THE SOCIETY FOR THE CONSERVATION OF PHYTOFUEL AND SCIENCES

15th INTERNATIONAL SCOPAS CONFERENCE

Book of Abstracts

Date
19th November, 2025

THE SOCIETY FOR THE CONSERVATION OF PHYTOFUEL AND SCIENCES

15th International Conference – Jatropha 2025 (Virtual Edition)

Theme: Advances in Biofuel Production as Prospective Solution to Crop and Environmental Challenges

Date: 19th November, 2025

Platform: Google Meet

Meeting Link: https://meet.google.com/vxm-qtov-qea (Time zone: GMT +1)

VIRTUAL CONFERENCE PROGRAMME

Time	Activity
9:30 – 10:00 AM	Participant Login & Technical Check
10:00 – 10:05 AM	Opening
10:05 – 10:10 AM	Conference Guidelines for Virtual Participation (Muting protocol; How to ask questions; Recording notice)
10:10 – 10:15 AM	Welcome Remarks; Prof. M. A. Belewu – President, SCOPAS
10:15 – 10:45 AM	Keynote Lecture; **"Jatropha and the Future of Sustainable Biofuel Systems"** - Dr. Muideen Tella Liadi
10:45 – 11:00 AM	Interactive Q&A (via chat + mic)
11:00 – 11:15 AM	Break
11:15 AM – 1:45 PM	Scientific Paper Presentations – Session (Each presenter: 10 mins + 3 mins Q&A
1:45 – 2:00 PM	Break
2:00 – 4:00 PM	Scientific Paper Presentations – Session (Each presenter: 10 mins + 3 mins Q&A
4:00 – 4:15 PM	Certificate Announcement
4:15 – 4:20 PM	Closing Remarks – Prof. A. A. Abdulrahman
2:05 – 2:10 PM	Vote of Thanks – Prof. Mubarak Ameen
2:10 – 2:15PM	Official End – Networking Room Remains Open

VIRTUAL PARTICIPATION RULES

- Keep microphone muted except when speaking.
- Rename yourself as Name – Institution.
- Use the chat box for questions during presentations.
- Conference is recorded for official archiving.

Table of Contents

Blood Profiles of Rabbits Fed *Hyptis suaveolens* Leaf Meal Additive

[1]ALIYU, K. I*.; [1]JIMOH, F. O., AND [2]ALAGBE, J. O.

[1]Department of Animal Science, Faculty of Agriculture, University of Abuja, Abuja

*Corresponding Author: tanwaaliyu@gmail.com; Karimat.aliyu@uniabuja.edu.ng

Abstract

A 10-week feeding trial was conducted to evaluate the hematology and serum biochemical response of rabbits fed graded levels of *Hyptis suaveolens* leaf meal. Forty-eight (48) rabbits aged 5 – 6 weeks were randomly assigned to four treatments in a completely randomized design, with twelve rabbits per treatment. The control group (T1) received a basal diet, while T2, T3, and T4 were supplemented with 1 g, 2 g, and 3 g *H. suaveolens* leaf meal per kg diet, respectively. Phytochemical analysis revealed appreciable levels of phenols (809.11 mg/100 g), flavonoids (406.34 mg/100 g), tannins (207.82 mg/100 g), alkaloids (177.60 mg/100 g), saponins (98.50 mg/100 g), glycosides (102.31 mg/100 g), and steroids (27.44 mg/100 g). Hematological indices significantly improved ($p<0.05$) with increasing inclusion levels of *Hyptis suavolens*: PCV (30.41 – 33.60 %), Hb (8.42 – 10.11 g/dL), Red blood cell (5.07 – 7.80 × 10^{12}/L), and White blood cell (13.40 – 16.91 ×10^{9}/L). Serum proteins increased (total protein: 3.98 – 4.89 g/dL; globulin: 2.08 – 2.78 g/dL), while glucose (160.20 – 114.90 mg/dL) and cholesterol (97.33 – 70.10 mg/dL) decreased significantly ($p<0.05$). Activities of ALT, AST, and ALP were reduced in treated groups, indicating hepatoprotective potential. These findings demonstrate that *H. suaveolens* up to 3% dietary inclusion improves hematological and serum biochemical profiles, suggesting its potential as a safe phytogenic feed additive in rabbit nutrition.

Keywords: Blood Profiles, Rabbit, *Hyptis Suaveolens*, Leaf Meal, Additives

Haematological and Serum Biochemical Response of Red Sokoto Goat Fed Fungus Treated African Olive (*Olea europaea Sub. sp Africana L*) Leave Meal

[1]IDRIS, F. M*., [2]BELEWU, M. A., AND [3]GANIYU, A. O.

[1]Department of Animal Science, Faculty of Agriculture, University of Abuja, Abuja, Nigeria.

[2]Department of Animal Production, Faculty of Agriculture, University of Ilorin, Ilorin, Nigeria.

[3]Department of Dairy Science, Faculty of Agriculture, University of Abuja, Abuja, Nigeria.

*Corresponding Author; idris.fahad2020@uniabuja.edu.ng

Abstract

This study evaluates the feeding value of fungus treated African Olive *(Olea europaea Sub. Sp Africana L)* leaves meal on blood parameters of Red Sokoto goats. Twelve (12) weaned Red Sokoto goats (average weight 9.4 kg) were used for the study. Four diets were formulated to contain treated African Olive leave meal at 0% (T1), 5% (T2), 10% (T3), and 15% (T4) inclusion level as replacement of groundnut cake. The goats were randomly assigned against formulated diets in a completely randomize design replicated three times. There were significant ($p < 0.05$) difference in crude protein and ether extract of the experimental diets. The average daily intake was significantly ($p < 0.05$) highest in T4 (683.17 g/day) followed by T3, T2 and least was recorded in T1 (415.94 g/day). There were no significantly ($p > 0.05$) differences among the mean values of haematology and serum parameters of the experimental animals except the total protein. The total protein was significantly ($p > 0.05$) highest in T3 (7.00 g/dl) but not different statistically from T2 (6.75 g/dl) and T4 (5.98 g/dl). Based on this result, fungus treated fallen African olive leaves meal could be included in goat diet up to 15% without adverse effect on haematological and serum biochemical indices.

Keywords: African Olive Leave, Fungus, Haematological, Red Sokoto goat, Serum biochemical

Effects of Fungus Treated Castor Seed Cake on Performance Characteristics of Broiler Chickens

[1]BELEWU, M. A*., [1]ABDULGANIYU, F. D., [2]AKERELE, A. C.

