

ANNUAL CONFERENCE ON BIOSCIENCE AND BIOTECHNOLOGY, 2024.
UNIVERSITY OF NIGERIA, NSUKKA

BOOK OF ABSTRACTS



**UNIVERSITY OF NIGERIA NSUKKA
FACULTY OF BIOLOGICAL SCIENCES**

**ANNUAL
CONFERENCE ON BIOSCIENCE
AND BIOTECHNOLOGY**

**THEME: EXPLORING THE
FRONTIERS OF BIOSCIENCES,
BIOTECHNOLOGY AND
BIOTHERAPEUTICS**

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2ND - 4TH JULY, 2024

July, 2nd – 4th, 2024

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THEME

Exploring the Frontiers of Biosciences, Biotechnology
and Biotherapeutics

Sub-Themes

- Medical Biotechnology, Biomedicine and Biotherapeutics
- Nanobiotechnology, Bioenergy and Green Chemistry
- Plant and Animal Biotechnology
- Bioinformatics
- Marine Biotechnology
- Industrial Microbiology and Biotechnology
- Genetics and Molecular Evolution
- Environmental Science and Bioenvironmental Engineering
- Enzymology
- Food, Nutrition and Agricultural Products
- Infectious Diseases

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*ANNUAL CONFERENCE ON BIOSCIENCE AND BIOTECHNOLOGY, 2024.
UNIVERSITY OF NIGERIA, NSUKKA*

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Samson, Chilaka, Ferdinand Chiemeka

July, 2nd – 4th, 2024

ANNUAL CONFERENCE ON BIOSCIENCE AND BIOTECHNOLOGY, 2024.
UNIVERSITY OF NIGERIA, NSUKKA

BOOK OF ABSTRACTS

**Programme of Events for the Annual Conference on
Bioscience and Biotechnology 2024,**

Faculty of Biological Sciences, University of Nigeria, Nsukka

***Theme: Exploring the Frontiers of Biosciences,
Biotechnology and Biotherapeutics***

July 2nd – 4th, 2024

July, 2nd – 4th, 2024

*ANNUAL CONFERENCE ON BIOSCIENCE AND BIOTECHNOLOGY, 2024.
UNIVERSITY OF NIGERIA, NSUKKA*

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July, 2nd – 4th, 2024

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2nd July, 2024

Opening Ceremony

Chairperson: *Dr. E.C. Ossai*

10:00-10:10 am Welcome address by the Local Organizing Committee Chairperson

Dr. E.C. Ossai

10:10-10:20 am Address by the Dean, Faculty of Biological Sciences, University of Nigeria, Nsukka.

Prof. E. I. Nweze

10:20-10:40 am Address by the Ag. Vice Chancellor, University of Nigeria, Nsukka

Prof. Romanus C. Ezeokonkwo

10:40-11:10 am Keynote Address: Saving the Harvest: How can Academia and Research Feed Nigeria, Africa and the World?

Prof. Umezuruike Linus OPARA CEng CFS FIAgrE FNIAE FSAIAE

11:10 – 11:20

BRIEF INTERACTION

Oral Presentations

11:20-11:25 am BBC-1 *Solanum aculeastrum* Dunal Berries: Phytochemical Profiling and GC-MS Analysis of Methanolic Extract and n-Hexane, Dichloromethane, Ethyl Acetate and n-Butanol Fractions

Gift Crucifix Pender, Bernard Guyah, Peter G. Mwitari, Inyani John L. Lagu, Mercy Jepkorir, and James H Ombaka

11:25-11:30 am BBC-2 Acid-fast Bacilli in Slaughtered Cattle in Ikpa Slaughterhouse and Human TB Patients and the Need for Further Molecular Studies in Nsukka, Enugu State, Nigeria

Akwoba Joseph Ogugua, Chisom Nwobi, Linda Majest-Alukagbare, Nzubechukwu Emmanuel Ezeakor, Charity Ashe'osla Agada

11:30-11:35 am BBC-3 The Effects of Ethanolic Leaf Extract of *Gongronema Latifolium* on Pathophysiological Parameters of Albino Rats Administered Lead Acetate (Pbac) Solution

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Udokwu, Izuchukwu Emmanuel; Nwosu, Chigozie Godwin; and Ngwu, Godwin Ikechukwu

11:35-11:40 am BBC-4 Anti-Malarial Activity of Aqueous Seed Extract of *Carica Papaya* (L) and its Effect on Haematological Parameters of *Plasmodium Berghei*-Infected Mice

C. Eze Chinelo; C. Agbo Martina; N. Ezeibe Ezinwanne; A. Evurani Somtochukwu; N. Ugwu Chinenye

11:40-11:45 am BBC-5 Factors Militating against Effective Teaching and Learning of Biology in Secondary Schools in Ondo West Local Government Area, Ondo State.

Oluwafemi, Joshua Oriola; Bolaji, Opeyemi; Ikusika, Bamidele Adunola; Enyin Catherine Kate.

11:45-11:50 am BBC-6 Conversion of Roselle Juice (Zobo) made from the Calyces of *Hibiscus sabdariffa* to Better Probiotic Quality and Prolonged Shelf Life using *Lactobacillus plantarum*.

Agbo, M.C, Ezeonu, I.M, Asadu, C.A, Ikejiofor, IV and Eze, C.C.

11:50-11:55 am BBC-7 Substrate Specificity of Peroxidase Isolated from *Vitis vinifera*

Amuche Modesta Eze, Ugochukwu Nwadike, John Onyebuchi Ogbodo, Mida Habila Mayel, and Tobeckukwu Christian Ezike

11:55-12:00 pm BBC-8 Redefining Food Analysis with Modern Biotechnology: Significance of Omics Analytical Techniques Integration, Chemometrics and Bioinformatics

Charles Obinwanne OKOYE, Daniel ECHUDE, and Bonaventure Chidi Ezenwanne

12:00-12:05 pm BBC-9 Carcinogenic Risk Assessment of Heavy Metals from the Consumption of Artificially Ripened Banana

Nwankwo, Joy Uchechi, Osuji, Chigoziri Akudo, and Okorie, Maria Ezinne

12:05-12:10 pm BBC-10 Effect of Media Supplements on the Growth Support of Bacteria Isolated from Fishpond in Nigeria

Anikwe, Ruth Ukamaka; Onyeka, Precious Chidimma; Nnabuiife, Obianuju Obiajulu; Ndubuisi, Ifeanyi Amara

12:10-12:15 pm BBC-11 Molecular Identification of Some Wild Mushrooms in Igugu Community, in Udenu Local Government Area of Enugu state, Using the ITS and SSU Regions.

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James, O.V., Abu, N.E., Odo, C.V., and Patrick, O.N., Onwe, O.N

12:15-12:20 pm BBC-12 Medical Waste Management in Enugu State, Nigeria – A Comparative Study

Nwoke Oji Achuka, Echiegu Emmanuel Amagu, Ezech Chidumebi Anselm

12:20-12:25 pm BBC-13 Giving up Density (GUD) of Two Brands of Feed (Animal Care® and Vital® feed) Resulted in the Association of Different Growth Parameters of Albino Rats

Felix A. Andong, Mayowa P. Olabode, Charity E. Otene

12:25-12:30 pm BBC-14 Effect of Methanol Extract of *Curcubita maxima* Leaves and Pulp on Gentamicin-Induced Nephrotoxicity

Ibeabuchi, Ezinne E. and Anaduaka, Emeka G.

12:30-12:35 pm BBC-15 Impact of Selected Preservatives and Food Processing Substances Used for Ripening of Fruits on Hemoglobin Oxidation in Apparently Healthy Individuals

Emmanuel Ikechukwu Nnamonu, Edmund Chidiebere Mbegbu

12:35-12:40 pm BBC-16 Cholinesterases Inhibition, Antioxidant Activity and Phytochemical Profiling of Crude Methanol Extract of *Psorospermum fabrifugum* (Christmas berry) Root; An *In vitro* and *In silico* Studies.

Benjamin O. Ezema; Kingsley O. Omeje; Samson C. Onoyima; Juliet N. Ozioko; Chiugo C. Aduba; Kenneth E. Ogbonna; Onah Benjamin Emenike; Sabinus Oscar O. Eze

12:40-12:45 pm BBC-17 Effects of *Vitex doniana* Leaf Diets on Prostate-Specific Antigen, and Antioxidant Levels of Testosterone Propionate-Induced Benign Prostatic Hyperplasia Rats

Ugwu, J. I., Ezeanyika, L. U. S., Anosike, C. A., Okoye I. G., Ejiogor, N. C. and Okorie P. C.

12:45-12:50 pm BBC-18 Isolation and Utilization of *Schizopora flavipora* for Dye Decolourization.

Eze, Chukwuebuka Gabriel., Oshinaike, Christiana Odunayo., Paul, DivineFavour., Orji, Blessing Ngozi., Remigius, Maryann Adaobi and Sylvester, Angela Ekwere.

