All the rats were fed with normal diet (ECWA marsh) purchased in Maiduguri and water ad libitum for 4 weeks (28 days). After 28 days oral intubation, some haematological parameters of Red Blood Cell (RBC), Heamoglobin concentration (Hb), Packed cell volume (PCV), White blood cell (WBC), Differential leucocyte count (DLC) (Nuetrophils, Eosinophils, Basophils, Monocyte and lymphocyte) were assayed. Twenty four (24) hours after the last administration, the animals were sacrificed and histopathological parameters of the liver, kidney and the heart were carried out. The result revealed significance increase at ($P<0.05$) in the level of WBC and Lymphocyte while RBC, Hb, PCV, neutrophils Basophils and Eosinophil were not affected. Toxic effect were seen on the liver, kidney and the heart at the high dose of 800 mg/kg. From the findings it was concluded that the 95% methanolic plant leaf extract of *hyphane theibaica* (L) Mart had no hematinic activity like the methanolic fruit pulp and serve as good immune block buster and however using the plant methanolic leaf extract at high dose should be exercised to avoid other health related problems.

EPH 071

ANTIPLASMODIAL ACTIVITY OF SELECTED MEDICINAL PLANTS USED TO TREAT MALARIA IN NIGERIA

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ABSTRACT

Background of the Study: Malaria still remains a public health menace most especially in tropical and subtropical region resulting in high morbidity and mortality. This may be due to increasing resistance of the available antimalarial drug by the parasites. Insufficiency of the drugs have made it necessary to search for new effective agents from natural source like plants. Based on this, the present study attempted evaluating antiplasmodial activity of some medicinal plants; Hibiscusvitifolius, Hyptissauveolens and Asparagusafricanusin rodent model of malaria. Material and Methods: A rodent malaria parasites Plasmodium berghei was used to inoculate healthy Swiss albino mice of both sexes, aged 6-8weeks and weighing 18-25g. An aqueous crude extract of Hibiscusvitifolius, Hyptissauveolens and Asparagus africanusleaves were administered to different groups of mice at a dose in the range: 200, 400 and 600mg/kg b. wt. Parasitemia level, body weight, rectal temperature and packed cell volume were determined using standard protocols. Results: The results of the study showed all the plants extract possess antiplasmodial activity but in a vary degrees. Asparagusafricanus (200 and 400 mg/kg) and Hyptis sauveolens(600 mg/kg) seem to have exerted the most activity. The study observed that the extracts did not prevent loss of weight. Rectal temperature of mice treated with all extracts at higher doses (600 mg/kg)

was lowered (37.36 °C to 35.23 °C) compared to untreated mice (37.56 to 34.10 °C). Mean survival time of mice were improved particularly in mice treated with Hyptissauveolensat 600 mg/kg while effect of extracts on PCV change was not significant. Conclusion: Findings from this study shows that all the plants extract contain compounds with antiplasmodial activity against P. berghei, indicating that the plants may be a good source for the development of novel antimalarial agent.

Keywords: Antiplasmodial, Leaves Extracts, Medicinal Plants, Mice, Plasmodium berghei,

SUB-THEME

BIOINFORMATICS AND NANOTECHNOLOGY (BAN)

BAN 001

COMPUTATIONAL MOLECULAR CLONING OPTIMIZATION OF CHITINASE GENE IN PLANT GENETIC ENGINEERING SYSTEM

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ABSTRACT
Computer-aided plasmid design also known as 'in-silico' cloning is increasingly emerging as a potent computational tool in genetic transformation research for its cost effectiveness and minimization of multiple laboratory trials. This in turn saves cost, time and energy. Transfers of specific nucleotide sequences of interests to cloning vectors are critical to the production of desired genes or proteins. Cloning of genes that code for important enzymes like chitinase can never be over accentuated because of the need to synthesize variants of the protein to suit different genetic engineering interests like chitinase binding domain (ChBD) type, catalytic domain, etc. Chitinases play key roles in the digestion of chitin through hydrolysis of b- 1,4 linkages between the N-acetyl glucosamine molecules. Thus, it's useful in crop improvement against insect pests and fungi, via recombinant DNA process. In this work, we employed structural bioinformatics using "Addgene" and "Serial Cloner" software with theoretical molecular genetics techniques to study, construct and analyze a suitable plasmid for chitinase gene cloning. In the stringent restriction enzyme cloning analyses carried out through "in-silico" model optimization in a pGreen plasmid without altering the original components, *Xba*1 and *Bam*H1 were selected as the restriction enzymes of choice at the multiple cloning sites. PCR primer designs and evaluations were also optimized with respect to the restriction sites. The resulting ligation product is molecular clone of Chitinase A1 gene in a pGreen vector ready for laboratory authentication.

Keywords: *In-silico*, Cloning, Plasmid, Genetic transformation, Serial Cloner, Chitinase, Restriction enzyme

BAN 002

IN SILICO MULTI-EPITOPE VACCINE CANDIDATE DESIGN FOR PROPHYLAXIS AGAINST PLASMODIUM FALCIPARUM

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ABSTRACT
The prevalence and severity of malaria in humans have made it one of the most killer diseases, particularly in the tropics. Among the different species of the pathogens, *Plasmodium falciparum* is the most infectious and lethal. The pathogen's complex life cycle of diverse forms and developmental stages in different host systems aids its resistance to drugs. This is apparently one of the major

reasons for the continuous increase in the incidence of malaria infections despite constant progresses in treatments and control measures against the disease overtime. The course for continuous search and improvements in developing vaccines against malaria is now enhanced by the evolving 'Omics' technology which has made designing of effective vaccines possible with reduced cost and time. In this study, computer-aided multi-epitope vaccine candidate design method, which is emerging as a potent computational tool in vaccinology research was used to design a 32-epitope sub-unit vaccine against P. *falciparum*. We employed standard bioinformatics pipeline software like '*IEDB, VaxiJen, Allertop, Protpram*, *IL-4, IL-10, IL-γ*'servers to identify, predict, prepare, and screen 124 epitopes for malaria vaccine development. The selected epitopes comprising of B-cells, CTLs and HTLs from P. *falciparum* strain which were proteins expressed at the four stages of the parasite's life cycle, perfectly scaled through comprehensive and stringent immunoinformatics characterization. Human Beta-defensin-3 adjuvant was added to boost the immune response while the subunits were conjugated with appropriate linkers. The resulting construct is a good vaccine candidate by in-silico evaluation that is ready for laboratory validation.

Keywords: *P. Falciparum*, Epitope, Adjuvants, Immunoinformatics, Omics, Vaccine,

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BAN 003
MOLECULAR DOCKING STUDIES OF SOME SELECTED CHEMICAL ACTIVATORS OF APOPTOSIS REGULATOR (BCL-2)

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ABSTRACT
Thirty six (36) compounds were collected from the PubChem database and used to study the inhibition of Bcl-2 receptors via a computational aided drug design technique. The molecular docking of all the ligands were done, and Ligands AP7 (-25.313 kcal/mol), AP26 (-29.430 kcal/mol) were the best from all the 36 compounds used in the study. The structures of AP7 and AP26 were optimized by changing some of the fragments to form new compounds giving as AP7a and AP26a respectively. The binding energies of AP7a and AP26a were determined and their values presented as -25.264 kcal/mol and -26.0851 kcal/mol respectively. In conclusion, the aforementioned results show that the newly designed compounds were better BCl-2 apoptosis regulator inhibitors than the 36 compounds used for the study, due to the significant hydrogen bond energies formed by the novel compounds.

BAN 004

LIGAND-BASED DRUG DESIGN STUDIES ON SOME SELECTED CHEMICAL ACTIVATORS OF APOPTOSIS REGULATOR (BCL-2)

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ABSTRACT
In spite of the substantial increase in the study of cancer over the past decades, the disease is still a serious global health challenge and poses a considerable study. Bcl-2 apoptosis regulators were identified as potential targets in eliminating cancer cells, due to their high affinity for BAX proteins which functions as a tool for bringing death to any cell. Hence, developing new Bcl-2 inhibitors with better therapeutic effect is strongly needed. In an attempt to overcome this challenge, this research is aimed at designing novel chemical moieties with better inhibition capacity Bcl-2 apoptosis regulator via prediction of their activities using a newly developed QSAR model. The QSAR mo del that was presented in this work was selected for the design and predictions of future molecules found within the applicability of the model because it has the highest statistical parameters such as: coefficient of determination (R^2 = 0.7836), cross validation coefficient (Q^2_{loo} = 0.7094), and adjusted R^2 (R^2_{adj} = 0.7475). The models was able to predict the activity of the compounds used in developing the models, the validation statistical parameter for the test set were not as significant as that for the training set, but the result suggest that the model can be improved upon by applying other nonlinear modeling techniques like that of machine learning algorithm and support vector machine or by replacing the molecules identified as outliers and influential molecules in the data set with other molecules of similar structure.

BAN 005

IN SILCO ANALYSIS OF CHEMOKINE CO-RECEPTOR CCR5 AS A TARGET FOR HIV THERAPEUTICS

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ABSTRACT
Studies have shown that individuals with Δ32 mutation within the CCR5 locus were resistant to HIV infection, while those that are heterozygous for the mutation progressed very slowly. A lot of potential problems associated with CCR5 agonist resulting from variable drug toxicity and speedy appearance of mutations. The successful hematopoietic stem cells transplantation from a donor with CCR5 Δ32/Δ32 efficiently eliminated the entire HIV traces in Berlin patient; this suggests that HIV

patients can be cured by generating CCR5-negative cells in the patients. Because of the high risk associated with stem transplantation there is a strong need to develop a therapeutic design where suitable cells will be targeted for *in vivo* transduction such as the case of gene editing. This research was aimed at identifying the targeted sites for the inhibition of HIV-1 entry and replication. By the use of bioinformatics tools specifically PSIPRED, MEMSAT 3, SAS and GENTHREADER, this study revealed the tertiary structure and the CCR5 protein binding sites to be targeted for HIV therapy especially in gene editing and vaccine development. The CCR5-maraviroc crystal structure indicated a non-competitive ability of Maraviroc to bind a site entirely different from the regions of chemokine and HIV binding.

Keywords: *In silco*, Chemokine, Co-receptor, CCR5, HIV, Therapeutics

BAN 006

MOLECULAR DOCKING ANALYSIS OF PHYTOCONSTITUENT OF PHYLLANTHUS NIRURI (CHANCA PIEDRA) AGAINST NON-STRUCTURAL PROTEIN 5B (NS5B) FROM HEPATITIS B VIRUS USING IN-SILICO APPROACH

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ABSTRACT
Hepatitis B is an infectious diseases caused by the Hepatitis B virus (HBV) that affect the liver, it is a type of viral hepatitis and can cause both acute and chronic infection. The virus is transmitted by exposure to infectious blood or body fluids. The virus has affected approximately 180 million people around the world. A non-structural protein 5B (NS5B) polymerase is a viral protein found in hepatitis B and plays a major role in the replication of the virus, over decades, it has been found that inhibition of this enzyme stop the replication of the virus and thus treat disease. Crystal structure of target protein was retrieved from PDB (PDB ID:3UPI). The protocol of USCF chimera prepares the protein. In this study a total of 21 compounds were obtained from GC-MS analysis of *Chanca piedra* and was used for virtual screening based on the physiochemical properties (lipinski's rule of five) further filtered for pharmacokinetic properties (Absorption, Distribution, Metabolism, Excretion, and Toxicity or ADMET). And then molecular docking was carried out. A total of 13 compounds with high binding energies values ranging between (-7.03 and -4.69) (CID_616782, CID_546995, CID_283728, CID_543706, CID_10798, CID_5364398, CID_697893, CID_10798, CID_543562, CID_89719, CID_534396, CID_530418, CID_5364553). These compounds were screened and their desirable pharmacokinetics properties were selected, therefore, these compounds are considered as suitable prospective inhibitors of (NS5B) after in vivo and in vitro experimental validation.

Keywords: NS5B, *Chanca piedra*, Docking, PDB, HBV, GC-MS, ADMET.