[1] Microbial Biotechnology and Dairy Science Laboratory, University of Ilorin

mabel@unilorin.edu.ng; +2348035817941

[2]Akerele Abimbola Comfort. University of Abuja, Department of Dairy Science

*Corresponding Author; mabel@unilorin.edu.ng

Abstract

This study was carried out to evaluate the performance characteristics, carcass quality and nutrient digestibility of broiler chicken (n = 72) fed *Aspergillus niger* treated Castor seed cake (CSC) which was partially replaced with groundnut cake at 0%, 30% and 60%. The birds were randomly allocated to three treatments each with 8 replicates in a completely randomized design model for 8 weeks. The *Aspergillus niger* treated castor seed cake was included in broiler diet at A (0%, Control), B (30% CSC) and C (60% CSC) respectively in partial substitution of groundnut cake, other ingredients are of fixed proportion. Feed intake and weight gain were recorded on a daily basis. The results showed that there were significant differences ($p<0.05$) in the feed intake, weight gain, feed conversion ratio, carcass characteristics and digestibility among the treatments. The weight gain and feed intake decreased steadily and feed conversion ratio increased as the level of fungus treated CSC increased. The live weight and carcass weight of the birds fed control diet (0% CSC) were significantly higher compared to those of 30% and 60% Fungus treated CSC. There were also significant differences ($p <0.05$) in their nutrient digestibility. In conclusion, the fungus treated castor seed cake was found not suitable as feed ingredients for broiler chickens when fed at 30% and 60% inclusion rate.

Keywords: Broiler chicken, castor seed cake, performance characteristics

Efficacy of Fungus treated Jatropha seed cake on the haematological parameters and serum indices of Piglets

[1]BELEWU, M.A*., DANIEL J.O., [2]NWATU, E. I. AND [3]SALAH, H.O.

[1]Dairy Science & Microbial Biotechnology Laboratory, University of Ilorin,

[2]Department of Dairy Science, University of Abuja

*Corresponding Author; mabel@unilorin.edu.ng

Abstract

Livestock feed constitutes 70% of the cost of production and the costly and scare of the conventional feed stimulated researchers in searching for unconventional feedstuffs. Jatropha is an example of the unconventional feedstuffs but the anti-nutrients in the seed needs to be treated biotechnologically.

The study examined the efficacy of dietary inclusion of Fungus (*Aspergillus niger)* treated Jatropha seed cake (FJSC)on the haematological parameters and serum indices of piglets in a complete randomized design model for a 56 days period. The dietary treatments were: Control diet, A (without fungus treated Jatropha seed cake), B (25%, inclusion of Fungus treated Jatropha seed cake), C (50% inclusion of Fungus treated Jatropha seed cake), D (75% inclusion of Fungus treated Jatropha seed cake) and E (100% inclusion of Fungus treated Jatropha seed cake) to replace soya bean cake while other ingredients were of fixed proportions. The results revealed higher feed intake for the control diet compared to other ingredients. However, Urea nitrogen and creatinine levels increased with the higher fungus treated Jatropha seed cake inclusion in the diets but within the normal values. The hematological values were within the recommended values. The findings suggest that inclusion of Fungus treated Jatropha seed cake should be encouraged since it has no effect on the blood profiles. Hence farmers should be encouraged to include it in the diet of Piglets. Furthermore, more research should be intensified on the carcass characteristics of animals fed *Aspergillus niger* treated Jatropha seed cake.

Keywords: *Aspergillus niger,* Haematology , *Jatropha curcas*, piglet, Serum parameters

Comparative Stem Anatomical Characters of Four *Ficus* Species in Nigeria

[1]TAOHEED, K. M.* AND [2]ABDULRAHMAN A. A.

[1]Department of Biological Sciences, Faculty of Basic Medical and Health Sciences, Baze University, Abuja.

[2]Department of Plant Biology, University of Ilorin, Ilorin, Kwara State, Nigeria

Abstract

A comparative stem-morpho anatomical analysis was carried out on four species in the genus *Ficus*. This was done to provide further understanding of the anatomy of this genus as there is a limited information about the *Ficus* species. The qualitative characteristics of the wood had several similarities and differences. All the four species had diffused porous wood. The axial parenchyma was individually unique in each species; *Ficus elastica* had Diffuse -in-aggregates, *F. exasperata* had Banded parenchyma, *F. mucuso* had Scanty paratracheal, *F. thonningii* had Apotracheal Axial parenchyma. The Rays were uniform among all four species, being multiseriate with layers of 4-10, however they had varying ray cells. Finally, the Fibres, the species had been equally splitted between the two types of fibres: *F. elastica* and *F. mucuso* had non-septate fibres while *F. exasperata* and *F. thonningii* had septate fibres. With regards to the qualitative characteristics, each species was distinct from each other. *Ficus thonningii* had the largest runkel ratio (0.70 ± 0.53), while *F. exasperata* had the smallest Runkel ratio (0.24 ± 0.12). All four *Ficus* species had a different Runkel ratio, all of the ratios had been lower than 1. That discerned that all four *Ficus* species would be good materials for paper production. *Ficus exasperata* had the longest Fibre (1.26 ± 0.16), while *Ficus thonningii* had the shortest fibre (1.0 ± 0.22). *Ficus exasperata* also had the widest Fibre (40.48 ± 4.42), although *Ficus elastica* possesses the narrowest Fibre (26.92 ± 3.34). The largest Fibre lumen wall was observed in *F. exasperata* (32.89 ± 5.02) and *F. mucuso* had the smallest fibre lumen wall size (21.52 ± 4.58). In complete contrast, *Ficus thonningii* had the largest cell wall (5.93 ± 3.10) with *Ficus exasperata* having the smallest cell wall (3.80 ± 1.46).