12:50-12:55 pm BBC-19 Growth Responses of *Abelmoschus esculentus* (L.) Moench under Stresses of Drought and *Meloidogyne incognita* Infection

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Egedigwe, U.O., Udengwu, O.S., Egedigwe-Ekeleme, A.C., Maduakor, C.J., Ojua, E. O.

12:55-1:00 pm **BBC-20 Heavy Metals Accumulation in *Milvus migrans parasitus* with Additional Information on its Phylogeny**

Echi, Paul C., Okorie, Chidinma C., Mba, Chinecherem G., Okeke, Chidinma S., and Offia, Okoro O.

1:00-1:30 pm

LUNCH BREAK

1:30-1:50 pm **Plenary 1: Valproic Acid causes Inositol Depletion by Increasing Nuclear Translocation of Opi1 Repressor and Phosphatidic Acid (PA) Species 34:1 and 34:2 and Decreasing INO1 Transcription.**

Chisom, J. Onu

1:50-2:00 pm

BRIEF INTERACTION

Oral Presentations

2:00-2:05 pm **BBC-21 Probing the Phytochemicals and Alpha-Amylase Inhibitory Action of *Leptadenia Hastata* Silver Nanoparticles**

Ifeoma Felicia Chukwuma, Okpala Chisom Catherine, Florence Nkechi Nworah, and Victor Onukwube Apeh

2:05-2:10 pm **BBC-22 Exploration of Molecular Interaction of *Barteria Nigritana* Phytoligands and Extract against Alpha-Amylase**

Ifeoma Felicia Chukwuma, Chisom Joan Ezuma and Eze Juliet Afam

2:10-2:15 pm **BBC-23 *Mycobacterium* Tuberculosis and Rifampicin Resistant Strains Diagnosis Using Genexpert Mtb/Rif Assay and their Co-Infection with HIV/AIDS**

Nweke Rita Ngozi

2:15-2:20 pm **BBC-24 Evaluation of Biological-Based Soil Amendments on Soil Erosion**

Ogwo V., Uzoejinwa B. B., Nwoke O. A. and Ugwu Ella.

2:20-2:25 pm **BBC-25 Therapeutic Potentials of Soursop (*Annona Muricata*) Seeds Extract on Benign Prostatic Hyperplasia in Rats**

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Juliet N. Ozioko; Benjamin O. Ezema; Kingsley O. Omeje; Amarachukwu V. Arazu; Parker E. Joshua and L. U. S. Ezeanyika

- 2:25-2:30 pm** **BBC-26 Investigation of the Acute Toxicity and *In Vivo* Antidiarrhoeal Activity of the Ethanol Extract and Fractions of *Ipomoea Triloba* by Model Infection and Protection Tests in Mice Against Selected Clinical Diarrheagenic Bacterial Isolates**
- M.F Alozie, U.S. Ekong, N.A. Onwuka, E.J Udofa, U.I Anwana, OJ Akinjogunla, TY Mirabeau.*
- 2:30-2:35 pm** **BBC-27 Biocidal Properties, Phytochemistry, Physiochemical Characteristics, and Microbial Properties of Fermented African Locust Bean (*Parkia biglobosa*) Effluent**
- Nkwocha, Chinelo C.; Nduka, Florence O.; Okolo, Ijeoma O.; Ifenu, Chuka A; Ozomadu, Chinasa M; Ejiofor, George C.*
- 2:35-2:40 pm** **BBC-28 Nutritional Profile of *Carpolobia alba* Sourced from Nsukka Local Government Area**
- Chiaka-Onyemeze, Nene H. and Ohalete, Gabriel Nwachukwu*
- 2:40-2:45 pm** **BBC-29 Antimicrobial Potential of *Littorina littorea* Shell Chitosan and its Metallic Nanocomposites**
- Ozoemena E. Eje, Arinze L. Ezugwu, and Ferdinand C. Chilaka*
- 2:45-2:50 pm** **BBC-30 Antimicrobial Activity, Phytochemistry and Acute Toxicity Profile of *Kigelia africana***
- Chukwudozie Kingsley I. and Aham Emmanuel C.*
- 2:50-2:55 pm** **BBC-31 Impact of Three Endophytic and Two Rhizospheric Fungi Isolated from *Vigna unguiculata* subsp. *sesquipedalis* on Early Seedling Growth of *Zea mays*.**
- H.C. Obayi, C.B. Chigor, U. Oyeagu*
- 2:55-3:00 pm** **BBC-32 The Effect of Different Drying Methods on the Chemical Composition of Uchakiri (*Vitex Doniana*) and Akokoro (*Ficus Capensis*)**
- Ogwo B.O. Chukwuka O.F. and Ohanene C.C.*

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- 3:00-3:05 pm** **BBC-33 Effect of pH on the Activity of Glucoamylase Obtained from *Aspergillus niger* in a Submerged Fermentation Process Using Guinea Corn Starch as Carbon Source**
- Onunwa, Gideon E; Ezugwu, Arinze L; Ferdinand Chilaka; David, Solomon Chibuzor; Ike, N. Makuo; Nwachukwu, A. Glory; Nkiruka, L. Nnadi*
- 3:05-3:10 pm** **BBC-34 Valorization of Corn Chaff Waste into Bioethanol**
- Chukwuemeka Samson Ahamefule and Ijeoma Jackline Elekwa*
- 3:10-3:15 pm** **BBC-35 *In Silico* Drug-Likeness/ADME-T Studies and Molecular Docking of Compounds from *Tephrosia bracteolata* Leaves against Some Targets of Diabetic Complications**
- Alexander D. Onoja, Endaline A. Madu, Precious A. Idakwoji, Micheal A. Adeyeye, Racheal C. Chinweuba, Okpanachi N. Oyibo*
- 3:15-3:20 pm** **BBC-36 Drivers for Herbal and Conventional Drug Consumption in Western Nigeria**
- Adeneye, Olawale Adeleke; Otei, Chinwendu Deborah and Ugwuonah, Geraldine Egundu*
- 3:20-3:25 pm** **BBC-37 Antibiotics Resistance Genes in Evolved Opportunistic Pathogens in the Gut of Gastroenteritis Patients in Nasarawa State, Nigeria**
- Anunobi Oluchukwu, Nwanguma Bennett, Abiola, Rose*
- 3:25-3:30 pm** **BBC-38 Benzhexol Hydrochloride-Induced Changes in Haematological Parameters of Albino Rats**
- Chinedu Ifeanyi Atama*
- 3:30-3:35 pm** **BBC-39 Phytochemical Screening and Oral Toxicity Study of Ethanol Fraction of *Terminalia ivorensis* Roots in Albino Rats.**
- Ugwoke, F.I., Ugwu, O.C., Nwaokocha, P.O., Okey, E.N, Amah, C.C., Ozioko, J.N., Onoja, R.I. and Joshua, P. E.*
- 3:35-3:40 pm** **BBC-40 Chemical Characterization, *In Vivo* Antioxidant, Anti-inflammatory and Anti-apoptotic Properties of *Peperomia pellucida* in Modulating Vascular Tone in Swiss Mice Exposed to Aluminium Chloride**

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Jerome Ndudi Asiwe, Godwin D. Yovwin, Vincent-Junior, Onoriode Igben, Blessing Abe, Sokiprim Akoko, Benjamin Oritsemuelebi, Joseph Chimezie, Anthony, Emeka Ojieh, Gwendolin Dagogo

3:40-3:45 pm **BBC-41 Developing a Micropropagation Strategy for the Conservation of African Bush Apple**

Chukwurah, P.N., Osuagwu, A.N., Fawibe, O.O. and Ekerette E.E.

3:45-3:50 pm **BBC-42 *In-vitro* Antioxidant and Anti-diabetic Potential of Ethyl Acetate Fraction of *Anacardium occidentale* Leaves**

Nworah, Florence N, Chukwuma, Ifeoma F, Chiaka-Onyemeze, Nene H and Nduka, Florence O.

3:50-3:55 pm **BBC-43 Antimicrobial Peptides: A Novel Approach to Combat Antibiotics Resistance**

Esther Chidimma Okonkwo, Mida Habila Mayel, Lovet Ufedo Ezike, Ugochukwu Nwadike, John Onyebuchi Ogbodo, Tobeckukwu Christian Ezike

3:55-4:00 pm **BBC-45 Effects of *Telfairia Occidentalis* Seed-Based Ketogenic Diet on Testosterone Propionate-Induced Benign Prostatic Hyperplasia in Wistar Rats**

Ejiofor, Nonso C., Ugwu, Joshua I., Okorie, Chigozie P., Onyekwelu Kenekwaku C., Uche Zedeck C., Adilieje, Chioma M., Ezeanyika, Lawrence U

4:00-4:05 pm **BBC-46 Evaluation of Microbial Load of Reusable Menstrual Pads and the Associated Risks of Infection**

Rajah, A.S., Yunusa, U., Tashi, F.T., Abdullahi, S.O. and Tukuntawa, A.S.