BAN 007

ANTI-DIABETIC INHIBITORY EFFECT OF IDENTIFIED PHYTOCHEMICALS IN ZIZIPHUS SPINA-CHRISTI ON ALPHA-AMYLASE: IN SILICO SCREENING APPROACH.

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ABSTRACT
Diabetes mellitus is a metabolic disorder characterised by persistent high concentration of blood glucose. Its progression results in health complications like neuropathy, retinopathy, nephropathy, pathology of other cell or tissue types of the body and death. *Ziziphus spina-christi* is a recognised plant for its nutritive and medicinal values. The aim of the study was to screen various identified phytochemicals in *Ziziphus spina-christi* on alpha-amylase which is an anti-diabetic drug target through in silico approach. A library of identified phytochemicals of *Ziziphus spina-christi* from literature search was built by downloading the compounds f-rom PubChem. The hits were screened for their drug likeness and pharmacokinetics using the Swiss ADME predictor. The suitable hits from the drug likeness were docked with amylase using Autodock vina and molecular interactions visualized with Discovery studio visualizer. Sixteen compounds in the library were selected based on the Lipinski rule. Jujubogenin-amylase complex had the lowest binding energy of - 8.9 Kcal/mol and also compares well to the clinically approved Acarbose with a binding energy of - 7.3 Kcal/mol. Hence, this investigation on the bioactive compounds from *Ziziphus spina-christi* especially Jujubogenin suggests its potential inhibitory activity on alpha-amylase for diabetes treatment.

Keywords: *Ziziphus spina-christi*, Diabetes mellitus, phytochemicals, drug likeness, *in silico* amylase, Jujubogenin

BAN 008

INVESTIGATION OF NADPH-OXIDASE'S BINDING SUBUNIT(S) FOR CATECHIN COMPOUNDS INDUCE INHIBITION

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ABSTRACT

Catechins are natural polyphenolic compounds with ability to minimize excess free radicals through different mechanisms including inhibition of NADPH oxidase (NOX) activity. NOX is a complex enzyme made-up of several subunits, where molecules including catechins bind to exert their effect. Hence, the attempt to probe the NOX enzyme's binding subunit of catechins-induce effect. Several *in-silico* techniques were deployed in probing the NOX enzyme's binding subunit of the catechins. The catechins were downloaded from PubChem database in SDF files. The five NOX subunits with PDB ID: 3A1F, 1OV3, 1HH4, 1OEY, and 7CFZ were downloaded from the protein databank. Drug-likeness properties and biological activities were predicted using ADMETMESH software. Catechin-NOX subunits' interactions was performed via molecular docking, and the docked conformations were analyzed using Protein-plus software. The results of the study predicted the catechin compounds; epicatechin (E), epicatechin gallate (EG) and epigallocatehin gallate (EGG) are drug-like in nature and possess enzymes inhibitory properties. Docking result predicted catechins are capable of interacting with the various NADPH oxidase (NOX) subunits but in a varied degree. Their (catechins) strongest affinities was predicted on p40phox and p67phox PB1 subunit (PBD: 1OEY) with binding energies in the ranges of -8.3 to -9.9kcal/mol in this order; Apocynin>EGG>EG>E. While a weak affinity was predicted between the catechin compounds and gp91 (phox) subunit (PDB: 3A1F) with binding energies (-4.9 to -6.5kcal/mol) in this sequence; E<apocynin<EGG<EG. In conclusion, the study predicted catechin compounds possess drug-likeness properties and has affinities for interaction with NADPH-oxidase subunits particularly the p40phox and p67phox PB1 probably to exert their antioxidant effects. Therefore, *in vitro* and *in vivo* study is recommended to verify this claim.

Keywords: Catechins, Inhibition, *In-Silico*, NADPH-Oxidase, Polyphenolics

BAN 009

IN-SILICO TOXICITY EVALUATION, ANTIPLASMODIAL ACTIVITY, AND CHEMICAL CHARACTERIZATION OF BIOACTIVE COMPOUNDS FROM VITEX DONIANA SWEET

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Abstract

Vitex doniana is a highly used medicinal plant and an enriched source of nutrients and bioactive compounds. Therefore, the present study was designed with the aim to characterize the bioactive compounds from fractions of *V. doniana* leaves and determine antimalarial, and *in-silico* toxicity studies of the fractions. Twenty-four (24) passaged mice (weighing 24 to 29g) with 0.5ml blood suspension containing approximately 2.5 × 107 parasitized erythrocytes were randomly divided into six groups (2 to 7). Grp1 was normal group and grp2 the disease control. Grp3 to grp7 were administered with artequick + *V. doniana* fraction, chloroquine + *V. doniana* fraction, artequick, chloroquine, and V. doniana fraction respectively. The biochemical parameters and characterization of bioactive components were determined using standard methods, while the in-silico toxicity prediction employs the use of ProTox. From the result, there was a significant ($p<0.05$) reduction in parasitaemia for groups that received treatment, with groups 3 and 4 having the highest

chemosuppression (4.25±0.25 and 4.65±0.28%, respectively) when compared with the disease control group which had 7.93±1.61 % in parasitaemia. The phytochemical screening showed the presence of alkaloids, phenols, flavonoids, saponins, tannins, reducing sugars, and volatile oils, with the absence of glycosides and terpenoids. The GC-MS analysis of fraction 'IEMF-1:1' of *V. doniana* leaves identified eleven constituents that were dominated by oleic acid (22.66%), 1H-indole, 4-methyl (15.68%), and L-tryptophanol (14.2%). Similarly, an analysis of fraction 'IEMF-1:3' of *V. doniana* leaves identified nine constituents, which were dominated by L-tryptophanol (28.89%), 2,3-dihydroxypropyl elaidate (22.43%), and 13-octadecenal (16.6%). The various compounds are reported to have biological activities *invivo*. The *in-silico* toxicity prediction of compounds from fractions of V. doniana leaves, shows compounds in the toxicity class of 3 to 6, including the standard antimalarial drugs artesunate and chloroquine, with prediction accuracy in the range of 67.38% to 100%. The molecular weights of all compounds are less than 500 g/mol, and thus, obeys Lipinski's rule (RO5) for molecular weight threshold of promising drug candidates. The result presents the promising potentials of fractions of *V. doniana* leaves as a drug candidate for managing malarial infection.

Keywords: Characterization, *in-silico, P. berghei, toxicity, V. doniana.*

BAN 010
TRYPANOSOMA BRUCEI GAMBIENSE PHOSPHOLIPASE A_2-SPECIFIC NANOBODIES AS POTENTIAL THERAPEUTICS FOR HUMAN AFRICAN TRYPANOSOMIASIS

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ABSTRACT

The development of vaccines for African trypanosomiases (AT) is hindered by antigenic variation in trypanosomes. Moreover, current chemotherapy options face limitations due to drug resistance and toxicity. Thus, there is a need for innovative treatment alternatives. Nanobodies hold promise for diagnostics and therapeutics in various diseases and infections. In this study, we identified new inhibitory nanobodies against recombinant *T. b. gambiense* PLA_2 (*Tbg*PLA_2), a validated drug target and essential enzyme for trypanosomes' survival in their hosts. We produced recombinant TbgPLA_2 in *E. coli* and *Pichia pastoris*, purifying the enzyme to homogeneity. The nanobodies were expressed in *E. coli* using cell surface display technology and also purified to homogeneity. Biochemical analysis revealed that *Tbg*PLA_2 is a 39 kDa enzyme with a specific activity of 107.40 µmoles/min/mg protein. Its V_{max} and K_M values were determined as 25.1 µmol/min and 0.90 mM, respectively. High-

throughput screening (HTS) of the nanobodies library led to the discovery of both off-rate and non-off-rate selected Nbs capable of binding to and inhibiting *Tbg*PLA$_2$ at nanomolar concentrations (with an IC_{50} value of up to 6.85 nM). The non-off-rate selected Nbs exhibited robust biophysical properties and thermostability by retaining some residual inhibition of *Tbg*PLA$_2$ activity after boiling at 99 °C. Protein sequence analysis of the off-rate selected Nbs revealed distinct complementarity-determining regions (CDRs) among all Nbs. These findings provide valuable insights and highlight a significant advancement in the development of a nanobody-based therapy targeting *Tbg*PLA$_2$ for the treatment of African trypanosomiasis.

BAN 011
QUERCETIN-IRON NANOPARTICLES: SYNTHESIS, CHARACTERIZATION, AND APPLICATION IN BIOREDUCTION OF HEXAVALENT CHROMIUM

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ABSTRACT

Background: Environmental pollution emanating from anthropogenic sources remains one of the problems of the 21st century. Cr (VI) is a toxic metal ion discharged from various industrial activities like tanning, electroplating, and textile manufacturing. The pertinacious nature of this contaminant continues to be a problem despite several remediation strategies that have been developed for its removal necessitating the exploration of green technology for the synthesis of various organic nanoparticles for bioremediation of Cr (VI). **Methods:** Quercetin-iron nanoparticles were produced using a green method. The products were characterized using UV-visible spectroscopy, Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), Energy Dispersive X-ray analysis (EDX) and Dynamic Light Scattering (DLS) technique. In batch mode, the effect of process parameters; contacts time, bioreductant dosage, pH, temperature and initial Cr (VI) concentration was investigated for the removal of Cr (VI) in laboratory simulated wastewater. **Results:** The characterization results show that the nanoparticles were irregular in shape with an average particle size of 32nm and a hydrodynamic size of 42nm. A strong signal of iron was reported in the corresponding EDX spectra. The nanoparticles did not require additional stabilizing agent. The optimal Cr (VI) reduction (96%) was attained at contact time 40mins, pH 2, room temperature, 1mg/L bioreductant dosage, and 10mg/L initial Cr (VI) concentration. The pseudo first order and pseudo second order model can be used to fit the reduction process indicating adsorption with simultaneous reduction. Thermodynamic studies reveal that the reaction was spontaneous and exothermic in nature ($\Delta G^o < 0$, $\Delta H^o < 0$, $\Delta S^o > 0$).

Keywords: Quercetin-iron nanoparticle Bioreduction Chromium Green technology Effluent

BAN 012
MOLECULAR DOCKING STUDIES ON 6-PYRUVOYL TETRAHYDROPTERIN SYNTHASE OF PLASMODIUM FALCIPARUM (6-PFTPS)

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ABSTRACT
6-pyruvoyl tetrahydropterin Synthase (6-PTPS) enzyme, is a lyase involved in the synthesis of tetrahydrobiopterin. In *Plasmodium* species, where Dihydroneopterin Aldolase (DHNA) is absent, the enzyme (*6-PfTPS*) acts in the folate biosynthetic pathway necessary for the growth and survival of the parasite. This study identified potential inhibitors of *Pf*PTPS using molecular docking techniques. Molecular docking and virtual screening of 62 compounds including the control, to the deposited PDB structure was carried out using AutoDock Vina in PyRx. Seven of the compounds showed better binding affinity than the control ligand, biopterin, and were selected and screened. Three conformers of 140296439 with the binding energy of -7.2, -7.1, -7.0kcal/mol along with 140296495 were better than the control at -5.7kcal/mol. In silico ADMET studies predicted good pharmacokinetic properties of all the compounds while reporting a high risk of irritant toxicity in 140296439 and 144380406. The study highlights 140296439, 140296495, 144380406, 135573878 and 136075207 as potential inhibitors of PfPTPS and possible compounds for antimalarial drug development.