Chemotaxonomic Insights from FTIR Spectral Analysis of Leaves/Stems of *Amaranthus* Species

MOSES DELE AKE* AND ABDULLAHI ALANAMU ABDULRAHAMAN

Department of Plant Biology, Faculty of Life Sciences, University of Ilorin, Ilorin, Nigeria

*Corresponding author: mosesdeleake@yahoo.com; +2348033854530

Abstract

Fourier Transform Infrared (FTIR) spectroscopy was employed to investigate the biochemical profiles of leaves/stems from six *Amaranthus* species (*A. blitum, A. caudatus, A. spinosus* Green and Red, *A. hybridus,* and *A. viridis*). Spectra recorded in the 4000–650 cm^{-1} range revealed characteristic absorption bands corresponding to hydroxyl, aliphatic, amide, aromatic, and carbohydrate functional groups, reflecting both shared metabolic frameworks and species-specific variations. *A. blitum* exhibited the strongest hydroxyl stretching and dual aromatic bending bands, indicative of high polysaccharide and phenolic content, while *A. viridis* lacked hydroxyl vibrations, distinguishing it chemically from other species. Variants of *A. spinosus* showed prominent $\delta(CH_3)$ vibrations and unique amide/aromatic shifts, suggesting differences in lignin, wax, and protein composition. *A. hybridus* was characterized by a pronounced amide I band, reflecting elevated protein content, but reduced aromatic conjugation. These results demonstrate that FTIR spectroscopy effectively captures both common and distinctive biochemical signatures, providing a robust platform for chemotaxonomic discrimination, nutritional evaluation, and functional assessment of *Amaranthus* leaves.

Keywords: *Amaranthus*, leaf, FTIR spectroscopy, chemotaxonomy, biochemical profiling, phenolics, proteins, carbohydrates

Morphological and Physiological Differentiation among Six *Ocimum* Species: Taxonomic and Ecological Implications

AKINTOLA, O. A.* AND ABDULRAHAMAN, A. A.

Department of Plant Biology, Faculty of Life Sciences, University of Ilorin, Ilorin, Nigeria

*Corresponding author: akintolaolusegunadwewale@gmail.com

Abstract

The genus ***Ocimum*** L. (Lamiaceae) encompasses a taxonomically complex group of aromatic herbs of great medicinal, ecological, and economic significance. Despite their global distribution and local importance, the delimitation of species within the genus remains challenging due to extensive morphological plasticity and overlapping traits. This study investigated interspecific variation among six *Ocimum* species**:** *O. basilicum*, *O. gratissimum*, *O. sanctum*, *O. tenuiflorum*, *O. americanum*, and *O. canum* using quantitative morphological and physiological parameters to infer their taxonomic relationships. Multivariate analyses, including principal component analysis (PCA) and hierarchical clustering, revealed distinct phenotypic patterns reflecting adaptive differentiation. The PCA biplot accounted for 64.8% of the total variance, primarily separating taxa based on leaf dimensions, chlorophyll content, and nitrogen concentration. Cluster analysis grouped the species into two major clades corresponding broadly to the traditional sectional divisions - Section Basilicum **(***O. basilicum***,** *O. gratissimum***,** *O. sanctum***)** and Section Minimum **(***O. canum***,** *O. americanum***,** *O. tenuiflorum***).** Morphological and physiological differentiation among these species suggests ecological adaptation and possible evolutionary divergence driven by environmental heterogeneity. These findings provide a robust phenotypic framework for resolving taxonomic ambiguities and support integrative classification of *Ocimum* species in West Africa.

Keywords: *Ocimum* L., Lamiaceae, Morphological variation, Physiological traits, Principal component analysis, Cluster analysis, Taxonomic differentiation, Integrative taxonomy

Dietary Supplementation with *Amaranthus caudatus* Promotes Bone Marrow Regeneration and Hepatic Recovery in Anaemia: Nutritional and Phytochemical Correlates

MOSES DELE AKE* AND ABDULLAHI ALANAMU ABDULRAHAMAN

Department of Plant Biology, Faculty of Life Sciences, University of Ilorin, Ilorin, Nigeria

*Corresponding author: mosesdeleake@yahoo.com; +2348033854530

Abstract

Anaemia remains a major public health concern globally, with nutritional deficiencies and oxidative stress as key underlying factors. *Amaranthus caudatus*, a nutrient-dense pseudocereal and leafy vegetable, has been traditionally used for its therapeutic and dietary benefits. This study investigated the hematopoietic and hepatoprotective effects of *A. caudatus* in cyclophosphamide-induced anaemic Wistar rats, establishing mechanistic links between its nutritional and phytochemical profiles and tissue recovery. Proximate, mineral, and phytochemical compositions of *A. caudatus* leaves and seeds were quantified using standard AOAC and spectrophotometric methods. Anaemia was induced in female Wistar rats with cyclophosphamide (40 mg/kg, intraperitoneally). Rats were subsequently fed diets containing 0%, 50%, or 100% *A. caudatus* leaf powder for 14 days. Hematological indices were assessed, and histological analyses of bone marrow and liver tissues were conducted using haematoxylin and eosin staining. *Amaranthus caudatus* contained high concentrations of protein (23.15 ± 0.37%), iron (12.41 ± 0.15 mg/100 g), calcium, magnesium, potassium, and bioactive phenolics (287.42 ± 0.52 mg GAE/100 g). Rats fed *A. caudatus* diets exhibited significant improvements ($p < 0.05$) in red blood cell count, haemoglobin concentration, and packed cell volume compared with anaemic controls. Histological observations revealed restoration of bone marrow cellularity with active erythroid foci and regeneration of hepatic cords with reduced sinusoidal congestion. These tissue recoveries were accompanied by reduced oxidative damage and improved systemic redox status, indicating synergistic action between the plant's nutrients and phytochemicals. Dietary supplementation with *Amaranthus caudatus* ameliorates anaemia through dual mechanisms of nutrient provision and

antioxidant-mediated tissue protection. The species demonstrates substantial potential as a functional food and nutraceutical for supporting haematopoiesis and hepatic recovery under oxidative stress conditions.

Keywords: *Amaranthus caudatus*, anaemia, hematopoiesis, hepatoprotection, phenolics, antioxidants, functional food, Wistar rats

Ecological Distribution and Conservation Status of the Genus Vitex In Nigeria

[1]KEHINDE ADEGOKE ADENIJI AND [2]ABDULLAHI ALANAMU ABDULRAHAMAN

[1]Forestry Research Institute of Nigeria, P.M.B 5054, Jericho, Ibadan.