4:05-4:10 pm **BBC-47 Knowledge and Perception of Cardiopulmonary Resuscitation**

Mercy O. Anyika, Princewill I. Ugwu and Kizito O. Okafor

4:10-4:15 pm **BBC-48 Discovery of Trypanocidal Bioactive Leads by Docking Study, Molecular Dynamic Simulation and *In Vivo* Screening.**

Nneoma M. Ofokansi Akachukwu Ibezim and Chukwunonso B. Obi

4:15-4:20 pm **BBC-49 Comparative Studies on the Antioxidant Properties of Ethylacetate Fraction of Cashew Leaves (*Anacardium occidentale*) and its Zinc Oxide Nanoparticles**

Nworah, Florence N., Eje, Ozoemena E., Ijoma, Adachukwu G. and Igwebuikwe, Nancy. C.

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- 4:20-4:25 pm** **BBC-50 Impacts of Single and Combined Administration of Ethanol Leaf Extracts of *Mangifera indica* and *Gongronema latifolium* on Liver Enzymes and Electrolyte Profile of Male Albino Wistar Rats.**
Essien, Nnamso. E., Bobson, Promise-Godsfavour. M., Tom, Ekaette. J., Okon Ekong. A.
- 4:25-4:30 pm** **BBC-51 Effect of Aqueous Extract of Asaja Beans on the Haematological Profile of Albino Rats (*Rattus norvegicus*).**
Okwor Jude I., Ishiwu Jecinta C., Ocheni Simon A., Chukwuobasi Thelma, Akogwu Hyacinth O.
- 4:30-4:35 pm** **BBC-52 Comparative Assessment of Heavy Metal Uptake Efficacy Among Indigenous Plant Species (*Mirabilis jalapa*, *Pennisetum purpureum*, *Panicum maximum*, and *Sida acuta*) in Crude Oil-Contaminated Soil in Akwa Ibom State, Nigeria**
Udom N. R., Ogwo P.A. and Uchendu U.I.
- 4:35-4:40 pm** **BBC-53 Naphthyl Acetic Acid Production and Nitrogen-Fixing Capacity of Diazotrophic Bacteria Isolated from Okra Plant Rhizosphere.**
Uchenna Oyeagu, Kingsley N. Ogbonna, Chelsea S. Eze¹, Nmesoma B. Nebo and Emmanuel U. Eke
- 4:40-4:45 pm** **BBC-54 Inhibitory Effect of *Alstonia boonei* Compounds on Inducible Nitric Oxide Synthase (iNOS) Activity: An *in silico* and Pharmacokinetic Study**
Ogbobe, M.N., Chibuogwu, C.C., Okolo, B. and Njoku, O.U.
- 4:45-4:50 pm** **BBC-55 Medicinal Value of the Stem Bark of the White Stickpea (*Zapoteca portoricensis*): The Anti-sickling Potential, Oxidation and Haemolytic Effect on AA and SS Blood Cells**
Anekwe, D.C. and Onwubiko, G.N.
- 4:50-4:55 pm** **BBC-56 Evaluation of Antimicrobial Activity of Formulated Water-in-Oil Cream Containing Extracts of *Cajanus cajan* (pigeon pea) L. Leaves**
Offor, Amarachi C., Ugoeze, Kenneth C. and Ofoefule, Sabinus I.
- 4:55-5:00 pm** **BBC-57 Antioxidant Potentials of Methanol Extract of *Alstonia boonei* (Stem Bark) against Cadmium-induced Neuro-oxidative Stress in Wistar Albino Rats.**
Onyemuche, N. Tochukwu and Parker E. Joshua

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3rd July, 2024

10:00-10:20 am Plenary 2: One-Way ANOVA in Biological Science Research: Impact of Different Fertilizer Types on Plant Growth

Professor Okechukwu S. Abonyi (FSTAN, MNAE)

10:20-10:30 am

BRIEF INTERACTION

Oral Presentations

10:30-10:35 am BBC-58 Quantitative Assessment of Artemether-Lumefantrine Antimalarial Drug Combination using HPLC-UV Method: A Systematic Review

SISON Emiliano Jr. and OGBIKO Cyril*

10:35-10:40 am BBC-59 Assessment of Air Pollution Tolerance Index (APTI) and Expected Performance Index (EPI) of Plants along Nsukka. - Enugu Road.

Amujiri, Angela N.; Eze, Perpetua C.; Amadi, Chibugo C. and Ayogu, Virgilus O.

10:40-10:45 am BBC-60 Quality Assessment of Psyllium Husk as a Gluten Replacer in the Production of Bread from Brown Rice Flour

Aniemena, C. C., Okoronkwo, N.C. and Nwadike, Fynma

10:45-10:50 am BBC-61 Assessment of the Protective Influence of Selenium Nanoparticle against Hepatic Oxidative Stress-Induced by Ciprofloxacin in Wistar Rats.

Alilonu, Doris Olachi and Ebokaiwe, Azubiike Peter*

10:50-10:55 am BBC-62 Feeding Behavior and Body Condition of *Clarias Gariepinus* Exposed to Sunlight

Ursula Odo, Nkiruka F. Oparaku, Felix A. Andong and Mayowa P. Olabode

10:55-11:00 am BBC-63 Comparative Studies on the Consolidated Bioprocessing and Simultaneous Saccharification and Fermentation for Bioethanol Production Using *Pichia kudriavzevii* Strain AUMC 10190 Isolated from Cassava Mill Effluent Site

Ossai, Emmanuel C.; Duhu, Chisom D.; Eje, Ozoemena E. and Ugwuanyi, Jerry O

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- 11:00-11:05 am** **BBC-64 Formulation and Evaluation of Nano-Paediatric Suspension of Darunavir Prepared with Na-CMC and HPMC as Suspending Agents**
CA Ofoefule, JI ogbonna, CC Mbah, LO Ugorji and SI Ofoefule
- 11:05-11:10 am** **BBC-65 Synergistic Effect of Co-digestion of Paper Waste and Chicken Manure for Enhanced Biogas Production**
Ndubuisi-Nnaji, U.U., Ofon, U.A. and Clement, V.I.
- 11:10-11:15 am** **BBC-66 Effects of Combined Pretreatment: Milling, Hydrothermal and Fungal Amendment on Biogas Production from Co-digestion of Paper Waste and Chicken Manure**
Ofon, U. A., Ndubuisi-Nnaji, U. U. and Ekaette, M. I
- 11:15-11:20 am** **BBC-67 Investigations on *Chlorella sorokiniana* Potentials in *Clarias gariepinus* Aquaculture Water Waste.**
Njoku, O.U., Ogbodo, C.R. and Oyeagu, U.
- 11:20-11:25 am** **BBC-68 Correlates of Personal Protective Equipment Utilisation among Building Construction Workers in Nsukka Metropolis, Enugu State**
Mell-Eze R. Oluebube, Ezike, Tobeckukwu C. and J.O Onyezere
- 11:25-11:30 am** **BBC-69 Biodegradation of Water Hyacinth (*Eichhornia Crassipes*) Lignin Detected by Fourier-Transform Infrared Spectroscopy and Scanning Electron Microscopy**
Agbo, Ruth Obianuju; Gideon O. Abu and Ezike, Tobeckukwu C.
- 11:30-11:35 am** **BBC-70 Evaluation of serum kidney injury molecule 1 level of diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria.**
Okonkwo Innocent N., Okafor Edwin N., Okpagu Blessing C., Obayi Linda O., Ijoma Uchenna N. and Ijoma Chinwuba K.
- 11:35-11:40 am** **BBC-71 Bacterial Load of Vehicles and Receptacles Used in the Sales and Distribution of Table and Sachet Water in Enugu Metropolis and Environs**
Achukwu, Ngozika Obianuju and Obute, Chukwuebuka Michael

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- 11:40-11:45 am** **BBC-72 Production and Quality Evaluation of Crackers from Blends of Wheat (*Triticum Aestivum*) and Kidney Beans (*Phaseolus Vulgaris*) Flour Flavoured with Onion (*Allium Cepa*) Powder**
Amonyeze, A. O., Aniagor, E. N., and Nnodum, A. C.
- 11:45-11:50 am** **BBC-73 Haematological Effect of *Alstonia boonei* Methanol Extract in Lipopolysaccharide-Induced Model of Inflammation.**
Chibuogwu C. C., Ekeh M. N. and Nnemolisa S. C.
- 11:50-11:55 am** **BBC-74 Mechanism of Artemisinin Resistance in *Plasmodium falciparum***
Onyeanus, Chidinma J. and Chibuogwu, Sophia U.
- 11:55-12:00 pm** **BBC-75 Effect of Metal Ions on the Activity of Laccase Isolated from *Pleurotus ostreatus***
Ezike, T. C., Chibuogwu, C. C., Onah, E. O., Ezembu, M. T., Eje, O. E. and Nwadike U.
- 12:00-12:05 pm** **BBC-76 Chemical Profiling and *In vitro* Antioxidant Screening of the Flowers of *Cassia fistula* L. (Fabaceae)**
Eze, Nnaemeka M. and Onyebueke, Oluebube R.
- 12:05-12:10 pm** **BBC-77 Blood Parameters of African Catfish *Clarias gariepinus* Fed Diet Included with Black Soldier Fly (*Hermetia illucens*) Larvae Meal**
Okwuosa Obinna Benjamin; Eyo Joseph E.; Sharifah Rahmah; Yu Mei Chang; Mohamad Jalilah; Okomoda Victor Tosin; Hon Jung Liew; Amadi-Ibiam Christina O
- 12:10-12:15 pm** **BBC-78 Evaluation of the Neuropharmacological Potential of *Zapoteca portoricensis* (Jacq) HM. Hernández in Experimental Murine Models**
Felix Asogwa, Bonaventure Obi, Uchechukwu Iyanyi, Henry Abonyi, Theophine Akunne
- 12:15-12:20 pm** **BBC-79 Dissection of the Agro-morphological Variations in 30 Elite Genotypes of *Phaseolus vulgaris* L.**
Oyediran, O. T., Udengwu, O.S. and Odo, C. V.
- 12:20-12:25 pm** **BBC-80 Epidemic Cholera Trends in Nigeria**
Onyia, E.U., Eleazar, C.I.