Keywords: Molecular Docking, Drug Target, Antimalarial Drugs, Inhibitors

BAN 013
PRODUCTION, COMBUSTION AND EMISSION CHARACTERISTICS OF BIODIESEL FROM CYANOBACTERIA (BLUE GREEN ALGAE) ISOLATED FROM ALAU DAM MAIDUGURI BORNO STATE

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ABSTRACT
The rapid rise of climate change and its threats to the Earth have become a concern to all sectors in the recent years. Accounting for 70% of the total global energy demand, fuels are playing a crucial part in the life of humans. This study was aimed at cultivation, and identification of cyanobacteria;

production and optimization of biodiesel from cyanobacteria biomass, and determination of physiochemical components, energy combustion and emission characteristic of the biodiesel produced. A total of twenty (20) samples were collected from four different locations in Alau dam and eleven isolates were identified as *Oscillatoria* spp. *Oscillatoria* spp biomass yield ranged from 1.048g/L to 1.139g/L and the uncultured biomass harvested from Alau dam was 132.86g/L. The volume of lipid extracted from cultured biomass was 0.09053ml/g and for uncultured biomass was 7.40ml/g. There was significant difference ($P < 0.05$) in biomass and lipid of cultured and uncultured cyanobacteria. Lipids were converted to biodiesel and optimal conditions set at 3:1 (methanol: oil), with 0.09g catalyst for 1 hour. Two physiochemical parameters (temperature and reaction time) were optimized which influences the biodiesel production. There was increase in biodiesel production with increase in temperature whereas the biodiesel yield decreases as reaction time increased. The biodiesels produced were analyzed (GC-MS analysis, FT-IR, specific gravity, viscosity, high heating value, cloud and pour point, flash point, refractive index, engine test and gas emission analysis) to determine the energy combustion, physiochemical components and emission characteristics. All the properties analyzed were within the regulatory limits stipulated for conventional diesel fuel as per the ASTM specifications. Therefore, *Oscillatoria* spp. is an ideal candidate for biodiesel production and it is recommended that its cultivation methods should be enhanced with a view to harnessing its full potentials.

Keywords: Biodiesel, Cyanobacteria, Blue-green Algae, and Optimization

BAN 014
IN SILICO DOCKING AND PHARMACOKINETICS ANALYSIS OF ACTIVE COMPOUNDS FROM PHYLLANTHUS NIRURI (CHANCA PIEDRA) AGAINST HUMAN SALIVARY AMYLASE FOR THE TREATMENT OF DIABETES MELLITUS TYPE-II

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ABSTRACT
Human salivary amylase (HSA) is responsible for postprandial glucose levels therefore, different plant extracts with alpha amylase inhibitory activity are being investigated that might decrease postprandial blood glucose levels. HSA inhibitory activity of medicinal plants and their phytochemical compounds are explored that might be helpful within the treatment of diabetes mellitus (DM). The Crystal structure of the target protein was obtained from PDB (PDB: 1SMD). The protocol of USCF chimera prepares the protein. In this study a total of 31 compounds were obtained from GC-MS and is used for virtual screening based on their physiochemical properties (Lipinski's rule of five) further filtered for pharmacokinetic properties (Absorption, Distribution, Metabolism, Excretion, and Toxicity or ADMET) and then molecular docking was carried out. A total of 18 compounds with high binding energies with values ranging between (-9.22 and -4.03) (CID_312822, CID_616782, CID_41687, CID_544017, CID_530418, CID_534396, CID_534396, CID_697893, CID_5280435, CID_5366244, CID_546995, CID_89719, CID_5363335, CID_95337, CID_25045, CID_283728, CID_543706, CID_5364553. These compounds were screened and their desirable

pharmacokinetics properties were selected, therefore, these compounds are considered as suitable prospective inhibitors of (HSA) after in vivo and in vitro experimental validation.

Keywords: DM, HSA, Chanca piedra, GC-MS, Docking, PDB, ADMET.

BAN 015

IN SILICO VIRTUAL SCREENING AND MOLECULAR DOCKING ANALYSES OF ACTIVE PHARMACEUTICAL INGREDIENTS (API) FROM PHYLLANTHUS NIRURI (CHANCA PIEDRA) AGAINST CYCLOOXYGENASE-2 ENZYME FOR THE TREATMENT OF CHRONIC INFLAMMATION

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ABSTRACT

Cyclooxygenase-2 (COX2), also known as prostaglandin-endoperoxide synthase (PTGS), is an enzyme (specifically, a family of isozymes, EC 1.14.99.1) that is responsible for formation of prostanoids, including thromboxane and prostaglandins such as prostacyclin, from arachidonic acid. It is also known as prostaglandin G/H synthase. It catalyzes the conversion of Prostaglandin H2 from arachidonic acid. Pharmaceutical inhibition of COX-2 can provide relief from the symptoms of inflammation and pain. In this study, the novel inhibitors of Cyclooxygenase-2 from *Phyllanthus niruri* were identified using in silico approach. The crystal structure of target protein COX-2 proteins was obtained from protein Data Bank (PDB: 3LN1). The structure prepared through energy minimization and structure optimization. A total of 16 compounds obtained from *Phyllanthus niruri* capable of binding to Cyclooxygenase-2 were subjected to virtual screening through Lipinski's rule of five and molecular docking analysis. Fifteen (15) compounds with good binding energies, ranged between ─5.04 to ─13.89kcal/mol were selected, better than the binding energy of ─4.88kcal/mol for C7H9FN2O2 (CAS) and further filtered for pharmacokinetic properties (Absorption, Distribution, Metabolism, Excretion, and Toxicity or ADMET). Twelve compounds (CID_616782, CID_546995, CID_283728, CID_543706, CID_5364398, CID_697893, CID_5364553, CID_41687, CID_534521, CID_544017, CID_312822, and CID_5366244) which had desirable pharmacokinetic properties selected for molecular dynamic (MD) simulation and molecular generalized born surface area (MM-GBSA) analyses. The results of the analyses showed that all the compounds formed stable and rigid complexes after the 50ns MD simulation and also had a lower binding as compared to7H9FN2O2 (CAS). Therefore, these compounds considered as good inhibitors of cyclooxygenase-2 after *in vitro* and *in vivo* validation"

Keywords: cyclooxygenase 2, Docking, MD simulation, ADMET and MM-GBSA

BAN 016

BIO-NANO-FABRICATIONS: PLANTS VIS-À-VIS MICROORGANISMS

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ABSTRACT
The syntheses and applications of nanoparticles are currently among the most interesting fields of emerging scientific researches. Nanotechnology has become one of the most auspicious technologies applied in all areas of human endeavours and nanomaterials have received global attention due to their extensive applications in 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 exploiting plants and microorganisms as convenient nanofactories. This paper focused on the various approaches for the biosynthesis of nanomaterials and the applications of those nanomaterials inmedicine, environmental remediation and several other human undertakings. The driving approaches inbiogenic syntheses 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 discussed.

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

BAN 017

COMPUTATIONAL STUDIES ON THE INHIBITORY ACTIVITY OF COMPOUNDS FROM FICUS PALMATA FORSK AGAINST OXIDATIVE STRESS-INDUCED DIABETES VASCULAR COMPLICATIONS

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ABSTRACT
Diabetes is a metabolic disorder that involves derangement of carbohydrate, protein and lipid metabolism. Oxidative stress is a physiological condition that results to diabetic complications in uncontrolled diabetes. This study aimed to investigate the inhibitory activity of 38 compounds from *Ficus palmata* Forsk against α-amylase, α-glucosidase, aldose reductase, and sorbitol dehydrogenase which are enzymes of diabetes and diabetic complications using *in silico* model. Three compounds

(isohemiphloin, quercetin-3-O-rutinoside-7-O-glucoside and vitexin) with high binding energies for the selected diabetic target proteins were subjected to further studies. The binding energies range from -11.0 to -11.2 kcal/mol for α-glucosidase, -10.2 to -13.4 kcal/mol for aldose reductase and -9.2 to -11.9 kcal/mol for sorbitol dehydrogenase. However, the binding affinities of the three selected compounds were lower than that of the reference drugs used in this study. Isohemiphloin, quercetin-3-O-rutinoside-7-O-glucoside and vitexin follow the Lipinski's rule of 5 except in some cases. Isohemiphloin and vitexin violated one of the rule (NHorOH>5) while quercetin-3-O-rutinoside-7-O-glucoside violated 3 of the Lipinski's rule (MW>500, NorO>10, NHorOH>5). The compounds displayed low toxic effects as observed from the ADMET analysis. Overall, the current findings indicated that isohemiphloin, quercetin-3-O-rutinoside-7-O-glucoside and vitexin obtained from *F. palmata*, a high-altitude plant, could serve as lead compounds in the management of diabetes and its complications induced by oxidative stress.

Keywords: Aldose reductase, oxidative stress, diabetic complications, high-altitude medicinal plants

BAN 018
BIOINFORMATICS ANALYSIS OF CCR5 PROTEIN STRUCTURE AS A HIV CO-RECEPTOR

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ABSTRACT
Information about the gene CCR5 obtained from National Centre for Biotechnology information (NCBI) website (http:www.ncbi.nlm.nih.gov/). It was discovered that the gene of human CCR5 has two transcript variants "A" with accession number NM_000579 and "B" with Accession number NM_01100165. These transcript variants encode the same protein, the A variant represent the longer variant. Bioinformatics analysis was carried out for human CCR5 to analyze its gene and protein structures, also make comparisons with other homologous species. Basic Local Alignment Search Tools (BLAST) as well as phylogenetic analysis using Clustal-X was adopted to analyze the relationships between human CCR5 and other homologous species. The protein BLAST revealed a wider range of homology in amino acid sequences of CCR5 among vertebrates. Chimpanzee, orangutan and gorilla were 99% while rhesus monkey and olive baboons were 98% homologous to humans. Other mammals such as pig, cattle, sheep, and dog were 87%, 86%, 84%, and 83% respectively. Other homologous species such as house mouse was 82%. Multiple sequence alignment of human CCR5 with 14 selected homologous species from result of BLAST P has revealed highly conserved sequences of amino acids. Pygmy chimpanzee has the closest amino acid sequence to human with very few substitutions on the 12 th amino acid of the pygmy chimpanzee where isoleucine (I) was substituted with asparagine (N) and the 13 th amino acid residue where asparagine (N) was substituted with aspartic acid (D). The phylogenetic tree for CCR5 has shown that human CCR5 sequences are closely related non - human primates such as pygmy chimpanzee, rhesus monkey, Sumatran orangutan and olive baboon. This close relationship reveals evolutionary tendency from SIV which infect those primates into HIV that infect humans.

Keywords: Bioinformatics, CCR5, HIV, Co-receptor

BAN 019

IN SILICO ANALYSIS OF RECOMBINANT CLONE (PET30A / MYT272-3) TOWARD TUBERCULOSIS VACCINE DESIGN

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ABSTRACT

The discovery of *Mycobacterium tuberculosis*, pathogenic agent of Tuberculosis (TB) was presented in 1882. The first antibiotics against TB was first administered to human in 1946. TB vaccine has been in used for about a century. Yet, in 2021, an estimated figure of 10·6 million individuals became ill with tuberculosis and 1·6 million persons died from TB. Bacillus Calmette-Guérin (BCG), a live attenuated vaccine and is currently the most widely used. It has variability in effectiveness ranging from 0-80%, hence an urgent need for a better vaccine candidate is of paramount important. The recombinant clone (pET30a / Myt272-3 clone) was constructed in Molecular Bacteriology and Toxicology Laboratory of University of Malaya was screened for its stability. The molecular weight of the protein was determined, Protein BLAST bioinformatics analysis and MALDI-TOF analysis were carried out. The protein was purified by Nickel based affinity chromatographic techniques. Bioinformatics software were used to analyze aliphatic index, instability index and grand average hydropathicity (GRAVY). The clone was found stable. The molecular weight of the protein was found to be approximately 10.58 kDa as determined by SDS-PAGE and conformed to the MW computed by EXPASY MW bioinformatics tool. Protein BLAST analysis indicated 81% homology with Phenolpthiocerol synthesis polyketide synthase I PpSA of *Mycobacterium tuberculosis,* MALDI-TOF analysis further validated the homology of the protein. Recently, computational biology approaches are found very valuable for understanding enormous data leading to the new field called immunoinformatics. These predictive findings serve as a practical guide towards *Mycobacterium tuberculosis* peptide vaccine design and development.