[2]Department of plant Biology, Faculty of Life Science University of Ilorin, Nigeria

Abstract

Ethnomedicinal significance of *Vitex* species in Nigeria are well documented. Despite this, the total number of *Vitex* species, ecological distribution and conservation status of these valuable species are yet to be ascertained. A total of 239 herbarium specimens of Vitex were examined in four Herbaria in Nigeria of which (10) species were recognized namely: *Vitex agnus-castus* (9 specimens), *Vitex chrysocarpa* (7), *Vitex doniana* (108), *Vitex grandifolia* (38), *Vitex ferruginea* (8), *Vitex simplicifolia* (22), *Vitex thyrsiflora* (23), *Vitex oxycuspis* (11), and *Vitex rivularis* (11) and Vitex bongalensis (2). The information on Herbarium records were used in generating distribution map. The IUCN (International Union of Conservation of Nature) Red List web platform was used to determine the conservation status and threats of the *Vitex* species found in Nigeria. It was revealed that *Vitex bogalensis* and *Vitex feruginea* are threatened species in Nigeria. *Vitex doniana* is widely distributed throughout the country. However, *Vitex Oxycuspsis* and *Vitex bogalensis* are narrowly distributed. Conservation efforts are necessary to protect these species for habitat loss, over- exploitation and other threats.

Keyword: Taxonomy, Ecology, Distibution and Conservation

Haematopoietic and Hepatoprotective Potentials of *Amaranthus blitum* in Experimentally Induced Anaemic Rats: Evidence from Hematological, Phytochemical, and Histological Evaluations

MOSES DELE AKE* AND ABDULLAHI ALANAMU ABDULRAHAMAN

Department of Plant Biology, Faculty of Life Sciences, University of Ilorin, Ilorin, Nigeria

*Corresponding author: mosesdeleake@yahoo.com; +2348033854530

Abstract

Iron deficiency anaemia remains a major global health challenge, especially in low- and middle-income countries. Leafy vegetables of the genus *Amaranthus* are increasingly explored as functional foods for hematopoietic and hepatic support. This study evaluated the histological responses of bone-marrow and liver tissues following induction of anaemia and subsequent dietary supplementation with *Amaranthus blitum*, and interpreted those responses in light of the plant's phytochemical and nutritional profile.

Female and male Wistar rats were induced into anaemia and thereafter assigned to normal feed, standard iron therapy (ferrous sulphate), or diets supplemented with 50 % or 100 % *A. blitum*. Histological analyses at 40 h post-induction and at 14 days post-treatment included bone-marrow cellularity, trabecular structure, megakaryocyte presence, myeloid/erythroid/lymphoid populations, and liver architecture, hepatocyte cytoplasm, portal tract integrity and inflammation. Parallel phytochemical, proximate, mineral, vitamin and GC–MS analyses of *A. blitum* leaves and seeds were used to interpret tissue responses. The 50 % *A. blitum* diet group displayed normalised marrow cellularity with robust erythroid and myeloid lineage maturation and intact hepatic architecture with minimal inflammation, supporting a regenerative and protective effect. The 100 % diet group, while maintaining hepatic integrity, exhibited mild marrow hypocellularity or haemorrhagic foci at 14 days, suggesting dose-saturation or antinutritional effects. High concentrations of alkaloids, glycosides, saponins, phenolics and minerals (notably Fe, Zn, Cu) as well as terpenoid- and

fatty-acid-dominated GC–MS profiles in *A. blitum* likely underlie the hematopoietic and hepatoprotective effects.

Amaranthus blitum has potential as a functional dietary intervention for iron-deficiency-induced anaemia and hepatic support, particularly at moderate inclusion levels. These findings warrant further investigation into dose-optimization, bioavailability, and mechanistic pathways.

Keywords: *Amaranthus blitum*; iron deficiency anaemia; hematopoiesis; liver histology; phytochemicals; functional food; bone-marrow regeneration.

Uptake and Translocation of Biosynthesized Zinc Oxide Nanoparticle in Pepper Plants

ADEBOMOJO, A. A*. AND ABDULRAHAMAN, A. A.

Department of Plant Biology, Faculty of Life Sciences, University of Ilorin, Ilorin.

*Corresponding author: adebomojowaheed@gmail.com; 08067383308

Abstract

Pepper (*Capsicum annuum* L.) is ranked third in Nigeria among the cultivated vegetable crops, behind onions and tomatoes. It is vital to the nutritional stability of both rural and urban dwellers, providing vitamins and minerals in their diets. The increasing world's population and decreasing arable land available for cultivation called for new agro-technologies to support agricultural production and protection globally. Also, nutrient-reached food is essential for preventing malnutrition. An important micronutrient for humans, animals, and plants is zinc (Zn). The use of biosynthesized Zinc oxide nanoparticles (ZnO NPs) through foliar fertilization can reduce this problem. The current study used biosynthesized ZnO NPs using moringa leaf extract. The formation of ZnONPs was confirmed by UV-Vis spectroscopy, Fourier Transform Infrared spectroscopy, Scanning Electron Microscopy, and particle size analysis. The effect of different concentration of biosynthesized ZnO nanoparticles (10-100 mg) and distilled water as the control, was studied on the Zn uptake by the different organs of pepper plant using potted experiment and Atomic Absorption Spectroscopy (AAS). Results indicated that spherical-shaped zinc oxide nanoparticles with sizes less than 100 nm were obtained, where phenolics were the main chemicals present at the surface of NPs. Zinc oxide nanoparticles significantly improved the zinc content with increasing concentration of ZnONPs as compared to the control in all the main plant organs (roots, shoots and leaves) and the fruit by over 60% in both accessions of pepper studied. These results suggest that ZnONPs can help promote the transport of Zn to pepper fruits when foliarly-applied. This work provides insight into the role of ZnONPs in foliar uptake and *in planta* biodistribution for improving Zn delivery to edible plant parts and ultimately improving the Zn content in food for human consumption.

Keywords: Biosynthesized, Pepper, Zinc, Nanoparticles, Foliar, *in planta*, Atomic Absorption Spectroscopy (AAS)

Extraction, Phytochemical Screening and Antioxidant Analysis of Mo_{F1} – Mo_{F3} Fractions of Ethanol Extracts of *Moringa Oleifera* Leaves

MUBARAK O. AMEEN, AND AKANBI A. BISOLA*

[1]Department of Chemistry, University of Ilorin, Ilorin, Nigeria.