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12:25-12:30 pm **BBC-81 Exploring Potential Inhibitory Compounds from *Parkia biglobosa* against *Plasmodium falciparum* Triose Phosphate Isomerase (PFTIM): A Molecular Docking and Free Binding Energy Study.**

Nnemolisa, S. C., Chibuogwu, S. U., Chukwu, M. C., Igwilo, K. A., Chukwurah, C. C., and Chibuogwu, C. C.

12:30-12:35 pm **BBC-82 Mechano-responsive Cell Modification: Leveraging the Motor Clutch Model for Next-Generation Cell Therapies**

Chiamaka Ozigbo

12:35-12:40 pm **BBC-83 Physicochemical Parameters and Bacteriological Evaluation of Raw Cow Milk from Prince Abubakar Audu University Dairy Farm**

Azeez Zainab, Jibrin Godwin and Momoh Sati Joseph

12:40-12:45 pm **BBC-84 Endophyte: A Reservoir of Biotherapeutic Agents**

Ifeoma S. Asogwa, Somtochukwu A. Evurani, Anthony I. Onah and Chukwuemeka A. Agbo

12:45-12:50 pm **BBC-85 Effect of Methanol Fraction of *Millettia aboensis* Stem Bark Extract on Loperamide-Induced Constipation in Wistar Albino Rats**

ABBA, Boniface E., NJOKU, Ugochi. O., & ODO Chigozie P.

12:50-12:55 **BBC-86 Evaluation of Bio-active Constituents, Antimicrobial Properties and Synergistic Potential of Palm Oil (*Elaeis guineensis*) with Standard Antibiotics using Checkerboard Technique**

**Patrick N. Onyi^a, Ifediba C. Winifred^a, Odougwu U. Augustine^a, Hope E. Ndubuisi-Onyi^a, Patrick B. Njobe^c, Damian C. Odimegwu^a, Thadeus H. Gugu^a, Anthony A. Attamah^b, Kenneth C. Ofokansi^b, Emmanuel C. Ibezim^b, Restus C. Onwusoba^a, Anthony Onah^a, Dinebari P. Berebon^a, Ezekiel Green^c, Uchechukwu Okekeaji^e, and Vincent N. Chigor^d*

12:55-1:00 pm **BBC-87 The Effect of Spent Engine Oil (Seo) on the Phytochemical Compositions of the Leaves of *Talinum paniculatum* (Jacq) Gaertn and *Talinum fruticosum* (L.) Juss.**

Ozokolie, B.C., Edochie, W.C., Njoku, E.U, Ezeh, P.C, Egonu, S.N. and Amadi, C.C

1:00-1:30 pm

LUNCH BREAK

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1:30-1:50 pm **Plenary 3: Discovery of New Nitro-based Compounds as Potential Drugs for Tuberculosis**

Ifeanyi E. Eke Ph.D.

1:50-2:00 pm

BRIEF INTERACTION

Oral Presentations

2:00-2:05 pm **BBC-88 Network Pharmacology Analysis of Methanol Extract of *Bridelia Ferruginea* Leaves in Drug-Induced Liver Injury**

Chioma A. Anosike and Godspower C. Nwadike.

2:05-2:10 pm **BBC-89 Evaluation of *Musa sapientum* (Banana) Leaf Extracts (BLE) as Natural Preservatives against Three Common Spoilage Fungi**

Beatrice O. Ojiego and Gideon I. Ogu, Josephine M. Madu

2:10-2:15 pm **BBC-90 Artemether/Lumefantrine-Loaded Nanostructured Lipid Carriers Enhances Oral Malarial Treatment**

Ossai, Emmanuel Chekwube; Agbom, Chukwuemeka Ome; Ossai, Ogochukwu Edith; Mumuni, A. Momoh; Ezike, Tobeckwu Christian; Mbah, Chukwuemeka Christian

2:15-2:20 pm **BBC-91 Heat Stability and Thermodynamic Studies of Alpha-Amylase Produced from *Pichia Kudriavzevii* AUMC 10190 Isolated from Cassava Mill Effluent Site**

Ossai, Emmanuel C.; Obiora, Happiness C.; Eje, Ozoemena E. and Ugwunayi, Jerry O.

2:20-2:25 pm **BBC-92 Microbial Profiling and Characterization of Anaerobic Digested Poultry Litter**

Stella Suanu Leh-Togi Zobeashia, Akoma Ifeanyi, Egbulefu, Chidinma Sylvia, Aliyu Hadiza

2:25-2:30 pm **BBC-93 Anaerobic Digestion Potential of Organic Feedstock for Biogasification**

Leh-Togi Zobeashia Stella Suanu, Egbulefu Chidinma Sylvia, Aliyu Hadiza, Akoma Ifeanyi

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- 2:30-2:35 pm** **BBC-94 Protective Effect of Ethanol Extract of Jackfruit Rags (*Artocarpus heterophyllus* LAM.) on Paracetamol-Induced Hepatotoxicity in Wistar Albino Rats.**
Anosike, C.A. and Onah V. C.
- 2:35-2:40 pm** **BBC-95 The Use of Fish Parasites as Indicators of Lead and Zinc Aquatic Pollution, Oji River, Enugu State, Nigeria**
Ifeanyi O. Aguzie, Nmesoma B. Chibuike, Precious C. Chime, Gloria C. Chukwu, Joy I. Nzei, Ijeoma J. Aguzie, Patience O. Ubachukwu
- 2:40-2:45 pm** **BBC-96 Curcumin Protects against Ketoconazole-Induced Hepatotoxicity in Wistar Rats**
Nwakaego Omonigho Ebong, Bamiwuye Similoluwa Daniel and Elias Adikwu
- 2:45-2:50 pm** **BBC-97 Bacterial Load of Vehicles and Receptacles Used in the Sales and Distribution of Table and Sachet Water in Enugu Metropolis and Environs**
Achukwu, Ngozika Obianuju and Obute, Chukwuebuka Michael
- 2:50-2:55 pm** **BBC-98 Solid Lipid Nanoparticles-loaded Artemether/Lumefantrine for Improved Oral Malaria Treatment**
Ossai, Emmanuel Chekwube; Ugwuoke, Chinenye Patience; Ossai, Ogochukwu Edith; Mumuni, A. Momoh; Ezike, Tobeckukwu Christian; Mbah, Chukwuemeka Christian
- 2:55-3:00 pm** **BBC-99 Evaluation of Serum Kidney Injury Molecule-1 Levels of Diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria.**
Okonkwo Innocent N., Okafor Edwin N., Okpagu Blessing C., Obayi Linda O., Ijoma Uchenna N., Ijoma Chinwuba K.
- 3:00-3:05 pm** **BBC-100 Medical-Biotech Approach to Environmental Waste Recycling: A View Point from Antimicrobial Activities of Cocoyam (*Xanthosoma sagittifolium*) Peel**
Ekwe, E., Patrick O.N., Odi J.N., James O.V., Chahul E.S., Kyowe O. H.
- 3:05-3:10 pm** **BBC-101 Wheat bran as a Potential Agricultural Waste for Bioethanol and Lignocellulosic Enzymes Production using Cultures of *Pleurotus Ostreatus* and *Saccharomyces Cerevisiae***
Nwadike, U.G.E.M., Ezike, T. C. and Chilaka, F. C.