Keywords: Tuberculosis, Vaccine, Mycobacterium tuberculosis, Immunoinformatics

SUB-THEME
INDUSTRIAL BIOCHEMISTRY (IBC)

IBC 001

PURIFICATION OF MALATE DEHYDROGENASE FROM SALMONELLA TYPHI

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ABSTRACT
The aim of this study was to purify and characterize citric acid cycle enzyme malate dehydrogenase (MDH EC1.1.137) from salmonella typhi. The study was carried out in the laboratory of Biochemistry department, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria, between Febuary and November, 2021. The purification steps consisted of ammonium sulphate precipitation, ion-exchange chromatography and gel filtration. A typical procedure provides 33.7 fold purification with 22.3 yield. Single band was observed in both native gradient and SDS-PAGE. The molecular weight estimated for the native enzyme was 36.0kDa were determined. Hence, MDH is a dimer of identical subunits. The enzyme was highly active at pH 8.0 when NADH was used as the cofactor and was highly stable at pH 7.0, the optimum temperature for the enzyme activity was recorded to be 60%. Oxaloacetate was determined as the specific substrate with an apparent Km of 8. The characteristics of thermo stability and its high activity of alkaline pH suggest its potential diagnostic, therapeutic and beverage related applications. This MDH may be of value in developing serological test for typhoid which is caused by salmonella typhi.

Keywords: salmonella typhi, malate dehydragenase, purification, homodimer, reduction reaction

IBC 002

SCREENING AND OPTIMIZATION OF MEDIUM VARIABLES FOR EXTRACELLULAR POLYGALACTURONASE PRODUCTION FROM ASPERGILLUS FLAVUS *SP*

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ABSTRACT
Microbial enzymes are widely used in industrial processes due to their low cost, large productivity, chemical stability, environmental protection, plasticity and vast availability. Presently, polygalacturonase (PG) is one of the most important enzymes in fruits juice industries. The effect of various fermentation conditions on PG production from*Aspergillus flavus sp* ., through shake-flask culture was investigated using RSM. Plackett–Burman design was used to screen the significant factors that affect the enzyme production. After the design was applied, response surface methodology (RSM) through the use of Central Composite Design (CCD) was used to study the significant parameters further in order to get the most optimum production conditions. The optimum concentrations of temperature, pH, K_2HPO_4, peptone and pectin were found to be 37.58 ^oC, 5.73,

0.01g, 1.27% and 0.64% respectively. Second order polynomial regression model have accurately shown the interpretation of experimental data with an R^2 value of 0.9472, 0.9108 adjusted R^2 predicted R^2 of 0.8297, respectively.

Keywords: Amylase, Central Composite Design (CCD),*Aspergillus flavus sp*., Plackett-Burman Design, Response Surface Methodology (RSM).

IBC 003

ANTIFUNGAL POTENTIALS OF AQUEOUS EXTRACTS OF ALLIUM SATIVUM (GARLIC), SYZIGIUM AROMATICUM (CLOVES) SINGLY AND IN COMBINATION AGAINST FUNGI CAUSING TOMATO POST-HARVEST SPOILAGE IN MAIDUGURI METROPOLIS

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ABSTRACT

Tomato contains high moisture, low pH and nutrients that make it very susceptible to attack by microorganisms particularly fungi causing more than 40% post-harvest losses. The study tested the sensitivity of fungi isolated from spoiled tomato samples collected from six different markets within Maiduguri metropolis.to extracts of garlic, cloves singly and in combination. The sensitivity of the isolated fungi was tested using Agar Well Diffusion Method with aqueous extracts of the spices at four different concentrations of 45%, 65%, 80% and 100%. At 45% concentration, the garlic and combined extracts showed strong antifungal activity against all the fungi except for *Aspergillus terreus*, *Penicillium spp*, *Zygosaccharomyces bailii*, *Candida tropicalis*, and *Aspergillus ustus*. *Penicillium spp* and *Saccharomyces cerevisiae* were shown to be the most sensitive against aqueous extract of garlic with 3.4 mm and 3.2 mm zones of inhibition respectively at 100% concentration, while *Aspergillus. parasitucus*, *Aspergillus oryzae*, and *Saccharomyces cerevisiae* are the most sensitive of the combined extract at the same concentration. However, all the tested fungal isolates resisted the aqueous extract of cloves at all the tested concentrations. The combined extract, therefore, exhibited the highest level of inhibition against the growth of the tested fungi at all concentrations and may therefore have potential to arrest post-harvest tomato spoilage.

Keywords: Tomato**;** Antifungal; *Allium sativum (Garlic)**;** Syzigium aromaticum* **(**Cloves); Post-Harvest Spoilage.

IBC 004

EFFECT OF DIFFERENT EXTRACTION METHODS ON THE SUITABILITY OF NEEM SEED OIL FOR DOMESTIC OR INDUSTRIAL USE

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ABSTRACT

This study aimed to investigate the effect of two different extraction methods - Cold Press Extraction (CPE) and Soxhlet Extraction (SE) – on Oil yield, physicochemical properties, chemical composition,

and anti-nutritional factors, as indices of suitability for domestic or industrial use. SE method showed a higher oil yield (13.33%) than the CPE (10%) method. While the acid and peroxide values of CPE (5.7±0.78, 9.0±0.00) and SE methods (5.60±0.10, 6.27±0.50) showed no significant difference ($p < 0.05$), the saponification value of CPE (260.28±2.89) was significantly higher ($p < 0.05$) than SE (50.49±0.62). The anti-nutritional factors - Trypsin Inhibitors, Phytates, and Alkaloids in the SE method (1.91±0.01, 0.05±0.01, and 0.80±0.10) were also not significantly different ($p < 0.05$) from CPE method (2.07±0.01, 0.11±0.013, and 0.83±0.06). Gas Chromatography linked Mass Spectroscopy (GC-MS) was deployed in the preliminary characterization of oils obtained from both methods of extraction. Industrially essential compounds such as 9,17-Octadecadienal and cis-9-octadecadienal, Oleic acid, Glycidyl palmitate, and 7-Pentadecyne were present. Corroborating the low molecular weight FFAs with the high saponification number, it may be suggested that neem seed oil, irrespective of the method of extraction is essential in both cosmetic and food industries. The high peroxide level makes it unsuitable for cooking. It may therefore be inferred that *Azadirachta indica* seed oil, irrespective of their method of extraction, may be industrially viable but less suitable for consumption.

IBC 005

POTENTIAL OF TAMARIND (TAMARINDUS INDICA L.) PULP SUPPLEMENT FOR IMPROVING BIOETHANOL PRODUCTION FROM SUGARCANE (SACCHARUM OFFICINARUM L.) MOLASSES

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ABSTRACT

Bioethanol is a biofuel that is produced from biological material (Biomass) which can be used as a source of fuel and is one of the most suitable energy-efficient and environmentally friendly. This research work is aimed at study the Potential of Tamarind (*Tamarindus indica* L.) Pulp Supplement for Improving Bioethanol Production from Sugarcane (Saccharum officinarum L.) Molasses in Maiduguri, Nigeria. The method of simultaneous saccharification and fermentation (SSF) was used in a single-step using baker's yeast (Saccharomyces cerevisiae) for cellulose conversion to bioethanol production. Sugarcane molasses was hydrolyzed using tamarind pulp supplement and distilled water. Test for reducing sugar was carried out using Dinitrosalicylic acid (DNSA) to determine the glucose content of the hydrolyzed samples. The fermentation was carried out using baker's yeast (*Saccharomyces cerevisiae*) for five (5) days. After fermentation, fractional distillation was carried out using soxhlet extractor to separate the fermented broth to obtain the distillates. The findings of the study has a significant differences ($p \leq 0.05$) in all the analysis carried out in this study. The results for the reducing sugar showed the glucose content of 0.088mg/dl obtained from cane molasses hydrolyzed using tamarind pulp supplement whereas the glucose content of 0.073mg/dl obtained using distilled water. The results further revealed that cane molasses hydrolyzed using tamarind pulp supplement to produced bioethanol showed the concentration of 3.741mg/l whereas 0.097mg/l using distilled water. The density of 6.852g/cm^3 is obtained in bioethanol produced from cane molasses hydrolyzed using tamarind pulp supplement whereas 5.200 g/cm^3 using distilled water. The quantity

(volume) of the bioethanol produced from cane molasses hydrolyzed using tamarind pulp supplement is 27. 96ml whereas 16. 97ml using distilled water. Gas chromatography and mass spectroscopy (GC-MS) analysis of 23.39% is generated in bioethanol produced from cane molasses hydrolyzed using tamarind pulp supplement whereas 9.94% using distilled water. This study revealed that sugarcane molasses is a good biomass for bioethanol production using tamarind pulp supplement as an enhancer. The findings of the study concluded that adding tamarind pulp supplement in bioethanol production optimizes high yield percentage bioethanol output.

Keywords: yeast, sugarcane (*Saccharum officinarum* L.) molasses, bioethanol, tamarind (*Tamarindus indica* L.)

IBC 006

MECHANICAL PROPERTIES AND BIODEGRADABILITY POTENTIAL OF BIOPLASTICS PRODUCED FROM CASSAVA EFFLUENT AND AGRO-BIOCOMPOSITES

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ABSTRACT

Plastics are part of our day-to-day lifestyle and are been used for various domestic, industrial and educational purposes. They are mostly petroleum-based and take a long time to degrade. Global concerns due to the continuous accumulation of these plastics in our environment are on the rise due to their adverse effects on humans, animals. This has led to an increase in demand for alternatives that are eco-friendly, biodegradable and less toxic. In this study, biodegradable plastics were produced from cassava effluents and bio-composites using the solution casting technique. The properties of the bioplastic films produced such as tensile strength, thickness, elongation strength, water and oil permeability tests, bio-degradability test, microbial test, moisture content and functional group composition of the biofilm using Fourier transform infrared spectroscopy (FTIR) were determined. The results obtained revealed that the thickness, tensile and elongation strength of both biofilms were 0.5 ± 0.05 mm, 0.5 ± 0.05 mm; 15.80 ± 0.02MPa, 18.80 ± 0.05MPa; and 19.80 ± 0.04%, 24.80 ± 0.04%; respectively. The biofilms after 35 days had 45% biodegradation and no microbial growth was observed on them after 42 days; their moisture content was 2.5% and 8.3% respectively. The biofilm was able to retain oil and water for 120 minutes and 360 minutes; 65 minutes and 150 minutes for cassava and agro-composite biofilms respectively. While the addition of bio-composite material showed an increase in the tensile strength of the biofilm produced, the elasticity, elongation strength, water and oil permeability properties of the biofilms were better in the absence of the bio-composite material used in this study. FTIR analysis revealed the presence of similar functional groups in both biofilms. The result obtained in this study suggests that biofilms produced by cassava effluents are biodegradable and can be further explored for biotechnological applications, specifically in edible packaging.

Keywords: Bioplastics, biodegradable, functional group, bio-composite, cassava effluent, elasticity.

IBC 007

RESPONSE SURFACE OPTIMIZATION OF BIOETHANOL PRODUCTION FROM SUGAR BAGASSE BY ASPERGILLUS *FLAVUS*.

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ABSTRACT

Sugarcane bagasse is an attractive source for bioethanol production due to its abundance, low cost, and renewable nature. The use of response surface methodology for optimization of operational parameters that affects bioethanol production from sugar bagasse provides a cost-effective and efficient approach for maximizing bioethanol yields. In this study, sugar bagasse was used as the substrate for bioethanol production, and *Aspergillus flavus* was used as the microbial strain. The effects of temperature, pH, and innoculum concentration on bioethanol yield were investigated using a central composite design. The results of the study showed that the optimum conditions for bioethanol production were a temperature of 26°C, pH of 6, and a substrate concentration of 50 g/L. Under these conditions, the predicted bioethanol yield was 36.4 g/L. The results of this study provide valuable insights into the potential of sugar bagasse as a feedstock for bioethanol production and highlight the importance of optimizing process parameters for maximizing yields. The optimization of process parameters is critical for maximizing bioethanol yield from sugar bagasse. This study further demonstrate the potential of using sugar bagasse as a feedstock for bioethanol production and highlight the importance of optimizing process parameters to maximize yields. In addition, the study also showed the effectiveness of using Aspergillus flavus as a microbial strain for bioethanol production.