*Corresponding author: akanbiaishatbisola@gmail.com

Abstract:

The Leaves of *Moringa oleifera* was air dried, grinded to powdery and extracted with ethanol. The ethanol extract was fractionated with n-hexane (NH), dichloromethane (DCM), ethyl acetate (EA) and methanol (MeOH) in order of increasing polarity to afford thirteen fractions. Phytochemical screening and antioxidant analysis were carried out on MO_{F1} – MO_{F3},

The results obtained indicates the presence of alkaloids, flavonoids, tannins, carbohydrates, polyphenols, steroids, and glycosides in the three fractions while saponins was not detected. The Total Antioxidants Capacity (TAC) of the fractions were 0.0679, 0.0962, and 0.1074 mg/100g for MO_{F1}, MO_{F2} and MO_{F3} respectively. These results indicate the antioxidant potentials of the fractions, though the TACs were comparably low when compared to the control, gallic acid which has a TAC of 3.08135 mg/100g.

Keywords: Phytochemical screening, Antioxidant analysis, Total Antioxidants Capacity (TAC), *Moringa oleifera*, Gallic Acid.

Influence of Enzyme (Xylanase) Concentration on the Degradability of Pre-treated Rice husk

[1]KOLADE, I. O.*, [1]YOUSUF, M. B., AJIJOLAKEWU, K. A. and [2]ABDULKAREEM, T. Z.

[1]Department of Animal Production, Faculty of Agriculture, University of Ilorin, Nigeria

[2]Department of Microbiology, Faculty of Life Sciences, University of Ilorin, Nigeria

*Corresponding author: KOLADE, I.O., koladeishaq@gmail.com

Abstract

The experiment was conducted to examine the effects of the addition of xylanase enzyme produced via solid state fermentation method (SSF) on fibre degradation of rice husk and on its nutritional value. Rice husk was physically pre-treated through soaked in water for 24 hours or ground to increase the surface area or in loose form. Pre-treated rice husk was then subjected to enzyme treatment by spraying the xylanase onto the rice husk at five different concentrations at 0 (control), 0.1, 0.2, 0.3 and 0.4 100g/ml respectively). The treated rice husk was allowed to undergo fermentation process at room temperature up to 24 hours, after which it was subjected to chemical analysis to determine the proximate composition and fiber fractions of the feedstuff. Data obtained were subjected to analysis of variance (ANOVA) and means separated by Duncan Multiple Range Test. The results showed that acid detergent fibre (ADF), neutral detergent fibre (NDF) and acid detergent lignin (ADL) were significantly lower ($p<0.05$) in ground rice husk (54.0%, 63.67%, and 3.9%) when compared with soaked and unprocessed but significantly higher ($p<0.05$) in both unprocessed and soaked rice husk (66.67%, 87.33%, 5.57% and 63.33%, 86.00%, 7.00%). Dry matter (DM) and Crude protein (CP) recorded higher values ($p<0.05$) in ground rice husk (83.0%, 12.73%) than soaked and unprocessed rice husk while significant lower values ($p<0.05$) of Dry matter and Crude protein were recorded in both unprocessed and soaked rice husk (68.0%, 10.28% and 76.0%, 11.28%). Among the concentrations of enzyme, the percentage crude protein (CP) and dry matter (DM) were significantly higher ($p<0.05$) at 100g/ 0.2 ml (14.58% and 90.90%) and lower at 0.3 ml/100g (12.40% and 84.67%) level of xylanase supplementation while control (0 g/ml) recorded 10.42% and 72.30% respectively.

The acid detergent fibre (ADF) and neutral detergent fibre (NDF) were significantly lower ($p<0.05$) at 100g/ 0.2 ml (41.0% and 49.67%) and highest values were recorded (54.0% and 71.0%) at 100g/ 0 ml (control) level of xylanase supplementation. The ash content and acid detergent lignin were significantly higher in the untreated (control) rice husk (38.83% and 8.40%) and lower values were recorded in the entire xylanase treated rice husk. This study suggested that ground rice husk treated with xylanase enzyme at 100g/ 0.2 ml level of supplementation tends to enhance fibre degradation of rice husk and possibly improves its nutritive values.

Keywords: Rice Husk, Xylanase, Proximate Composition, Fibre Fraction

Effect of Season on the Chemical Composition and Anti-Nutritional Factors of *Ficus benjamina* and *Duranta erecta*

*IMAM, R. O[1].; WAHEED, A. A[2].; AYANKANMI, N. I[2] and ZUBAIR, J. B[2].

[1]Department of Dairy Science, Faculty of Agriculture, University of Abuja, Abuja

[2]Department of Animal Production, Faculty of Agriculture, Kwara State, Malete

*Corresponding Author: ridwan.imam@uniabuja.edu.ng

Abstract

This study investigated the seasonal variation in the chemical composition and anti-nutritional factors of *Ficus benjamina* and *Duranta erecta* leaves to determine optimal harvest periods for potential use as livestock feed. Leaf samples were collected during the late rainy and early dry seasons from Kwara State University, Campus, Malete, Nigeria, and analyzed using standard AOAC methods for proximate composition and phytochemical constituents. Findings revealed clear seasonal and species-specific differences in nutrient content. *Ficus benjamina* showed higher crude protein and fat levels during the dry season, while *Duranta erecta* exhibited greater carbohydrate accumulation in the same period. Moisture content was unexpectedly higher in both species during the dry season, and ash content was more pronounced in *Ficus benjamina* during the rainy season.

Phytochemical analysis confirmed the presence of tannins, flavonoids, phenols, glycosides, saponins, alkaloids, and terpenoids, with most compounds varying significantly between seasons and species. Tannins and phenols were generally higher in *Duranta erecta* during the dry season, while flavonoids peaked in *Ficus benjamina* under similar conditions. Terpenoid levels remained relatively stable across treatments. The study concludes that *Ficus benjamina* may be more suitable as a protein-rich supplementary feed in the dry season, whereas *Duranta erecta* provides higher carbohydrate content but requires careful use due to its elevated anti-nutritional compounds. These results highlight the importance of seasonal considerations when incorporating these plants into livestock feeding strategies.

KEYWORDS: Season, Proximate, Antinutrients, Rainy

Comparative Efficacy of Bio-Rational and Synthetic Insecticide Treatments on Maize Production: A Field Assessment of Integrated Pest Management Options in Nigeria

*I. A. ADEROLU AND O. S. OLADELE

Department of Crop and Environmental Protection, University of Abuja, Nigeria

*Corresponding Author: adeisma@yahoo.com | ORCID: 0000-0003-1648-3900

Abstract

In sub-Saharan Africa, maize production is still limited due to the fall armyworm (FAW; *Spodoptera frugiperda*), which continues to defoliate the maize plants and destroy whorls, further paralyzing the productivity. The usage of synthetic insecticides also brings up the issue of environmental contamination, human exposure, and resistance. Therefore, the comparative study profusely involved two bio-rational and two synthetic insecticides in FAW control and yield maximization of maize in the field experiment in the Southern Guinea Savanna of Nigeria.