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- 3:10-3:15 pm** **BBC-102 Soil Enzyme Activities in Farm Soils Cultivated with Yam (*Dioscorea spp*), Cassava (*Manihot esculenta*) and Plantain (*Musa paradisiaca*: Soil Health Investigation**
Ekene J. Nweze, Chidera I. Ibeto and Ikechukwu N. Onwurah
- 3:15-3:20 pm** **BBC-103 Molecular Characterization of Bacteria from Crude Oil Tank Farms in Nigeria**
Beatrice O. Ojiego, Josephine M. Madu, Gloria I. Obioh
- 3:20-3:25 pm** **BBC-104 Sensory Evaluation, Physicochemical and Antioxidant Properties of Yoghurt Fortified with *Ocimum gratissimum*, *Phoenix dactylifera* and *Canarium schweinfurthii***
Olonishuwa Paul, Daikwo Moses and Na-Allah James
- 3:25-3:30 pm** **BBC-105 Nanocarriers: A Promising Tool for the Management of Inflammatory Diseases**
Dabrinze, Chinemerem C., Chiaka-Onyemeze, Nene H., Ezeanyika, Lawrence U. S., Chukuwuma, Ifeoma F., Odo, Paul C., Okereke, Glory E. and Ilonze, Chikaodili P.
- 3:30-3:35 pm** **BBC-106 Prevalence of Asymptotic Urogenital Candidiasis amongst Male Students at the University of Nigeria, Nsukka**
Onyegbule J.C. and Eleazar C.I.
- 3:35-3:40 pm** **BBC-107 Intermittent Fasting: An Approach for Preventing Chronic Diseases**
Wilson, Emem E., Nkwocha, Chinelo C., Dabrinze Chinemerem C.
- 3:40-3:45 pm** **BBC-108 Studies on the Remedial Effect of *Jatropha tanjorensis* Leaf Extract on the Haematology of Mice Infected with *Plasmodium berghei* and Treated with Artemisinin-Based Combination Therapies**
Nnachi, Ijem A.; Umekekwe, Stephenie A.; Ezinwa, Hope C.; Iroemeh, Michael C. and Eze, Nwachukwu G.
- 3:45-3:50 pm** **BBC-109 High-Performance Liquid Chromatographic Analysis of High-Fructose Corn Syrup Produced from Different Varieties of Corn**
Vincent E. Ozougwu and Ashiakpa N. Philip
- 3:50-3:55 pm** **BBC-110 Mechanism of Antibiotic Resistance by Protein Moonlighting**

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Ikeanyibe, Collette N., Eze, Sabinus O. Ezike, Tobechukwu C. and Omeje, Kingsley O.

- 3:55-4:00 pm** **BBC-111 Antisense RNA Technology**
Olisemeke Anthonia Nwabuogor and Parker Elijah Joshua
- 4:00-4:05 pm** **BBC-112 Proteomic and Mass Spectrometric Analysis for Biomarker Discovery in Early-Stage Heart Failure.**
Ogu Amoge Chidinma and Nirmalan Niroshini
- 4:05-4:10 pm** **BBC-113 Investigation of Fish Aquacultures in Nsukka Metropolis as Potential Sources/Reservoirs of Antibiotic-Resistant Bacteria**
Asuquo, S.J., Chidebelu, P. E. and Nweze, E. I
- 4:10-4:15 pm** **BBC-114 Microbiological Contamination of Microphones used in the Delivery of Lectures and other Social Functions in Different Faculties at the University of Nigeria, Nsukka.**
Nwobodo, Charity U., Enyi, Success K., Chidebelu, Paul E. and Enemuor, Simeon C.
- 4:15-4:20 pm** **BBC-115 Evaluation of Microbiological Contamination of Air Conditioners Installed in Offices in Different Faculties at the University of Nigeria, Nsukka.**
Ugochukwu, Blessing C., Okenyi, Rufina C. and Enemuor, Simeon C.
- 4:20-4:25 pm** **BBC-116 Chemoinformatic Screening of *Moringa oleifera* Phytochemicals for FGFR3 Inhibitors: Promising Candidates for Breast Cancer Treatment**
Timothy Prince Chidike Ezeorba, Isaac Ifeanyichukwu Aniagolu, Kingsley Nnaechetam Eze, Ada-Jesus Mercy Okechukwu, Treasure Nneka Nelson, Emmanuel Sunday Okeke, Ifeoma Felicia Chukwuma
- 4:25-4:30 pm** **BBC-117 Assessment of the Hydrolytic Enzymes Production Potential of Fungi Collected from Crude Oil-Polluted Sites in Nigeria**
Madu, M. J., Obioh, G. I. B., Ogbonna, A. I. and Ojiego, B. O.
- 4:30-4:35 pm** **BBC-118 Effect of the ZnO Nanoparticles Obtained from Cashew (*Anacardium occidentale*) Leaves on the Haematological Parameters of Rats with Alloxan-Induced Diabetes.**
Nwadike, O. S. and Nworah, F. N.
- 4:35-4:40 pm** **BBC-119 Histopathological Changes Associated with Exposure to Some Toxic Heavy Metals in Kidneys of Albino Wistar Rats**

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Udo, E.S, Ogwu, P.A. and Eze, V. C

4:40-4:45 pm **BBC-120 Impact of roasting on vitamins, minerals, and proximate compositions of *Terminalia catappa* (Tropical almond)**

Ifeoma Felicia Chukwuma and Emmanuel Osinachi Abiaziem

4:45-4:50 pm **BBC-121 Volatile Organic Compounds (Vocs) FUME (PM2.5&10) from Automobile Spray Paints Induced Inflammation and Oxidative Damage: From Stock Parents to F1 Generation**

Ogbodo, John Onyebuchi, Onwurah, Ikechukwu Emmanuel, Njoku, Obioma Uzoma, Egba, Simeon Ikechukwu, Ogbodo, Chizaramekpere Grace, Arazu, Amarachukwu Vivian, Onyesife Chioma O and Ezike, Tobeckukwu Christain

4:50-4:55 pm **BBC-122 Anti-Convulsant, Proinflammatory and Discrimination Index Responses to PTZ Kindling Model Following Pretreatment with Plant Tannin in Rodents**

*Emeka Godson Anyanwu, Nto Jonson Nto, Mba Christian Ejuiwa**

4:55-5:00 pm **BBC-123 Determination of Lethal Dose (Ld₅₀) and Mutagenic Effects of Sodium Azide on Germination Percentage in Two Varieties of Tomato (*Solanum Lycopersicum*)**

Adaugo Gift Ibeh, Obinna Agada, Chidozie Dennis Udechukwu, and Jecinta Nneka Gozie Ofoegbu

5:00-5:05 pm **BBC-124 Interplay between Gut Microbiota and Probiotic Diet and it's impact on Human Health**

Ebere K. Ibe, Nwagu T.N.T, Nnamchi C. I*

5:05-5:10 pm **BBC-125 Properties and application of *Pichia kudriavzevii* HBUAS72401 cellulase in hydrolysis of organic acid pretreated rice husk**

**Diogu Chinelo Ukamaka, Ezugwu Arinze Linus, Onoyima Chinekwu Samson, Chilaka Ferdinand Chiemeka*

5:10-5:15 pm **Q&A / Interaction**

5:15-5:20 pm **Closing Remarks**

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An Address by the Chairman of the Local Organizing Committee, Dr. Emmanuel C. Ossai

The Ag. Vice-Chancellor,
Dean,
The invited speakers,
Staff of the faculty,
Conference participants,
Ladies and gentlemen,



It gives me great pleasure to speak to you this morning, to welcome you most cordially at the opening ceremony of the Conference – the fourth Bioscience and Biotechnology Conference organized by the Faculty of Biological Sciences, University of Nigeria. As you are in the know, the theme of the Conference is *Exploring the Frontiers of Biosciences, Biotechnology and Biotherapeutics*, and was aimed to gather scholars across the nation and beyond to present the latest research outcomes and advances in relevant fields of Bioscience, Biotechnology and Biotherapeutics, and to also provide an ideal environment for making new scientific collaborations and knowledge-sharing in the field.

The style of the Conference has been largely virtual, tracing its origin from the fallout of COVID-19 pandemic. The Conference management, however, opted for a Hybrid pattern this year, but owing to the ease and convenience associated with virtual presentations for both the management and the participants, all the presentations will be done virtually. I have a strong belief that this year's conference, with 125 abstracts received, will be an improvement on previous ones, judging by the quality and diversity of the abstracts. However, having the largest number of participants in the history of the conference (89 abstract being previous record), we ask for your patience and understanding in case of any shortcomings, and we would appreciate it if you could share your opinion of the event with us through the Local Organizing Committee.

I would like to thank immensely, the Keynote speaker, Professor Umezuruike Linus Opara, and the Plenary speakers, Professor Okechukwu S. Abonyi, Dr. Ifeanyi E. Eke, and Chisom, J. Onu. Their prompt acceptance of our invitation, certainly, would add to the glamour of the conference.

Finally, this conference would not be possible without support from the Dean of Faculty, Professor Emeka. I. Nweze who worked tirelessly and passionately to bring the event to fruition. I would also like to thank the Chairman of Faculty Colloquium and Publication Committee, and my team for all the hard work they put in to make this event possible. Special thanks go to the secretary of the LOC, Dr. Christian C. Chibuogwu, and past chairperson and Secretary of the LOC, Professor Bennett C. Nwanguma and Dr. Kingsley O. Omeje. I equally thank and appreciate the chief host and the Ag. Vice-Chancellor for his presence, support and interest in the conference.