Keywords: Sugarcane bagasse, Bioethanol, *Aspergillus flavus*, Optimization

IBC 008

PRODUCTION OF LACCASE (BENZENEDIOL: OXYGEN OXIDOREDUCTASES, EC. 0. 3. 2.) ENZYME FROM *LACHNOCLADIUM* SPECIES ON SOLID STATE FERMENTATION

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ABSTRACT

White rot fungus *Lachnocladium* species was cultured on malt extract agar, the production and partial purification of laccase was investigated. *Lachnocladium* species was inoculated in 50ml conical flasks which took 2 - 7 days to grow. *Lachnocladium* species thrived successfully on the growth medium. It was harvested using sodium acetate buffer, filtered using muslin sheath and the supernatant centrifuged after precipitation using ammonium sulphate. Laccase activity was tested at variable incubation time of 10, 20, 40, and 60 minutes with 20 minutes being the optimum. Substrate concentration was also varied and the best substrate concentration for laccase activity was 0.04mM. Optimum temperature for laccase activity was at 50°C though there was continuous activity at other temperatures above 50°C. Therefore, the best incubation time for the production of laccase enzyme

from *Lachnociadium* species is 20 minutes with the best substrate concentration being 0.04mM at optimum temperature of 50°C. This accounted for the high laccase activity.

Keywords: Laccase, Solid State Fermentation, Enzyme, *Lachnocladium*

IBC 009

COMPARATIVE STUDY OF BIOETHANOL PRODUCTION FROM AGRICULTURAL WASTES BY ENZYME AND ACID HYDROLYSIS

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ABSTRACT

Massive wastes produced throughout the food production process are harmful to both environmental preservation and agricultural productivity. Using sulphuric acid (H_2SO_4), enzymes generated by *Aspergillus niger*, and agro-wastes such as cassava peels, pineapple peels, corn cobs, sugarcane pulp, and sawdust, this study looked into the possibility of producing bioethanol from agro-wastes. As a pre-treatment for delignification, acid and enzymatic hydrolysis were applied to the agricultural wastes. *Saccharomyces cerevisiae* was used for fermentation procedure and the production of ethanol over the course of a 7-day anaerobic incubation period. After being treated with H_2SO_4 and *A. niger*, the samples' reduced sugar concentration was determined using the Anthrone method. The result shows that the enzyme-hydrolysed samples gave an optimum reducing sugar yield of 2.34, 1.02, 2.56, 2.70, and 1.84 mg/ml for sugarcane pulp, corncob, pineapple peel, cassava peel, and sawdust respectively. Ethanol yield was determined by the optical densities of the distillates at 600nm using a spectrometer. The ethanol yield also favoured the enzyme hydrolysed samples after fermentation and distillation at 80^0C with concentration levels of 4,33, 4.25, 4.65,5.08 and 4.39 % (v/v) while the Acid hydrolysed sample has concentration levels of 3.78, 4.26, 4.12, 3.87 and 3.74 % (v/v) for sugarcane pulp, corn cobs, pineapple peels, cassava peels, and sawdust respectively. The higher yields of bioethanol from the enzyme hydrolysed samples suggest that *Aspergillus niger* has a greater potential to break down the cellulosic component of the waste to simple fermentable sugars relative to the acid-hydrolysed substrates.

Keywords: Agro-wastes, *Aspergillus niger*, *Saccharomyces cerevisiae,* Bioethanol, Enzyme hydrolysis, Acid hydrolysis

SUB-THEME
MEDICAL/CLINICAL BIOCHEMISTRY (MCB)

MCB 001

PREVALENCE OF KETOACIDOSIS AMONG DIABETIC PATIENTS ATTENDING KOGI STATE ZONAL HOSPITAL, IDAH

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ABSTRACT
Diabetic ketoacidosis (DKA) is an acute, major, life-threatening complication of diabetes that mainly occurs in patients with type-1 diabetes, but not uncommon in some patients with type 2 diabetes. This condition is a complex disordered metabolic state characterized by hyperglycemia, ketoacidosis, and ketonuria. The present study aimed at identifying diabetic patients attending the hospital (Zonal Hospital, Kogi State), collect urine samples from the patients and screening the collected samples in the laboratory for increased levels of hyperglycemia, and ketone bodies. Thirty (30) urine samples were collected in universal bottles from patients attending chemical pathology unit at the hospital, from both men and women that are diabetic. Combi-9 strip reagent was inserted in to 4ml fresh urine sample and removed immediately and colour reactions were matched with the standard to detect the presence of ketone in the urine samples. From the result obtained, Twenty four (24) tested positive for ketones representing 80% out of which 8 were male adult while 16 were female. A total of 6 samples tested negative for ketone bodies representing 20%- 1 male and 5 females respectively. This result implicates ketoacidosis associated with diabetics mellitus seen in acute condition of type 1 diabetes. However, the 6 patients representing 20% tested negative for ketone bodies. This group were diabetics confirmed by the presence of glucose in their urine but in traceable amount or complete absence of ketone bodies in their urine. It could be said that probably they were on insulin therapy but not confirmed.

MCB 002

KAEMFEROL AND SELAMECTIN INHIBIT PROTEOLYTIC ACTIVITY OF PLASMODIUM FALCIPARUM PLASMEPSIN V

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ABSTRACT
Malaria is a devastating disease depending only on chemotherapy as treatment. However, resistance to available medication is still a challenge; therefore there is an urgent need for the discovery of novel

therapeutics with a novel mechanism of action to counter the antimalarial resistance scourge. Recently plasmepsin V was validated as a drug target for the treatment of malaria. The pepsin-like aspartic protease anchored in the endoplasmic reticulum, has been shown to be responsible for the trafficking of parasite-derived proteins to the erythrocytic surface of the host cells. Screening of a small library of compounds was carried out to identify novel inhibitors that target *Plasmodium falciparum* plasmepsin V (PfPMV). After screening, four promising plasmepsin inhibitors, kaemferol, quercetin, selamectin and shikonin were identified and these compounds were subsequently probed further for their inhibitory potentials. Two lead compounds, kaemferol and selamectin showed promising inhibition properties with IC 50 -values 22.4 and 21.1 µM respectively as against 62.6 µM obtained for pepstatin, a known aspartic protease inhibitor. The kinetic analysis revealed that kaemferol and selamectin inhibited plasmepsin V in a non- competitive and competitive manners respectively. We propose two new lead compounds, kaemferol and selamectin as novel aspartic protease inhibitors worthy of further investigation for the treatment of malaria.

Keywords: Malaria, P. falciparum, Plasmepsin, Kaemferol, Selamectin

MCB 003

ANTIPLASMODIAL AND ANTIOXIDANT ACTIVITIES OF DIFFERENT BRANDS OF CHLOROQUINE IN PLASMODIUM BERGHEI INFECTED MICE

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ABSTRACT
Rising cases of antimalarial resistance have been linked to consumption of adulterated antimalarial drugs. The present study investigated antiplasmodial and antioxidant activities of different brands of chloroquine in *P. berghei* infected mice. Out of twenty (20) brands of chloroquine surveyed, three (3) brands A, B and C were randomly sampled and chemically analysed for quality assessment. The chloroquine brands were subjected to *in vivo* examination. Forty-two (42) mice were allocated into five groups of seven (7) mice namely; normal control (NC), infected-untreated control (IU), infected-10 mg/kg body weight (BW) of chloroquine brand A (IQA), infected-10 mg/kg BW of chloroquine brand B (IQB), infected-10mg/kg BW of chloroquine brand C (IQC). The melting points of brand A, B, and C are 207 ºC, 206 ºC and 207 ºC respectively while infrared (IR) spectra of the brands matched chloroquine IR fingerprint of the British pharmacopoeia. Brands A, B and C had percentage dissolutions of 51.7%, 141%, and 166.7% respectively, but the assays of chloroquine brands A, B and C yielded 41%, 41% 96.7% respectively. Administration of the three brands of chloroquine effectively lowered parasitemia level and significantly ($p < 0.05$) increased the packed cell volume of the infected mice. Treatment with the three brands of chloroquine significantly ($p< 0.05$) ameliorated *P. berghei* induced oxidative stress. It was concluded that the three brands of chloroquine phosphate contain chloroquine active ingredients but failed assay and dissolution tests as prescribed by the European pharmacopoeia. The three brands of chloroquine exhibited antiplasmodial activity in *P. berghei* infected mice.

Keywords: antimalarial-resistance, antimalarial drugs, *P. berghei*, chloroquine-brands, mice

MCB 004

ANABOLIC, ANDROGENIC AND ANTI-CHOLESTEROLEMIC EFFECT OF KIGELIA AFRICANA LEAF EXTRACT ON SOME MALE WISTAR RATS.

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ABSTRACT

- Male erectile dysfunction (ED) refers to incompetency to reaching and retaining adequate penile tumescence for sexual intercourse. Over 152 million men globally suffer from ED and by 2025; the number of affected individuals is anticipated to be around 322 million. In this research work, the effect of petroleum ether extract of *Kigelia africana* on lipid profile and reproductive hormones of Wistar rats was examined.The leaf of *K. Africana* was collected, air dried and then pulverized to powdered form by a machine blender and sieved. Thereafter, 400g of the pulverized plant material (*K. Africana*) was dissolved in 1200ml of 70% petroleum ether for 72 hours. This was followed with vacuum filtration and extracts was concentrated using an evaporator water bath at 40°C to obtain a solvent free extract, and stored in a refrigerator at 4°C. Twenty-one (21) Wistar male rats were used for this research. The animals were acclimatized for a period of seven (7) days. Treatment was carried out as follows: group 1 (normal control) received only the vehicle (Normal saline) orally, while group 2 and 3 received extract of (200 and 400 mg/kg b.wt/day respectively for 2 successive weeks. The rats were sacrificed and the blood was collected by cardiac puncture for the analysis of lipid profile and reproductive hormones.The result revealed that the extract produced a significant increase ($p<0.05$) in serum testosterone, follicle stimulating hormone, luteinizing hormone, TAG and HDL but a significant ($p<0.05$) decrease in serum total – cholesterol and LDL respectively at 200mg/kg and 400mg/kg body weight when compared with normal control. It was speculated from these results that the extract may possess anabolic, androgenic and anti/ hypocholesterolaemic effect which might reduce the risk of predisposition to both cardiovascular and erectile dysfunctions possibly due the presence of phytoandrogens and phytonutrients.

Keywords: HDL, *Kigelia africana*, LDL, libido, phyto androgens

MCB 005

EFFECT OF ANGIOTENSIN CONVERTING ENZYME (ACE) INHIBITOR (CAPTOPRIL) ON THE LEVELS OF ACE IN PLAMODIUM BERGHEI-INDUCED MICE

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ABSTRACT

Malaria is caused by parasites that are transmitted to people through the bites of infected female mosquitoes. *P. falcifrum* is the most deadly malaria parasites and the most prevalent in Africa, where malaria cases and death due to malaria are heavily concentrated (WHO, 2016).These study aimed to determine the effect of Lonart (anti-malarial drug) and captopril (ACE inhibitor) on the level of parasitemia and the level of ACE in the serum and kidney in plasmodium infected mice. Forty (40) apparently healthy mice were randomly divided into five groups: group 1 were given normal rat feed without any treatment, group 2 were infected with *Plasmodium berghei* without any treatment, group 3 were infected with *Plasmodium berghei* and treated with lonart, group 4 and 5 were infected with *Plasmodium berghei* and treated with captopril at low and high dose respectively. The parasite used was *Plasmodium berghei* ANKA, inoculated into mice and drugs administration follows, the percentage of the parasitemia is in the range of 4-5% after the infection.% parasitemia was observed for the fourteen days, it shows that the parasitemia level group 1 (1.01±0.004a) differ significantly ($p<0.05$) from group 2 (4.26±0.11c) .there is significant difference between group 2 and group 4 and 5. No significant difference between group 3 and 5. There is significant difference ($p<0.05$) between group 2 and group 3. Serum and kidney homogenates was obtained after the mice were sacrificed and the ACE level was determine using ELISA-KIT, ACE level of group 1 differ significantly ($p< 0.05$) from group 2,3 and 5, but there is no significant difference ($p<0.05$) between group 1 and group 3. There is significant difference ($p<0.05$) between group 2, group 3 and group 4. Group 2 and group 3 differ significantly ($p<0.05$).there is significant difference between ($p<0.05$) group 4 and group 5. Hence elevated levels of Angiotensin I due to the inhibition of the ACE have a beneficial effect against malaria-induced pathology in mouse models.