The experiment was conducted on the 2024/2025 crop season on the basis of a randomized complete block study of five treatments and three replications. The parameters that have been measured included incidence of larvae, evaluation of leaf injury, height of plants, cob characteristics, and grain yield. The following analysis of variance (ANOVA) showed that the treatment effects were significant in all the measured variables ($p \leq 0.05$). Bio-rational insecticides decreased the incidence of larvae (41 - 55) and decreased the leaf damage (38 - 52) compared to the control group. In addition, there was a rise in the grain yield of 35 - 48 percent, and the performance of the bio-rational products was statistically equal to that of the synthetic insecticides.

These findings prove that bio-rational products provide a supply of pest suppression and minimize ecological risks and the development of resistance. Therefore, their inclusion in the Integrated Pest Management (IPM) model is a feasible approach to the specific improvement

of maize production and a significant decrease in the level of chemical dependence among West African smallholders.

KEYWORDS: Bio-rational insecticides; maize productivity; integrated pest management; leaf injury; grain yield; sustainable crop protection

Melissopalynological Analysis of Honey Samples from Zuma Rock as an Indicator of Vegetation Types and Deforestation Levels

[1]LIADI, M. T.; ADEGBOLA, K. E.; [2]ORIJIEMIE, E. A.; AKANDE, A. A.; SAKA, I. E. AND OYERINDE, A. A.

[1]Department of Crop and Environmental Protection, Faculty of Agriculture, University of Abuja

[2]Department of Department of Archaeology and Anthropology, University of Ibadan

*Corresponding Author: muideen.liadi@uniabuja.edu.ng.

Abstract

Melissopalynology, the analysis of pollen grains in honey, is a valuable tool for inferring local vegetation composition and environmental changes. In this study, melissopalynological analysis was applied to evaluate vegetation types and deforestation levels around Zuma Rock, Nigeria. Six honey samples were collected from local beehives between January and April 2025. Pollen was extracted from each sample using the acetolysis method and examined under light microscopy for identification and classification. Diversity indices of the data obtained were calculated using PAST software and frequency of the pollen types were calculated. Analysis revealed 12 pollen taxa representing eight plant families. The most abundant pollen came from *Parkia biglobosa* (71,844), followed by *Chrysophyllum albidum* (45,300), *Elaeis guineensis* (17,453), and *Blighia sapida* (9,932). Cultivated or disturbance-indicating taxa were also significant, including *Senna alata* (5,365), combined *Combretaceae/Melastomataceae* (5,408), and *Spondias mombin* (8,168). In contrast, typical forest species, *Nauclea diderrichii, Bombax buonopozense, Berlinia grandiflora*, appeared only in trace amounts (<5% of total pollen). The samples reflected a gradient of vegetation disturbance. Samples 1 – 3 were dominated by *Parkia biglobosa* (43–50%) and *Chrysophyllum albidum* (28 – 31%), with *Elaeis guineensis* contributing 4–10% and rainforest taxa ≤1.6%, indicating slightly disturbed savanna woodland. Sample 4 maintained high levels of *Parkia* (42.8%) and *Chrysophyllum* (21.5%), but showed a farmland influence through the presence of *Elaeis guineensis* (14.4%), *Mangifera indica* (4.3%), and *Spondias mombin* (4.5%). Sample 5

exhibited reduced *Parkia* (28.6%) and higher disturbance taxa such as *Combretaceae*/*Melastomataceae* (15.3%) and *Spondias mombin* (13.7%), reflecting secondary and regenerating savanna. Sample 6 was dominated by *Blighia sapida* (32.5%) with substantial input from *Spondias mombin* (14.5%) and *Chrysophyllum albidum* (13.4%), representing advanced deforestation where bees relied mainly on fruit trees and disturbed vegetation. These findings suggest that the peri-urban landscape around Zuma Rock is undergoing an ecological transition driven by anthropogenic pressures, suggesting that melissopalynology can serve as a low-cost tool for vegetation and deforestation monitoring in Nigeria.

Keywords: Melissopalynology, Honey, Vegetation, Deforestation, Savanna, Nigeria.

Biodiversity and Ecological Distribution of Termite Species in University of Abuja Campus

LIADI, M. T*.; ABDUL-GANIYU M. K.; ADEOYE A.; ADEROLU, I. A.; HUSSEIN, M. S.; BELLO, F. O.; RABIU, M. AND OYERINDE, A. A.

Department of Crop and Environmental Protection, Faculty of Agriculture, University of Abuja, Abuja

*Corresponding Author: muideen.liadi@uniabuja.edu.ng

Abstract

This study investigated the biodiversity of termite species within the University of Abuja Campus, employing a descriptive ecological survey design incorporating field-based sampling, laboratory identification using identification keys, and quantitative analysis to evaluate the composition, distribution, and abundance of termite species across different habitat types within the Campus. Data analysis was carried out using PAST Software, version 4.03 and Microsoft Excel 2013, enabling the computation of several key ecological indices to assess the diversity and structure of termite communities across the three habitat types: grassland, farmland, and disturbed land. Seven (7) distinct species (*Odontoterme ssp., Microtermes subhyalinus, Ancistrotremes cavithorax, Macrotermes bellicosus, Coptotermes sp., Trinervitermesgeminatus, Trinervitermes togoensis*) belonging to two (2) families (Termitinae and Rhinotermitinae) and three (3) subfamilies (Coptotermitinae, Macrotermitinae, Nasutitermitinae) were identified. Species richness (*Taxa_S*) was highest in grassland (7 species), followed by disturbed land (6) and lowest in farmland (4). The study recorded higher species evenness (0.8569) on disturbed land compared to farmed (0.8249) and grassland (0.5343). Shannon's diversity index, which accounts for both richness and evenness, supports this result with values highest on disturbed land (1.637), followed by grassland (1.319), and lowest on farmland (1.194). This finding significantly challenges the concept of anthropogenic disturbance. While termites remain widely considered as pests but with good ecological functions, preservation of grassland to conserve termites and thus harness their potential is recommended.