I wish all of us a memorable experience and look forward to your keen participation.

Thank you.

Dr. Emmanuel C. Ossai
Chairman, LOC

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An address presented by the Dean, Faculty of Biological Sciences, Professor Emeka I. Nweze at the International Conference organized by the Faculty of Biological Sciences, University of Nigeria, Nsukka on Tuesday July 2nd, 2024.

The Chief Host and Acting Vice Chancellor, University of Nigeria, Nsukka, Professor Romanus Ezeokonkwo, Principal officers of the university and other universities here present, The Keynote Speaker, Plenary speakers, Deans of Faculty, Directors of Institutes and Centers, Heads of Department, Professors and other lecturers here present, Members of the Board, Faculty of Biological Sciences, Distinguished Guests, Students, Gentlemen of the Press, Lions and Lionesses,

As the Host and Dean of the Faculty of Biological Sciences, the organizers of this conference, I consider it a great privilege and honour to address this special gathering of great scientists across the globe that cut across different disciplines within the field of biological sciences. The theme for this year's conference titled "Exploring the frontiers of bioscience, biotechnology and biotherapeutics" was carefully chosen



considering the importance of these three areas in changing the course of our history by enhancing human development. We all share this belief because of our common desire to deploy scientific research as a way of making life better for our people.

This conference is the fourth in the series being organized by the Faculty of Biological Sciences of the University of Nigeria. The theme of the conference as earlier highlighted will focus on critical research areas covering medical biotechnology, biomedicine and biotherapeutics, nanobiotechnology, bioenergy and green chemistry, plant and animal biotechnology, bioinformatics, marine biotechnology, industrial microbiology, genetics and molecular evolution, environmental science and bioenvironmental engineering and enzymology. There is no doubt that by addressing questions from these important subject areas through our research, we will all be able to solve a myriad of problems confronting humanity. This year's conference is by far the most subscribed/attended of the previous series. This shows the increasing acceptability/confidence of our colleagues in the ability of our faculty to deliver a successful conference. Thank you for your quality contributions. It wouldn't have been possible without all of you!

The keynote speech will be delivered by a distinguished academic, Professor Umezuruike Linus Okpara, who is the Executive Director of the UNESCO International Centre for Biotechnology at the University of Nigeria, Nsukka, and a Distinguished Professor at Stellenbosch University, South Africa. We are grateful to our plenary speakers for making out time to participate in this conference. The plenary speakers are Professor Okey Abonyi, a distinguished professor of Measurement and Evaluation

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at Alex Ekwueme Federal University, Ndufu-Alike, Ikwo in Ebonyi State, Dr. Ifeanyichukwu Eke of the Department of Microbiology, Genetics and Immunology at Michigan State University. Dr. Eke was our university's best graduating student in 2016. The last but not the least is Chisom Onu who is currently rounding up his doctoral degree in the Department of Biological Sciences, Wayne State University, Detroit, Michigan USA. I am sure that their presentations will be very enriching.

At this juncture, I warmly welcome all conference participants virtually to our great University, the University of Nigeria, Nsukka. I thank the Acting Vice Chancellor for honouring us with his presence despite his busy schedule. Thank you also for allowing us to host this conference. I also wish to thank the Chairman, Local Organizing Committee, Dr. Emmanuel Ossai and his team for their hard work and dedication to ensure that this conference is successful. The staff and students of our faculty are thanked for their contribution and active participation in this conference. I appreciate the ICT team led by Engr Chidubem for partnering with us to ensure that this conference can be anchored from our new faculty boardroom.

Finally, I am very excited, and I am sure most of you are, about the quality of papers to be presented during this conference especially the variety of topics to be covered, the great number of attendees and the different universities/Institutes represented. I am sure we will all leave here enriched and inspired to continue to uplift excellence in bioscience, biotechnology and biotherapeutics.

Distinguished guests, ladies and gentlemen, I wish you all a productive time and fruitful deliberations.

Professor Emeka I. Nweze

Dean, Faculty of Biological Sciences

University of Nigeria, Nsukka

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An address delivered by the Acting Vice-Chancellor, University of Nigeria, Nsukka, Professor Romanus C. Ezeokonkwo, at the International Conference organized by the Faculty of Biological Sciences, University of Nigeria, Nsukka on Tuesday July 2nd, 2024.

I am pleased to welcome you to the fourth edition of the Faculty of Biological Sciences International virtual conference themed “Exploring the Frontiers of Biosciences, Biotechnology and Biotherapeutics,” which is holding from today Tuesday, July 2nd to Thursday, July 4th, 2024.

We are currently facing serious challenges such as rising food scarcity, climate change, and disease outbreaks on a global scale. These challenges highlight the crucial role of biologists and biotechnologists in finding solutions to major threats to our existence. Conferences like this provide a platform for researchers in the life sciences and related fields to collaborate and propose lasting solutions to global problems.

The virtual nature of this conference allows researchers from all over the globe to participate without the need to travel, making it easier for those from different locations to take part. Furthermore, the visibility brought by such an academic activity positively impacts the university's reputation and global ranking.

I am proud to host this conference and congratulate the Dean and the entire staff of the Faculty of Biological Sciences for consistently hosting this event since its inception. I assure you of my administration's continued support for this and other commendable activities. On behalf of the Management of the University of Nigeria, Nsukka, I wish you all a successful and productive conference.

Thank you.

Professor Romanus C. Ezeokonkwo
Ag. Vice-Chancellor



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KEYNOTE ADDRESS

AND

PLENARY LECTURES

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KN: Saving the Harvest: How can Academia and Research Feed Nigeria, Africa and the World?

Professor Umezuruike Linus OPARA *CEng CFS FIAGR E FNIAE FSAIAE*

Executive Director, UNESCO International Centre for Biotechnology at UNN
Distinguished Professor at Stellenbosch University, South Africa

ABSTRACT

Africa, and the world at large, is faced with the existential challenge of climate change, which manifests, among others, in rising temperatures, changing weather patterns, and rising incidence of natural disasters such as flooding and wildfires. The linkages between climate change, the environment and sustainable development have become undeniable. While the rest of the world grapples with these inter-linked challenges, Africa (including Nigeria) still struggles with the fundamental issue of how to feed its present and rising population and contribute to global food security and peace. Food prices continue to rise amid rising youth unemployment. As Africa and the world searches for climate smart and environmentally-friendly solutions to improve agricultural productivity and wealth creation, pre-harvest and postharvest food losses remain very high, thereby exacerbating food insecurity for all. In this keynote lecture, we highlight the present status of African agri-food systems and identify opportunities for investments to radically transform and modernise Africa's predominant smallholder subsistence agriculture into climate-smart, market-oriented, productive, competitive, and sustainable agro-industries. We discuss the critical role of technological innovations in the biological and chemical sciences and engineering in increasing the productivity of agriculture and food systems, and transformation of rural economies. Finally, we showcase an integrated value chain approach to postharvest biotechnology research and innovation to reduce food losses and waste, and linking production to local, regional and international markets.

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Short Biography

Professor Umezuruike Linus Opara is the Executive Direction of the UNESCO International Centre for Biotechnology at the University of Nigeria, Nsukka, and a Distinguished Professor at Stellenbosch University, South Africa, where he is also the South African Research Chair in Postharvest Technology, and the founding Director of the Africa Institute for Postharvest Technology. He graduated with degrees in Agricultural Engineering (First Class Honours) from the University of Nigeria, Nsukka, and PhD from Massey University, New Zealand. He has published over 400 peer-reviewed journal articles, book chapters and conference papers, and graduated over 70 MSc and PhD students in universities in South Africa, the Sultanate of Oman, and New Zealand. He was recognised in 2019 and 2021, respectively, as a “Highly Cited Researcher” by the Web of Science Group, which distinguishes the “world's most influential researchers of the past decade”. With a current H-Index of 70 (Google Scholar) and 64 (Scopus), Prof. Opara is also the leading global individual researcher on pomegranates. Among many international, continental, and national awards for his sustained research productivity and impact, he was honoured as Laureate of the African Union Kwame Nkrumah Continental Award for Life and Earth Sciences – Africa’s highest research award for senior researchers, Winner of the Impact Research and Science in Africa Award for “excellence in research & building Africa’s human resources capacity”, and Distinguished Researcher Award by Sultan Qaboos University, Sultanate of Oman. In 2019, Stellenbosch University bestowed its higher honour on Prof. Opara – the Chancellor’s Award, for his “sustained excellence in research”. He was the founding President of the Pan African Society for Agricultural Engineering, founding Editor-in-Chief of the International Journal of Postharvest Technology and Innovation, past Executive Secretary of the International Academy of Agricultural and Biosystems Engineering, and past President of the International Commission of Agricultural and Biosystems Engineering. His ongoing activities focus on building Africa’s research capacity in engineering and biosciences for agri-food systems transformation and wealth creation. In June 2024, Prof. Opara was honoured as the inaugural Laureate of the AFRICA Research Excellence Award during the 31st AGM of AFREXIMBANK held in The Bahamas.