Keywords: Malaria, ACE, Plasmodium berghai ANKA.

MCB 006

TRYPANOSOMA BRUCEI BRUCEI INFECTION IS ASSOCIATED WITH GATA1 AND GATA2 GENE EXPRESSION DYSREGULATION IN RATS' BONE MARROW AND ERYTHROID PROGENITORSS.

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ABSTRACT
Anaemia is the often the major cause of death during Trypanosomiasis infection. Dyserythropoiesis in the bone marrow contributes to the pathophysiology of anaemia during infection but its mechanism is not fully understood. Considering the fact that transcription factors GATA1 and GATA2 play key roles in the proliferation and differentiation of cells, studying their expression levels during erythroid proliferation and differentiation will provide a deeper insight on their role in anaemia and support the development of novel therapies aimed at ameliorating anaemia in affected animals. 40 rats were divided into infected and control groups, parasitemia and PCV levels was monitored. Bone marrow and bone marrow mononuclear cells were collected and RNA extracted from them for gene expression analysis using real-time quantitative PCR (qRT-PCR) to assess GATA1 and GATA2 genes. Parasitaemia was recorded by day 3 post-infection in the peripheral blood and by day 4, T. b. brucei was observed in the bone marrow of infected animals. There was a gradual increase in the parasite in the bone marrow, with a drop in packed cell volume and a significant increase ($p < 0.05$) in GATA1 gene expression. In the cultured bone marrow mononuclear cells, by day 3 post infection, there was significant expression of GATA2 gene compared to GATA1. From this study, it can be inferred that. T. b brucei is able to invade the bone marrow which provides evidence to support dyserythropoiesis in the bone marrow via GATA1 and GATA2 genes dysregulation as a contributing factor to anaemia during trypanosome infection.

Keywords: Dyserythropoiesis, Gene expression, Trypanosomiasis, GATA1, GATA2

MCB 007

ASSESMENT OF STRESS MARKERS IN SOME SELECTED STUDENT OF FEDERAL POLYTECHNIC KAURA NAMODA PRIO, DURING AND AFTER EXAMINATION

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ABSTRACT
Although, the causes of stress are particular to the individual, it is hard to make widespread statements about them; however, there are confident triggers that might cause stress. The main cause, in this study, has been exam's hassle which seems to be common among students. Exam stress is normal but can give rise to anxiety which can hinder performance of individual. Most students will

have endured the trauma Examinations act as stressor and activate hypothalamic pituitary adrenal axis causing an increase in cortisol level, which is reflected in saliva. Present study employed sixty students from both genders aged 20 - 25 years old in the Department of Science Laboratory Technology, at Federal polytechnic Kaura Namoda undertaking semester exams of 2019/2020 Academic session. Blood samples were collected trice, i.e. before, during and after the examination to compare levels of some hormones, Cortisol, and prolactin from all students. Serum Cortisol amd prolactin were determined using ELISA quantitative method. The levels of prolactin and salivary cortisol were significantly raised during examination stress. With the values 2.45±1.22, 4,16±2.21 and 2.87±2.31nfg/ml for prio, during and after examination respectively. As for serum Glucose, the values obtained were 5.3± 1.2, 4.6± 0.8 and 6.2± 0.7Mmol/l in that order. The changes in stress level significantly correlated with the change in levels of glucagon which obviously lowered the level of glucose during examination. Though there was no significant effect on the performance. No much differences observed between Males and females. This study suggests that as examinations act as unavoidable stressors, the science educators as well as students should be made aware of the negative consequences of stress faced during their training. Efficient relaxation program as well as counseling services should be provided to stressed students so that they are able to cope better with examination stress

Keywords: Stress, Cortisol, Prolactin and Glucose

MCB 008

DETERMINATION OF ASCORBIC ACID IN VITAMIN C SYRUP SOLD IN GOMBE METROPOLIS AREA OF GOMBE STATE

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ABSTRACT
Titrimeric method was used to analyze ten different brands of each vitamin C syrups that are sold in Gombe metropolis. The percentage of ascorbic acid content in vitamin C syrups Containing 100mg/5ml showed that samples (1,2,3 and 7) having (68.37%, 54.10% 52.10% and 74.00%) were below 95-105 recommend by British pharmacopeia limit. While for A samples (4, 5 and 6) have percentage ascorbic acid content of (95.00%, 95.10% and 96.00%) respectively and we&#39 are within the normal ranges. The vitamin C syrups that contain 40mg/5ml showed that Samples (1, 2, and 3) to contain (84.05%, 76.42%, and 88.87%) respectively which are all bellow the normal specification orange of 95-105. Therefore, the total percentage pass of the experiment 30% while the percentage failure is 70%. Hence it can be concluded that most of the vitamin syrups being sold within the metropolis are of substandard quality.

MCB 009

GENOPROTECTIVE EFFECT OF DIOSPYROS MESPILIFORMIS FRUITS EXTRACT ON ASPARTAME INDUCED DNA DAMAGE IN DROSOPHILA MELANOGASTER MODEL

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ABSTRACT
Artificial sweeteners have become increasingly controversial due to their questionable influence on consumer's health. Aspartame is the world's most widely used artificial sweetener to caused serious health problems, including cancer, cardiovascular disease, Alzheimer's disease, seizures, stroke etc. *Diospyros mespiliformis* has been used traditionally for the treatment of various diseases. The ethanol extract of the plant was investigated for its genoprotective activities in *Drosophila melanogaster* model (Harwich strain). Acute toxicity study was used to establish the median lethal dose (LD50) and single cell gel electrophoresis assay (SCGE/Comet assay) to evaluate DNA damage of the *D. melanogaster* hemolymph. The LD50 of the extract was found to be >1000mg/10g diet and the eclosion assay showed decreased rate of emergence at 750mg/10g and 1000mg/10g diet, making 500mg/10g – 10mg/10g to be safe doses for usage. Severe DNA damage was measured in the induced-untreated group with comet tail exhibit high DNA breaks while mild damage was observed in the 500mg/10g and 250mg/10g treated groups considerably based on the size and shape of the DNA inside the 'comet'. *D. mespiliformis* can be an effective source of drug/agent against genotoxicity.

Keywords: Aspartame sweetener, Genotoxicity, Genoprotection, *Diospylos mespiliformis*, *Drosophila melanogaster*, Comet assay

MCB 010

VARIATION IN SIBLING SPECIES OF THE MAJOR MALARIA VECTORS ANOPHELES GAMBIAE. S.L. AND DYNAMICS OF THEIR INSECTICIDES RESISTANCE IN NORTHERN NIGERIA

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ABSTRACT
Establishing *Plasmodium falciparum* infection and resistance status of sibling species of the populations of major malaria vectors is necessary for evidence based vector control. Here we characterized Anopheles populations from two ecological sites in Northern Nigeria (Gadau in Bauchi state and Samaru in Kaduna state). From the total 958 mosquitoes collected from Gadau, 512

(53.78%) were *Anopheles coluzzii* while 446 (46.22%) were Culex. Of the 204 total females collected in Samaru, 14 (43.33%) were *An.coluzzii*, while *An.gambiae*. s.s. 4 (23.33%) *An.arabiensis* 7 (23.33%) and the rest were all Culex 144 (70.59%). *An.coluzzii* from Gadau were resistant to deltamethrin, permethrin and DDT, with mortalities of 54.5%, 18.8%, and 33.5% respectively. The same insecticides gave 75%, 82.8% and 64.1% mortalities in Samaru respectively. Full susceptibility was observed to Malathion and bendiocarb across the two sites. A high frequency of 1014F knockdown resistance mutation (66.67%) was found in all An. coluzzii in Gadau. All the mixed-species genotyped from Samaru were found to be 100% kdr susceptible. Only 3, 10 females out of 19 each tested positive with Plasmodium in both Gadau and Samaru respectively. The predominance of resistance in *An. coluzzi* in Gadau and the susceptibility of mixed species from Samaru to insecticides suggest heterogeneity in composition of malaria vectors between sites and their resistance status, which should be considered while designing control measures and resistance management strategies. The observed susceptibility to Malathion and bendiocarb offers alternative solutions for control using indoor residual spraying.

Keywords: *Anopheles gambiae* s.l., target site resistance, 1014Fkdr Mutation, Cytochrome oxidase 1 gene, Savannah.

MCB 011

RELATIONSHIP BETWEEN SERUM LIPID PROFILE AND BODY MASS INDEX AMONG ADOLESCENTS RESIDING IN UNGOGO LOCAL GOVERNMENT

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ABSTRACT

There has been rising burden of childhood and adolescent's obesity in most developing countries despite high prevalence of under-nutrition. The aim of this study was to determine the relationship between serum lipid profile and body mass index among adolescents residing in Ungogo Local Government, Kano State. A cross–sectional analytical study was undertaken among adolescents aged between 13-19 years who were selected using multi-stage sampling technique. Serum lipid profile concentrations were estimated using enzymatic spectro-photometric methods while body mass index (BMI) was calculated as weight (kg)/Height (m2). Total Cholesterol, Triglyceride and High Density lipoprotein were found to be higher when compared to the corresponding baseline (150-200 mg/dL, 30-150 mg/dL, 40-60 mg/dL) respectively. Body mass index were found to be higher when compared to the corresponding baseline (>25.0 kg/m2). Total cholesterol and triglyceride were significantly ($P<0.05$) associated with body mass index. Total cholesterol and triglyceride were positively correlated with body mass index in the studied area ($P<0.05$). The current study revealed that there is strong relationship between serum lipid profile and body mass index among the studied subjects. BMI which is non-invasive is recommended as a screening tool for cardiovascular risk in the studied area and setting where serum lipid profile cannot be routinely estimated.

Keywords: Body Mass Index, Total Cholesterol, Triglyceride, High Density Lipoprotein

MCB 012

DETERMINATION OF ASCORBIC ACID LEVEL IN SOME VITAMIN C SYRUPS SOLD IN GOMBE METROPOLIS, GOMBE STATE, NIGERIA.

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ABSTRACT

The proliferation of the Nigerian Pharmaceutical shops with counterfeit and or improperly labeled drugs has been in the increase. It is the major cause of prolonged treatment with no recovery resu lting in increased mortality and morbidity rate from diseases that could otherwise be curable. The present study aimed to determine the Ascorbic acid content of some Vitamin C syrups from different Pharmaceutical Companies (Brands) sold in Pharmaceutical shops within Gombe Metropolis. A total of ten samples of Vitamin C syrups were randomly selected and used for the study, seven of which contained the label 100mg/5ml namely: Vimacee, Sofa, Jesil, Peace, Age-cee, Eocee and Emvit were designated samples 1-7 respectively while the remaining three containing the label 40mg/5ml namely: Pal, Asad, and Ugolab were designated sample 8-10 respectively. The pH and relative densities of the samples were determined using standard methods while the ascorbic acid content of all the samples was determined using titrimetric method. The results for the pH showed that only sample 7, Emvit, with a pH of 2.48 falls within the standard pH specification range of 2.0-2.5 from all the samples tested. The relative densities of all the samples in this study are all denser than the reference (water), which has a relative density of 1.0, hence are within the approved limits. The results of the percentage ascorbic acid content for the samples containing the label 100mg/5ml showed that samples 4, 5 and 6 from the Companies, Peace (95.00%), Age-cee (95.10%) and Eosocee (96.00%), fall within values of 95-105)% of Ascorbic acid recommended by the British pharmacopeia limit. The rest of the samples in that category designated 1, 2, 3 and 7 with the values, Vamicee (68.37%), Sofa (54.10%), Jesil (52.10), and Emvit (74.77%), fall below the recommended limit. The Vitamin C syrups containing the label 40mg/ml from samples 8-10 contain the following percentage concentration of Ascorbic acid: Pal (84.05%), Asad (76.42%) and Ugolab (88.81%) and have all fall below the values of 95-105 % recommended by the British pharmacopeia limit. It was concluded that only three of the Vitamin C syrups, (Peace, Age-cee, Eosocee), selected randomly from Pharmaceutical shops in Gombe Metropolis met the recommended standard set by the British pharmacopeia despite the claim by all the companies in the labels contained on the Vitamin C Syrups to have met the recommended standards.