Equilibrium, Kinetic and Thermodynamic Studies of Catalytic Degradation of Orange G Dye in Aqueous Media

[1]OKEOLA, F. O*. AND [1]ABDULSALAM, Z.

[1]Department of Industrial Chemistry, University of Ilorin, Ilorin

*Corresponding Author: okeolafo@gmail.com ; 08038626501

Abstract

This work investigates the catalytic oxidation of the azo dye Orange G (OG) in aqueous media using the classical Fenton process (Fe^{2+}/H_2O_2). We systematically examined pH, H_2O_2 concentration, Fe^{2+} concentration, temperature (293–313 K), ionic strength (Cl^-), and initial dye concentration. Spectrophotometric kinetic measurements (λ_max = 560 nm) under pseudo–first-order conditions show that decolorization improves with temperature, oxidant, and catalyst concentration and is optimal near pH 4, while chloride ions depress performance. Kinetic analysis indicates pseudo–first-order behavior under our conditions. Arrhenius and Eyring analyses provided activation energies of ≈83–84 kJ·mol^{-1} (catalyzed vs uncatalyzed), negative ΔS‡ and negative ΔH‡ values, and positive ΔG‡ at study temperatures, suggesting thermodynamically feasible but non-spontaneous processes under standard conditions. These baseline homogeneous Fenton data complement recent advances in heterogeneous and photo-Fenton variants and help guide process optimization for azo-dye wastewater treatment.

Keywords: Orange G, azo dye, Fenton oxidation, kinetics, thermodynamics, activation energy

Preparation of Activated Carbon and Syrup from Pit and Mesocarp of Date Fruit (*Pheonix dactylifera*)

[1]OKEOLA, F. O*.; [1]ATURU, D. M.; [2]AFOLABI, O. J.; AND [1]FAMILIOYE, K. O.

[1]Department of Industrial Chemistry, University of Ilorin, Ilorin

[2]Chemistry Department, University of Ilorin, Ilorin

*Corresponding Author: okeolafo@gmail.com ; 08038636501

Abstract

Date palm seed was used to prepare activated carbon using Orthoposphoric acid (H_3PO_4) as the activating agent. The DSAC was activated at a temperature of 400 ^{0}C, an impregnation ratio of 4:1 and activation time of 120 minutes. Physicochemical properties were carried out, the result shows a pH of 6.5, moisture content of 15.69 %, % yield of 66.67 % and a bulk density of 0.14 g/cm^3. The textural characterization was assessed based on nitrogen adsorption isotherm (BET), SEM and FT-IR characterization was also carried out. The resultant porous carbon has a BET surface area of 1044.113 m^2/g, a pore size of 6.523 nm, and pore diameter of 2.118 nm characterizing a mesoporous material. The result obtained for the DSAC shows that date seed can serve as raw material for the production of activated carbon, given their characteristics and wide availability, the use of date seed for activated carbon production can also reduce operational cost, which makes it a good alternative for Commercial Activated Carbon (CAC). The Date mesocarp was used for the production of date syrup. The result of the proximate analysis of the produced date syrup shows moisture content of 10.12 %, 2.60 % protein, 1 % fat, 2.14 % ash and 84.11 % of carbohydrate was obtained respectively. The total sugar, glucose and soluble solids was also tested and the following results were obtained: 21.36 %, 14.28 % and 62.00 % respectively. The presence of simple sugar in the date syrup makes date syrup a good alternative for sugar syrup.

Keywords: Activated carbon, surface area, pore structure, pore size date seed, BET, FT-IR, SEM, date syrup, proximate analysis.

Antioxidant Potential and Phytochemical Screening of Ethanolic Extract from *Spermacocea ocymoides* Leaves

*OJEDIRAN, G. OLURANTI[1,2], AMEEN, O. MUBARAK[2]., ATOLANI, OLUBUNMI [2,3], OSUJI OBINNA[1], OKORONKWO CHIAMAKA[1] & EGWUOGU CHISOM[1],

[1]Department of Chemistry, Alex Ekwueme Federal University, Ndufu-Alike, Nigeria.

[2]Department of Chemistry, University of Ilorin, Ilorin, Nigeria

[3]African Centre for Herbal Research, Ilorin (ACHRI), University of Ilorin, Nigeria

*Corresponding author e-mail: olurantiojediran@gmail.com

Abstract

Spermacocea ocymoides, commonly known as "false button weed," belongs to the family Rubiaceae. It has previously been reported for its antimicrobial, antiepileptic, and antiplasmodial properties and is well-known for its ethnomedicinal applications. In this report, phytochemical screening and antioxidant activities of ethanolic leaf extract from *S. Ocymoides* (SOE) were conducted using standard procedures.

Fresh leaves of *S. Ocymoides* were collected, dried under shade, and pulverized. SOE was obtained via Soxhlet extraction, yielding 4.09 g (9.52%) of the plant's constituents. Qualitative Preliminary phytochemical screening for tannins, glycosides, phlobatannins, flavonoids, phenols, steroids, saponins, anthraquinone, alkaloids, and terpenoids was carried out using standard procedures. The free radical scavenging potential of SOE was assessed against 1,1-diphenyl-2picrylhydrazyl (DPPH) radical. Qualitative phytochemical analysis showed the presence of tannins, flavonoids, alkaloids, phenolic compounds, glycosides, saponins, anthraquinone, and terpenoids, while steroids and phlobatannins were absent. These phytochemicals may be responsible for the plant's antioxidant properties.

SOE showed significant antioxidant activity at different concentrations. The extract (0.5 mg/mL) exhibited DPPH-scavenging activity of 61.19% ± 0.22%, while the positive control (0.5 mg/mL ascorbic acid) had 100% ± 0.22% activity. The concentration of the extract required to trap 50% of DPPH (IC_{50}) was 0.205 mg/mL. The antioxidant activities of SOE were compared

with a reference or standard antioxidant (ascorbic acid). These results highlight the potential antioxidant potential of *S. ocymoides*, supporting its traditional use in managing oxidative stress-related disorders and suggesting further investigation for the development of antioxidant herbal medications.

Keywords: *Spermacocea ocymoides*, phytochemicals, antioxidants, DPPH, ethanolic crude extract

Access to Information and Communication Technologies among Rice Farmers in Gwagwalada Area Council Federal Capital Territory, Nigeria

SHEU AHMAD OLOHUNGBEBE*, OMOLOLA BASHIRAH JIMOH, AND SAFINAH ADEDOLAPO OLOMU

Department of Agricultural Economics, Faculty of Agriculture, University of Abuja, Nigeria.