BOOK OF ABSTRACTS

PL 1: Valproic Acid causes Inositol Depletion by Increasing Nuclear Translocation of Opi1 Repressor and Phosphatidic Acid (PA) Species 34:1 and 34:2 and Decreasing INO1 Transcription.

Chisom, J. Onu and Miriam, L. Greenberg

Biological Sciences Department, Wayne State University Detroit, Michigan

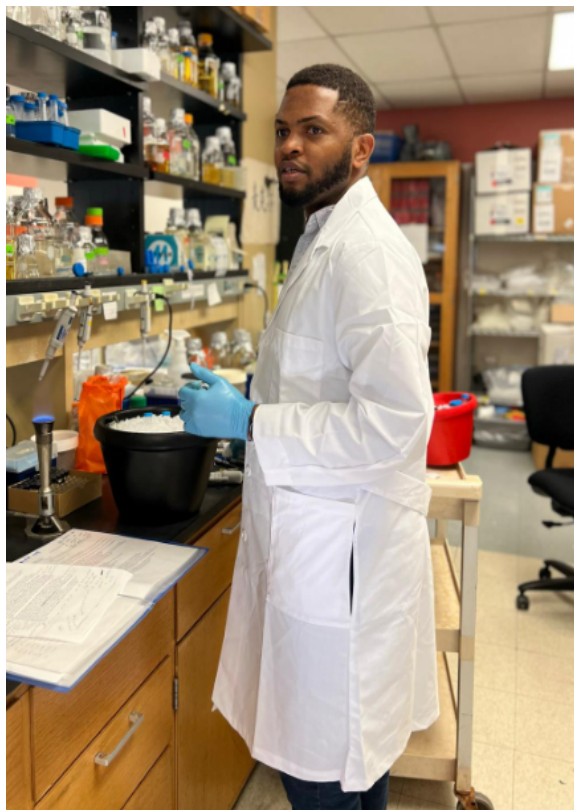
ABSTRACT

Valproic acid (VPA) is a mood stabilizer widely prescribed and used for the treatment of bipolar disorder (BD). BD is a psychiatric disorder that affects 2% of the world's population. Although VPA has been in use for more than four decades, the therapeutic mechanism of action remains unknown. We have determined that VPA decreases inositol levels. Two other mood stabilizers, lithium, and carbamazepine have been shown to decrease inositol. The finding that three structurally distinct mood stabilizers decrease inositol suggests that inositol depletion may be a key therapeutic mechanism of action of the drugs. Using the yeast model in which the inositol biosynthetic pathway has been well studied, we aimed to determine the mechanism by which VPA decreases inositol. Inositol is synthesized de novo from glucose-6-phosphate (G6P), a product of glucose phosphorylation by the rate-limiting enzyme Myo-inositol phosphate synthase (MIPS) encoded by the INO1 gene in yeast. Transcription factors Ino2 and Ino4 initiate INO1 transcription by forming a tetramer on the INO1 promoter. INO1 expression is robustly repressed by Opi1 protein, which interacts with Ino2 on the INO1 promoter. The repressor protein Opi1 is tethered to the endoplasmic reticulum (ER) by the Scs2 protein and phosphatidic acid (PA) when inositol is limiting. In the presence of inositol, Opi1 translocates to the nucleus, and INO1 expression is repressed. Our research has shown that VPA decreases INO1 mRNA and MIPS protein levels, increases Opi1 nuclear translocation, and that VPA-mediated inositol depletion is Opi1-dependent. In addition, VPA decreases total PA levels and, specifically, PA species 34:1, 34:2, and 32:1. Further, Scs2 protein is not altered with VPA treatment. These findings suggest that VPA depletes inositol by increased Opi1-mediated repression of INO1 expression and that depletion of individual PA species, but not total PA, is responsible for increased Opi1-nuclear translocation. These studies have implications for BD as PA has been shown to modulate inositol hexakisphosphate kinase 1 (IP6K1) nuclear translocation to decrease MIPS protein levels in mammalian cells.

BOOK OF ABSTRACTS

Short Biography

Chisom J. Onu is a staff member at the University of Nigeria in the Microbiology Department. He is completing his doctoral studies in Molecular Biology and Biotechnology at Wayne State University in the USA. His current research focuses on understanding the mechanism of action of the mood stabilizer valproate. Chisom has been the recipient of several awards, including the RUMBLE fellowship, the BIPOC travel award, and the Cambridge Isotope travel award. He has been actively involved in the Detroit community and at Wayne State, serving with Detroit Minds Matter, a non-governmental organization that supports black youths and prepares them for college. Additionally, he has also served as a Graduate Ambassador at Wayne State, where he engaged with prospective students seeking admission to the university.



BOOK OF ABSTRACTS

PL 2: One-Way ANOVA in Biological Science Research: Impact of Different Fertilizer Types on Plant Growth

Professor Okechukwu S. Abonyi (*FSTAN, MNAE*)

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Ndufu-Alike, Ikwo Ebonyi State

ABSTRACT

Background and Rationale: In agricultural and biological sciences, understanding the effects of different fertilizers on plant growth is crucial for optimizing agricultural practices and ensuring sustainable food production. Fertilizers vary widely in their composition, including nutrient concentrations, organic versus inorganic sources, and additional additives (e.g., growth enhancers, and microorganisms). Evaluating their impact on plant growth using quantitative measures is essential for determining their effectiveness.

Research Question: How do different types of fertilizers (e.g., organic, inorganic, mixed formulations) influence the growth parameters of a specific plant species?

Alternative Hypothesis: Different types of fertilizers will significantly influence plant growth parameters, such as height, leaf number, and biomass production.

Experimental Design:

- **Independent Variable:** Type of fertilizer (e.g., organic, inorganic, mixed).
- **Dependent Variables:** Plant growth parameters measured (e.g., height, leaf number, biomass).

Methodology:

1. **Experimental Setup:** Select a suitable plant species for the study (e.g., tomato plants).
2. **Treatment Groups:** Divide plants into groups receiving different types of fertilizers.
3. **Measurement:** Regularly measure growth parameters (height, leaf number), and at the end of the experiment, harvest plants to measure biomass.
4. **Statistical Analysis:** Use one-way ANOVA to analyze differences among groups for each growth parameter.

Demonstration Rationale: This experiment may find significant differences in plant growth parameters among the fertilizer types. The findings will contribute to understanding which fertilizer types are most effective under specific conditions, thereby aiding agricultural practices. Also, it will provide valuable insights into optimizing fertilizer use for enhanced plant growth, contributing to both agricultural productivity and sustainability efforts.

BOOK OF ABSTRACTS

Professor Okechukwu S. Abonyi (*fstan, mnae*) holds a B.Sc Degree in Biology Education, Masters and Doctor of Philosophy in Measurement and Evaluation of the University of Nigeria. He was promoted to the rank of a Professor of Measurement & Evaluation in 2006. He was the head of the Department of Science Education of the Ebonyi State University from 2002 – 2006 and the Dean of the Faculty of Education from 2006 – 2009. He is currently a Professor of Measurement and Evaluation at the Alex Ekwueme Federal University Ndufu-Alike (AE-FUNAI).



Prof Abonyi is the national President of the Society For Nigeria Entrepreneurship Education Development (**SNEED**). He is a life member and a Fellow of the Science Teachers Association of Nigeria (STAN). He served as the Deputy Editor-in-Chief of STAN from 2007 – 2010 and the Editor-in-Chief from 2010 – 2013. He is also a Member of the Nigerian Academy of Education.

He is the Principal Consultant to the research consultancy unit – the **Multi Academic Consult** and served as a field Consultant to the Enterprise for Development International (EfDI). Abonyi also serves as a consultant to a number of national and international organizations including the UNICEF, National Commission for Mass Education, the National Teachers Institute and participates in a number of National and International Funded Research and grants.

Prof Abonyi has made a significant contribution to studies in Ethnoscience and instrumentation in research. His doctoral thesis on Ethnoscience sponsored by the Council for Development of Social Science Research in Africa (CODESRIA) opened up his horizon on ethno-conceptualism. His recent research focus is on ethno-conceptualism and implications of cognitive re-wiring in science.

Prof Abonyi is a member of many other Professional Associations including ICASE and CON. He has published enormously in a number of highly ranked national and international journals. It may interest you to note that Prof Abonyi has Successfully supervised and graduated twenty-nine doctoral and fourteen Master degree students with so many others at various stages of graduation.

This Professor loves poetry and dedicates his leisure to Data Analysis and critique of research work. He is happily married and has children.