Keywords: Ascorbic acid, pH, relative density, British pharmacopeia, recommended limit

MCB 013

EFFECTS OF ZINGIBER OFFICINALE (GINGER) RHIZOME SUPPLEMENTATION ON BLOOD INDICES IN HIGH FAT DIET INDUCED TYPE 2 DIABETES IN RABBITS

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ABSTRACT

Diabetes mellitus is a chronic metabolic disease which causes insidious tissue damage and dysfunctions, its onset and advancement is strongly correlated to oxidative stress, body fluid disorders and blood indices disproportions among other factors. The aim of this work is to evaluate the effects of ginger dietary supplementation on blood indices status in high fat diet induced type 2 diabetes in rabbits. Twenty (20) male rabbits (5 weeks of age) divided into four groups (n=5) were used; Group I (Normal control) was treated with standard animal feed (SAF). Group II-IV comprises of diabetic animal model (DAM) groups were treated as follows: Group II; treated with SAF only, Group III; treated with SAF + cholestran (0.26g/kg), Group IV; treated with SAF + ginger (12.5%) supplements. High fat diet (SAF = 69% + Cholesterol = 1% + Ground nut meal = 20% + ground nut oil = 10%) was fed to rabbits for eleven weeks to ascertain diabetic animal model (DAM), Thereafter experimental treatment protocol of the afore-mentioned groups last for a period of six weeks. At completion of the treatments animals were sacrifice, full cell count was conducted using the whole blood sample data obtained were statistically analyzed using SPSS version 20.0. The results revealed a significant decreased on white blood cells count in the ginger treated group compared to that in the diabetic control group, and restoration of differential cell count ratio were seen towards the values recorded in the normal control group. The results may probably indicate the potential effect of treatment supplement to restore blood indices within physiological ranges. This could be attributed to certain phytochemicals such as phenolic, saponins, trypsin and flavonoids among other bioactive compounds found in the supplement as revealed in the results of preliminary phytochemical screening of the supplement. Further work to validate these effects could facilitate the use of the supplement as a composite in formulating diet for type 2 diabetic patients.

Keywords: Ginger, High fat diet, blood indices,

MCB 014

ANTI-INFLAMMATORY ACTION OF DIETARY OMEGA- 3- POLYUNSATURATED FATTY ACID SUPPLEMENTATION ON TOTAL LEUKOCYTE AND DIFFERENTIAL COUNTS IN CARRAGEENAN-INDUCED PERITONITIS IN ANIMAL MODELS

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ABSTRACT

Anti-inflammatory action of dietary omega- 3- polyunsaturated fatty acid supplementation in animal models was studied using standard methods. Animals were distributed in six groups of five each (n = 5). Group 1 was administered 300mg omega-3 fatty acids (n-3 FA) containing 180mg EPA and 120mg DHA, group 2 received 600mg n-3 FA containing 360mg EPA and 240mg DHA; group 3 received 900mg n-3 FA containing 540mg EPA and 360mg DHA; group 4 was administered 300mg of the fish oil along with 20mg Celecoxib, group 5 took 20mg celecoxib, this represented the positive control and group 6 was administered 2 ml PBS alone, as the vehicle control group. Total leukocyte count and differential parameters in carrageenan-induced peritonitis were determined. Results were expressed as Mean ± SEM and data were analyzed by two – way analysis of variance (ANOVA) followed by Bonferroni post-test for separation of means using Graph pad Instat software 5. Differences between means were considered statistically significant at $p < 0.05$. Inhibition of carrageenan-induced peritonitis was 26.47, 18.63, 30.39, 42.16 and 45.09 %. Absolute Neutrophil Count (ANC) for all the treatment groups fall between 3080 - 6740µl which is within the acceptable limit of 2500 - 7000µl for ANC. Also, for ALC, which is 2300 - 3090µl from the table has an acceptable limit of 1000 - 5000µl while that for MXD from the table is from 220 - 370µl which is well within the limit of 200 – 1090µl acceptability. Obtained results provide scientific evidence for the use of dietary omega-3-polyunsaturated fatty acid as food supplement capable of resolving inflammatory conditions without side effects produced by traditional NSAIDs. The active components in omega-3 PUFAs; Eicosapentanoic acid (EPA) and docosahexanoic acid (DHA) in fish oil are capable of interrupting the prostaglandin metabolic pathway by competing with arachidonic acids for the COX active site thereby inhibiting their synthesis.

Keywords: PUFA, EPA, DHA, Leukocyte counts, Inflammation, Neutrophils

MCB 015

EFFECT OF CHEMOTHERAPY ON HAEMATOLOGICAL AND BIOCHEMICAL PROFILE IN CANCER PATIENTS ATTENDING ONCOLOGY CLINIC FTH GOMBE NORTH EAST NIGERIA

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ABSTRACT
Chemotherapies in cancer patients are presumed to be nephrotoxic, hepatotoxic and can cause haematological aberrations. Thus precise investigations on effect of chemotherapy on biochemical and haematological variables in cancer patients is necessary for monitoring and intervention. This study was designed to examine the effect of cancer chemotherapy on some biochemical and hematological variables in patients attending oncology clinic in FTH, Gombe. Ninety-eight male and female adult of age ranging between 18-70 years comprising of forty-nine each for those that are on chemotherapy and those that are chemo-naive were recruited for the analysis. 10ml of venous blood was collected under aseptic technique, 5mls was dispensed into lithium heparin vacutainer to obtain plasma for liver enzymes, Glutathione S- Transferase, urea and creatinine estimation, 5ml was dispensed into tube containing EDTA vacutainer for complete blood count. Urea and creatinine were significantly ($p \leq 0.05$) increased with patients undergoing chemotherapy compared to chemotherapy naïve. AST and ALT were slightly increased though not significant ($p > 0.05$), but ALP was significantly ($p < 0.01$) increased among patients undergoing chemotherapy compared to chemo-naïve. PCV and Hb count were significantly ($p \leq 0.05$) reduced in chemotherapy patients compared to chemo-naïve. WBC, Lymphocytes and platelets were shown to be marginally decreased in patients undergoing chemotherapy compared to those that are chemo-naïve. A decrease in GSTP1 mRNA expression was observed in patients undergoing chemotherapy compared to chemo-naïve patients. Chemotherapy has mild to severe effect on patients, they include anaemia, hepatoxicity, and nephrotoxicity and upregulation oxidative stress. Therefore, proper patient follow-up and appropriate interventions is crucial.

Keywords: Chemotherapy, Biochemical, Haematological

MCB 016
OXIDATIVE STRESS BIOMARKERS AND MICROELEMENTS IN DIABETES MELLITUS PATIENTS ATTENDING SIR YAHAYA MEMORIAL HOSPITAL BIRNIN KEBBI, KEBBI STATE

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ABSTRACT
Diabetes mellitus is a metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion and insulin action or both. The chronic hyperglycemia lead to organ damage, and blood vessels damage. Reactive Oxygen Species formed as a result of hyperglycemia results in secondary complications in diabetes mellitus. Diabetes affects the normal functioning of microelement that may involve in insulin secretion and action. The aim of this study is to evaluate the oxidative stress biomarkers and microelement level in diabetes mellitus patients attending sir Yahaya memorial hospital Birnin Kebbi. Two hundred (200) subjects were recruited for the study comprising of one hundred (100) diabetic patients and one hundred (100) non-diabetic subjects as control.

Cayman assay kits were used to estimate enzymatic antioxidants while vitamin A, C and E were determined using spectrophotometric method. The atomic absorption spectrometer was used to determined microelements assay. The result showed that, the glucose level of the diabetic patients was significantly ($P<0.05$) high compared to non-diabetic control subject. Zinc, Chromium, Magnesium and Copper were found to be lower in diabetic patients compared to control subject. Vitamin A, C, and E were also found to be lower in diabetic patients compared to control subjects. Also Superoxide dismutase, Catalase, Glutathione peroxidase were significantly ($P<0.05$) lower in diabetic patients while malonaldehyde was high in diabetic patients compared to the control subjects. In conclusion, the low oxidative stress biomarkers and Microelements in diabetic patients may be as a result of complications in diabetes mellitus patients due to chronic hyperglycemic condition.
Key words: Diabetes mellitus, hyperglycemia, insulin, microelement, and oxidative stress.

MCB 017
KNOWLEDGE OF OCCUPATIONAL HEALTH RISKS AND PERSONAL PROTECTION PRACTICES AMONG MANUAL STONE CRUSHERS IN NORTH CENTRAL NIGERIA

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ABSTRACT

Manual stone crushing gives crushed stones for building construction to low-income individuals who cannot buy machine-crushed stones, as well as some financial security to the workers, but the working conditions are frequently hazardous and harmful. The study aimed to describe the level of awareness among manual stone-crushing workers in North Central Nigeria regarding occupational health risks and assess the availability and utilization of personal protective equipment in the workplace. A cross-sectional study was conducted among manual stone crushers working within the North-central region of Nigeria. Workers were selected using a multistage sampling technique with 151 participants. Heavy metals concentration in hair, nails, and blood plasma of manual stone-crushing workers was determined using X-ray fluorescence spectroscopy (XRF) for hair and nails and Atomic absorption spectrometry (AAS) for blood plasma examined against some variables, including the use of personal protective equipment, age of workers, site place, the gender or sex of workers, duration at work, alcohol intake, and cigarette smoking habit. The results showed that using personal protective equipment (PPE) reduced the accumulation of Cu, Cr, and Fe in hair and nails and Cd, Fe, Mn, and Zn in the plasma of manual stone-crushing workers. Age, site place, gender, and work duration also impacted the heavy metal concentration in the samples. The study suggests that

appropriate PPE should be used to reduce exposure to stone dust and subsequent uptake and accumulation of heavy metals in human samples.

MCB 018

IN VITRO SENITIVITY PROFILE OF PLASMODIUM FALCIFARUM CLINICAL ISOLATES TO CHOLOROQUINE AND ARTEMISIN COMBINATION THERAPHY FROM KANO AND JIGAWA STATES, NIGERIA

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ABSTRACT

Malaria continues to cause unacceptably high level of disease and death especially in Africa, with Nigeria bearing the largest burden. Accumulated efforts have been put in place to manage transmission but emergence of *P.falcifarum* resistant species has been a major obstacle to the control efforts. This study aimed to evaluate the sensitivity of *P. falcifarum* isolate to previously used choloroquine and currently in use Artemisinin and Dihydroartemisinin- amodiaquine in Kano and Jigawa States, Nigeria. Sensitivity of parasite to the drugs was carried out using WHO invitro Micro test procedure. The results revealed high resistance to chloroquine in all the study sites, reduced susceptibility to artemisinin in Hadejia and reduced susceptibility to Dihydro-artemisinin-amodiaquine in Kura and Kano Municiapal. The geometric IC50 values for artemisinin and Dihyrodroartemisini-amodiaquine were found to be below the resistant threshold cut off values as 3.66nM and 1.29nM respectively, while that of chloroquine were far above the threshold value (504.66nM). These indicate that *p. falcifarum* is still resistant to choloroquine and Artemisin and its derivatives are still effective for malaria treatment in the states.