*Corresponding Author: ahmad.olohungbebe@uniabuja.edu.ng

Abstract

This study investigated the access to information and communication technologies (ICT) among rice farmers in Gwagwalada Area Council, Federal Capital Territory, Nigeria. The study used a multi-stage sampling technique employed to select the total sample size of eighty-three (83) from the study area. Primary data was used for this study, the analytical tools involved were descriptive and Tobit regression model. The result revealed that 67.5 % of respondents were male with a mean age of 61 years, the result of revealed that 32.5 % of respondents were female with a mean of 27 years, 23.5 % had education up to secondary level and 46.9 % has more than 11 - 20 years of farming experience with the mean of 13 years and 71.0 % of the house hold size had a range between 1 - 5 members with a mean of 5 members. The study found that 14.5 % of rice farmers had access to mobile phones, 12.0 % to the internet, 9.6 % to YouTube, and 8.4 % to videos. In contrast, 1.2 % of respondents lacked access to mobile phones, videos, the internet, and computers. The Tobit regression analysis revealed that household size was statically significant at 5 % probability level ($p<0.05$) and had a positive influence on rice farmers access to Information and Communication Technology. The result of the major constraints encountered by the rice farmers showed lack of Internet services with a mean of 4.03, high cost of device and services with a mean of 3.38 and limited technical skills with a mean of 3.58 were affecting them seriously. This study recommends that the government should strengthen ICT infrastructure in rural areas, offering community-based ICT training programs, subsides ICT equipment and services for farmers and increase awareness of ICT benefits in agriculture, thereby showcasing real-life examples of successful ICT integration in farming practices.

Keywords: Access, Information and Communication Technology, Rice and Farmers.

The Enzymatic Preservation of Aso-Oke Fabrics for Theatre and Film Productions

SHUAIB, S. O.

Department of the Performing and Film Arts, University of Ilorin, Ilorin, Nigeria

*Corresponding Author: posadgem@gmail.com

Abstract

Aso-oke fabric is a traditionally woven textile indigenous to the southwestern region of Nigeria, especially among the Yoruba people. Renowned for its aesthetic appeal and physical properties including excellent thermal regulation, high moisture absorption, low flammability, and resilience. Aso-oke remains a favored material in costuming for theatre and film productions, particularly those depicting epic or cultural narratives. Despite these advantages, Aso-oke's dense weave and organic composition make it prone to microbial infestation and susceptible to degradation over time, especially under the conditions of repeated use in performance environments. This study explores the potential of protease enzyme treatment in enhancing the physical and aesthetic durability of Aso-oke fabrics. Findings revealed significant improvements in color retention, microbial decontamination, and surface morphology, thereby supporting enzymatic preservation as a viable method for sustainable costume management in the performing arts.

Keywords: Enzymatic, Preservation, Aso-oke, Fabric, Theatre, Film, Protease, Microbial Load, Costume Hygiene, Cultural Heritage, Textile Conservation

Harnessing Biogas Innovation for Waste-to-Energy Conversion in Lagos State: A Pathway to Environmental Sustainability

Z. A. ANIFOWOSHE*[1], T. A. HAKEEM[1], A.S HARUNA[1]

[1]Department of Science and Technology, Centre for Strategic Research and Studies, National Defence College Nigeria, Abuja

*Corresponding Author: za.anifowoshe @ndc.gov.ng

Abstract

This study explores biogas production as an innovative response to the pressing waste management and environmental challenges in Lagos State, Nigeria. With Lagos generating over 13,000 metric tons of waste daily, a volume equivalent to roughly filling five Olympic swimming pool every 24 hours, inefficient disposal contributes significantly to greenhouse gas emissions and urban pollution. Biogas technology offers a dual solution: reducing organic waste while producing renewable energy. This research synthesizes advances in anaerobic digestion (AD), feedstock co-digestion, process optimization, and biogas upgrading technologies. Using open data, the study models the potential biogas yield, energy output, and avoided CO_2 emissions for Lagos State. The findings indicate a theoretical potential exceeding 1 million m^3/day of biogas with an associated CO_2 reduction exceeding 500,000 tons annually. The research concludes with strategic recommendations for scaling community-based digesters, policy reform, and private–public partnerships to transition Lagos toward a circular bioeconomy.

Antimicrobial Activity of Bacteria Species Isolated from Pharmaceutical Dunghill

SALAMI T. OMATSEYE AND DR. K. A. AJIJOLAKEWU

Department of Microbiology, Faculty of Life Science, University of Ilorin

Abstract

The increasing resistance of pathogens to conventional antibiotics and the limited discovery of new antibiotic compounds have led to a significant need for novel and sustainable sources of antimicrobial agents. Though, pharmaceutical dunghill consists a large number of bacteria and fungi species which has develop resistance mechanisms against some associated antibiotics around them. The mechanical impact and environmental factors on their rates of survival in that region, determine the type of biochemical compounds they produce which makes them extremely resistance to some synthetic antibiotics produced. Therefore, this research aims to investigate the presence of antibiotics producing organisms from pharmaceutical soil sample and their activity against antibiotic's resistances isolates, analysis there potential to inhibit or destroy their growth, proceeding to extraction of secondary metabolite production in bacteria species isolated from pharmaceutical dunghill, with a focus on analyzing their antibiotics susceptibility, antibacterial, antifungal, cytotoxicity and enzyme inhibition analysis and further identifying these organisms to their molecular level. However, the result of the isolated soil sample from pharmaceutical and medical site shows an increased number of bacteria species of 146 total isolates after confirmatory screening, the total number of isolates decreased in number to 65 isolates in the presence of gram positive and negative organism. The 65 isolates were further screened for their antimicrobial activity against clinical resistance organism of *Staphylococcus aureus, Klebsillia pneumonia, Acinetobacter baumanni, Pseudomonas aeroginosa, Enterobacter cloaca* and *Escherichia coli*, the isolates decreased in numbers of their susceptibility to 43 isolates with their zones of inhibition ranging from 12 mm to 39 mm. The isolate with good antimicrobial activity were extracted for their secondary metabolite activity and subjected to further research.

Keywords: Resistance, novel, antimicrobial and metabolite