Keyword: *P. falcifarum, Artemisinin, chloroquine*

MCB 019

EXTENDED SPECTRUM BETA LACTAMASE PRODUCING E. COLI AND KLEBSIELLA SPECIES ISOLATED FROM SOME SELECTED LAYER CHICKEN FARMS IN JALINGO

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ABSTRACT

Food producing animals, including poultry have been considered as potential sources of extended spectrum beta lactamase (ESBL) producing *Escherichia coli Klebsiella* species. This study investigated the ESBL producing *E. coli* and *Klebsiella* species isolated from layer chicken farms. A

total of one hundred and fifty six isolates of *E. coli* and *Klebsiella* species were isolated from the farms. The beta lactamase and ESBL producing abilities as well as the antibiotic susceptibility profile were determined. In addition, the Plasmid sizes and the curing rates of the ESBL producing strains were also investigated. The results obtained revealed that the occurrence of *E. coli*, *K. pneumoniae* and *K. oxytoca* in the farms were respectively 6.6%, 8.9% and 4.5% respectively while the occurrence of ESBL was respectively 16%, 0.6% and 0%. The antibiotic resistance profile revealed the resistance of the ESBL producing *E. coli* to ampicillin, ceftazidime and ceftriaxone to be 100% while susceptibility to ciprofloxacin, chloramphenicol, tetracycline, gentamicin and nitrofurantoin was 72%, 48%, 60%, 24% and 100% respectively. All the ESBL positive isolates harboured plasmids of 23130bp molecular weight and the curing rate was 30.8%.

MCB 020

INVESTIGATING THE SYNERGISTIC POTENTIAL OF THE COMBINED TREATMENT OF INDOMETHACIN AND HEMATIN WITH CYPERMETHRIN AGAINST ANOPHELES GAMBIAE GLUTATHIONE S-TRANSFERASE

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ABSTRACT
Malaria is characterised by mosquito transmission with an estimated 229 million cases and more than 400 000 deaths worldwide in 2020. The chemical control of *Anopheles gambiae* proves vital to malaria eradication. However, the indiscriminate use of such chemical insecticides has led to the emergence of resistance, hence the need to mitigate such occurrences. The use of synergistic compounds along with the available insecticide could help in re-establishing the potency of these chemicals. The synergistic potential of the combined treatment of indomethacin and hematin with cypermethrin against *Anopheles gambiae* glutathione s-transferase (GST) was investigated. The anopheline protein sequence was retrieved from the National Center for Biotechnology Information (NCBI) and the 3D structure was modelled on an X-ray diffraction-resolved *Schistosoma japonicum* GST template from the Protein Data Bank (PDB) using the Swiss-Pdb DeepView program. Twenty-three compounds from the PubChem database were screened as *An. gambiae* GST inhibitor candidatures. Only indomethacin and hematin qualified as potential inhibitors with binding energies of -7.4 kcal/mol and -8.6 kcal/mol respectively, below the -5.0 kcal/mol cutoff. The synergistic potentials of indomethacin and hematin with cypermethrin assessed using 2.5, 5.0 and 10 mg/ml concentrations, demonstrated 10 mg/ml as the effective synergistic dose for both compounds. The potentials of indomethacin and hematin as synergists to cypermethrin, viz, all permethrin insecticides could be furthered for plausible adoption to effectively control mosquitoes.

MCB 021

INVESTIGATING THE SYNERGISTIC POTENTIAL OF THE COMBINED TREATMENT OF LOPERAMIDE AND LIDOCAINE WITH DICHLORVOS AGAINST ANOPHELES GAMBIAE CARBOXYLESTERASE

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ABSTRACT

Malaria remains a significant tropical disease owing to its global reach and debilitating consequence on the human race, with about half the world's population at risk. Controlling mosquito vectors using chemical methods has been key to managing the disease. However, this effective vector control strategy is threatened by the emergence of resistant mosquito phenotypes. Mitigating these evolving resistant mosquito phenotypes could be pivotal to effectively containing malaria. The use of synergistic compounds along with the available insecticide could help in re-establishing the potency of these chemicals. The synergistic potential of the combined treatment of loperamide and lidocaine with dichlorvos against *Anopheles gambiae* carboxylesterase was investigated. The mosquito protein sequence was retrieved from the National Center for Biotechnology Information (NCBI) and the 3D structure was modelled on an X-ray diffraction-resolved *Pseudomonas aeruginosa* carboxylesterase template from the Protein Data Bank (PDB) using the Swiss-Pdb DeepView program. Twenty-three compounds from the PubChem database were screened as *An. gambiae* carboxylesterase inhibitor candidatures. Only loperamide and lidocaine fit as potential inhibitors having binding energies of -8.4 kcal/mol and -6.0 kcal/mol respectively. The synergistic potentials of loperamide and lidocaine with dichlorvos assessed using 2.5, 5.0 and 10 mg/ml concentrations, demonstrated 10 mg/ml as the effective synergistic dose for both compounds. This could serve as proof of concept for the use of these compounds as synergists to all organophosphate insecticides.

MCB 022

BIOCHEMICAL, HAEMATOLOGICAL AND ANTIOXIDANT ENZYMES EVALUATION OF ELECTRONIC SHOCK-INDUCED STRESS IN MALE WISTAR ALBINO RATS TREATED WITH ALLIUM SATIVUM (GARLIC) AND CURCUMA LONGA (TURMERIC) EXTRACTS

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ABSTRACT

The biochemical, haematological and antioxidant enzymes evaluation of electronic shock-induced stress in male Wistar albino rats treated with Allium sativum and Curcuma longa aqueous extracts

were investigated using standard methods. Forty-five male Wistar albino rats weighing, 120-150g used were grouped into nine with five rats per group and designate, A – I. Stress induction with electrical foot shock chamber and treatment with extracts lasted for two weeks, after which 2ml of blood was collected through cardiac puncture under mild anaesthesia and used for biochemical, haematological, and antioxidant enzymes evaluation. The stress effects on the body weight of the organisms revealed a significant decrease ($p<0.05$) in the body weight of the organisms in the first and second week of the experiment compared with the induced untreated group B. The liver function results revealed a significant decrease ($p<0.05$) in ALP, a significant increase ($p<0.05$) in ALT and AST. Levels of TBIL and DBIL showed no significant decrease ($p<0.05$). Haematological analyses revealed a non significant increase ($P<0.05$) in WBC and LYMP, a non significant decrease ($P<0.05$) in MID, GRAN, RBC, Hb, PCV, and PLT compared with the control group B. The antioxidant enzymes analyses results revealed a significant decrease ($p<0.05$) in MDA and subsequent significant increases ($p<0.05$) in GSH, CAT, SOD, and GPX. From the findings in this study, Allium satium and Curcuma longa extracts are endowed with bioactive ingredients with antioxidant potential and therefore could be useful in the treatment and management of stress and the related ailments.

Keywords: Biochemical, haematological, antioxidant, enzymes, rats, stress, extracts

MCB 023

EFFECT OF ETHYL ACETATE FRACTIONS FROM MENTHA PIPERITA LEAVES ON THE COPPER AND ZINC LEVELS IN THE SERUM AND HEART TISSUES OF POLOXAMER-407 INDUCED HYPERLIPIDEMIC RATS.

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ABSTRACT

Hyperlipidemia is a condition characterized by increased concentration of lipids (fats) in the bloodstream. It has been known to induce oxidative stress, a state of imbalance between the antioxidants and free radicals in the body. The current study was designed to investigate the effect of ethyl acetate fractions from *Mentha piperita* leaves on copper and zinc levels in serum and heart tissues of poloxamer 407 induced hyperlipidemic rats. Ethyl acetate leaf extracts (30g) was chromatographed over silica gel in a packed column and different fractions (F1-F12) were collected base on solvent elution system of n-hexane and ethyl acetate. A total of 75 Wistar rats were divided into 15 groups (five rats per group). Groups 1-14 were induced with poloxamer 407 (500mg/kg body weight) intraperitoneally once in every 48hrs for 21 days. Group 1 served as the hyperlipidemic control. Atorvastatin was the standard drug used (20mg/kg body weight) given to the rats in group 2. Groups' 3-14 received the different fractions (F1-F12) of ethyl acetate extracts of *Mentha piperita* leaves (100mg/kg). Group 15 was the normal control. At the end of the 21 days period, the rats were sacrificed, and the serum and heart tissues were collected to determine the levels of copper and zinc which are co-factors of superoxide dismutase; an antioxidant enzyme. From the results obtained, the animals treated with the fractions significantly ($p<0.05$) increased the copper and zinc levels when compared to hyperlipidemic group thereby, improving the antioxidant activity of SOD in the serum

and heart of hyperlipidemic rats.In conclusion, ethyl acetate fractions of *Mentha piperita* leaves have protective antioxidants properties against hyperlipidemia induced oxidative stress.

Keywords: Hyperlipidemia, Antioxidant, *Mentha piperita* leaves, Copper and Zinc.

MCB 024

MEDICAL GEOLOGY AND OVERVIEW OF STUDIES FROM AFRICA AND ASIA

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ABSTRACT

Despite some appreciable development of Medical Geology reported in some parts of the world, in Africa and Asia it is still developing. Indeed, there exist several pieces of evidence to show that research in this field is most relevant in the African and Asian continents. Due to the importance of the geo-environmental materials, factors, and processes including geogenic and anthropogenic activities, and the continually reported cases of diseases associated with such activities in Africa and Asia, it has become imperative to search for real relationships. In this review, in-depth studies on the impact of geological factors and human health were critically reviewed. Geologic source of toxic elements contamination in the environment causing human exposure when penetrated through food and water was carefully explored. Recent case studies, research and development (R&D) efforts from scholars, researchers, and government institutions are further reviewed to provide a road map for proper solutions. Discussion on ways of creating awareness about the harmful effects of contaminated water caused by toxic metals e.g arsenic and fluoride, mining hazards in Africa and Asia, and exposure to toxic metals and metalloids e.g lead, and chromium (II) was also made. Recommendations were provided on the need for synergy among medical scientists, geologists, geochemists, biochemists, etc, and agencies involved in environmental health studies. The necessity of providing an enabling environment for brainstorming ideas that could help in understanding the occurrence of new pathologies and the development of relevant curricula for Africa and Asia institutions were discussed.

Keywords: Geology, contaminants, geochemistry, environment, health

EPH 025

THERAPEUTIC ACTIVITY OF EUGENOL AGAINST PLASMODIUM AND THE POTENTIAL OF THE COMPOUND TOWARDS ANAEMIA AND OXIDATIVE ORGAN DAMAGE MITIGATION IN PLASMODIUM BERGHEI INFECTED MICE

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ABSTRACT

The hunt for a new antimalarial drug must continue because of parasite resistance to a number of already available treatments. In lieu of this, the *in vitro* and *in vivo* anti-*Plasmodium berghei* activity of eugenol as well as its mitigative action against *P. berghei*-induced anaemia and oxidative organ damage was investigated. Mice were infected with chloroquine-sensitive strain of *P. berghei* and

blood was collected for *in vitro* trial before being given eugenol at doses of 10 and 20 mg/kg body weight (BW) for seven days. The IC_{50}, parasitemia, packed cell volume and redox sensitive biomarkers in the liver, brain and spleen were measured. Our result demonstrated that eugenol has an IC_{50} value of 14.67 ± 2.32 µg/ml. Moreover, the compound significantly ($p < 0.05$) suppressed *P. berghei* proliferation in a non-dose-dependent pattern. In addition, eugenol significantly ($p < 0.05$) ameliorated the *P. berghei*-associated anaemia and organ damage at a dose of 10 mg/kg BW. This evidently confirmed that eugenol possesses antiplasmodial potentials and plays an ameliorative role towards *P. berghei*-related pathological alterations. Hence, the study opens up a new therapeutic use of eugenol which needs further investigation against halting the consequences of malaria.

Keywords: Eugenol; *Plasmodium berghei*; Anaemia; Oxidative stress.

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