BOOK OF ABSTRACTS

PL 3: Discovery of New Nitro-Based Compounds as Potential Drugs for Tuberculosis

Ifeanyichukwu E. Eke, *Ph.D.*

ABSTRACT

Tuberculosis (TB) is a respiratory disease that is caused by *Mycobacterium tuberculosis* (Mtb). Current TB chemotherapy is faced with many challenges, including the continual evolution of drug-resistant Mtb and the inefficacy of many drugs against latent TB. These challenges highlight the need to develop more effective drugs for TB. In this seminar, I will describe our discovery of new nitro-containing compounds that have potent antitubercular activities. Using forward genetics, I showed that these compounds are prodrugs that depend on different nitroreductases, highlighting their specificity for mycobacteria. Transcriptional profiling suggests that the compounds target different cellular processes including respiration and lipid metabolism. Some of these also kill dormant Mtb, highlighting their possible use in the treatment of latent TB. I also showed the *in vivo* efficacy of the compounds in reducing the mycobacterial burden of Mtb-infected mice. Lastly, I used a cheminformatic approach to discover new nitro-based scaffolds that have enhanced activity against some drug-resistant mutants, a phenomenon known as collateral sensitivity. Overall, this work characterizes the mechanisms of action of new nitro-containing compounds and provides proof-of-concept for their potential development as TB drugs.

BOOK OF ABSTRACTS

Short Biography

Ifeanyi got his first degree (First Class Honors) in 2016 from the Department of Microbiology, University of Nigeria, Nsukka. He was the overall best graduating student of his class and served as the university valedictorian. After graduating, he did an 18-month post-baccalaureate research before moving to the United States for his doctorate. Earlier this year, he completed his doctoral program at the Department of Microbiology, Genetics, and Immunology, Michigan State University (MSU). His dissertation was on the chemical genetics of new nitro-containing compounds that inhibit the growth of *Mycobacterium tuberculosis* and *M. abscessus*. This work led to the filing of a provisional patent in the United States and have resulted into one manuscript, with many more in the pipeline. Ifeanyi is a prolific researcher with a broad interest in developing new drugs that can be used to treat microbial infections and study microbial physiology.



BOOK OF ABSTRACTS

BBC-1

***Solanum aculeastrum* Dunal Berries: Phytochemical Profiling and GC-MS Analysis of Methanolic Extract and n-Hexane, Dichloromethane, Ethyl Acetate and n-Butanol Fractions**

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ABSTRACT

Solanum aculeastrum is reportedly used in several diseases including gonorrhoea, bronchitis, jigger infestations and wounds, and cancers. We conducted an exhaustive phytochemical and GC-MS profiling of its methanol extract and solvents fractions. About 4500g of dried berries of *S. aculeastrum* were extracted with methanol, part of which was partitioned into fractions of n-hexane, dichloromethane, ethyl acetate, n-butanol and aqueous fractions. These fractional preparations were subjected to phytochemical and GC-MS profiling except aqueous fraction. The percentage yield of 430.69g of methanol extract of berries of *S. aculeastrum* was 9.57%w/w, while the yields of dried 19.4g of n-hexane, 38.4g of DCM, 6.4g of ethyl acetate, 81.03g of n-butanol and 21.2g of the freeze-dried aqueous fractions were 7.08%w/w, 14.03 %w/w, 2.33%w/w, 29.60%w/w and 7.74%w/w respectively. The relative presence of glycosides, alkaloids, tannins, flavonoids, terpenoids, phenols, and saponins was confirmed except for quinones. GC-MS profiling of methanol extract identified 32 compounds including alkane, alcohol, carbohydrate, fatty acids, terpenoids, glycerides, vitamins, and some unclassified compounds. 25 compounds including terpenoids, alkene, fatty acids, vitamin, and unclassified compounds were identified in n-hexane fractions. The DCM fraction yielded 20 compounds including isoprenoid, terpenoids, amino acids, carboxylic acid and unclassified compounds. 22 compounds were identified in ethyl acetate fraction including phenol, fatty acids, alcohol, terpenoids, glycerolipid and unclassified compounds. The n-butanol fraction yielded 11 compounds including fluorinated aromatic substance, hormonal antineoplastic and a non-steroidal anti-inflammatory agent. This study has further elaborated on the bioactive compounds in berries of *S. aculeastrum*, to aid robust understanding of its pharmacological activities.

Keywords: Phytochemical; GC-MS; Methanol; n-Hexane; Dichloromethane; Ethyl acetate; n-Butanol

BOOK OF ABSTRACTS

BBC-2

Acid-fast Bacilli in Slaughtered Cattle in Ikpa Slaughterhouse and Human TB Patients and the Need for Further Molecular Studies in Nsukka, Enugu State, Nigeria

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ABSTRACT

Tuberculosis (TB) is a chronic zoonotic infectious disease traditionally diagnosed with Ziehl Neelson stain. Although prevalent in livestock and humans in Enugu State, data on the two groups in Nsukka, Enugu State, is scarce in available literature. This cross-sectional survey determined the prevalence of tubercles in cattle lesions as well as acid-fast bacilli in the tubercles and sputum samples of TB patients in Nsukka. Postmortem meat inspection was conducted on 538 slaughtered cattle to detect tubercles. Sputum samples collected from TB patients in Shanahan Hospital, Nsukka and the tubercles (from cattle) were subjected to Ziehl Neelsen (ZN) stain. Data collected were analyzed using descriptive and Chi-square statistics at p-values less than 0.05. Tubercles were found in 2.79% (15/538) of the cattle carcasses. Highest prevalence was recorded in cattle of 4½ years (5.15%), among the females (4.94%) and the White Fulani breed (3.10%). Occurrence of tubercles was found to be significantly associated with the sex of cattle. ZN showed an overall prevalence of 2.23% in cattle. The prevalence was highest among cattle of 4½ years old (5.15%), the females (4.32%) and the White Fulani breed (2.66%). Statistically significant association was recorded between the presence of acid-fast bacilli and age as well as sex. Out of the 40 TB patients screened, acid-fast bacilli was detected in 33 (82.5%). The prevalence was higher among females (83.33%) and those more than 40 years of age. There was no statistically significant association between the prevalence of acid-fast bacilli and any of the variables considered among the TB patients sampled. There is a need for further molecular characterization of the acid bacilli detected in tubercles from cattle and TB patients' samples from abattoirs and hospitals, respectively to determine the level of zoonotic TB in Nsukka, Enugu State, Nigeria.

BOOK OF ABSTRACTS

BBC-3

The Effects of Ethanolic Leaf Extract of *Gongronema Latifolium* on Pathophysiological Parameters of Albino Rats Administered Lead Acetate (Pbac) Solution

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ABSTRACT

Lead (Pb), a toxic heavy metal, enters the environment through the air, water, food, or soil. This study investigated the effect of ethanolic leaf extract of *Gongronema latifolium* on the histopathology of albino rats administered lead acetate (PbAc) solution for 28 days. Eighty-one adult albino rats aged 9 weeks were used. The acute toxicity tests were done using 36 rats, while 45 were used for the main study. The 45 rats were divided into five groups (1-5) of 9 rats each. Rats in group 1 (standard control) received pelleted chicken finisher feed and water only; group 2 (negative control) were daily administered 500 mg solution of PbAc/kgbw; groups 3, 4, and 5 received 500 mg solution of PbAc/kgbw and 125mg, 250mg and 500mg of the extract respectively. On the 28th day of the experiment, a rat was sacrificed from each group for histopathological examination of the liver and kidney. The phytochemical screening of the extract showed that it contained flavonoids, tannins, steroids, terpenoids, alkaloids, reducing sugars, cardiac glycosides, and phenol. Examination of the liver and kidney of rats in the negative control showed multifocal areas of inflammatory cellular infiltration and tubular degeneration. Treatment with 500mg of extract/kgbw regenerated the distorted kidney architecture. Also, the mild liver injury did not significantly change upon co-administration of different doses of the extract. Although the PbAc solution inflicted more damage to the kidney than the liver tissue, ethanolic leaf extract of *G. latifolium* at 500mg/kgbw of rats reversed the effect.

Keywords: Lead acetate; *Gongronema latifolium*; Extract; Albino rats; Histopathology.

BOOK OF ABSTRACTS

BBC-4

Anti-Malarial Activity of Aqueous Seed Extract of *Carica Papaya* (L) and its Effect on Haematological Parameters of *Plasmodium Berghei*-Infected Mice

C. Eze Chinelo* C. Agbo Martina, N. Ezeibe Ezinwanne, A. Evurani Somtochukwu, N. Ugwu Chinenye

ABSTRACT

Carica papaya is a nutraceutical plant whose various parts and extracts have been extensively employed in folk medicine for the treatment of diverse ailments due to their numerous pharmacological activities. The present study aimed to justify the folkloric use of *C. papaya* in the treatment of malaria and also validate the recommendation that beside potency, safety should be the overriding criterion in the selection of plants for health care needs. The study evaluated the anti-plasmodium potential of *C. papaya* seeds as well as their effect on haematological parameters of mice. A total of 25 mice were divided into 5 groups (A – E) of 5 animals each. Group A (solvent control) were uninfected and received 0.5 mL of distilled water (vehicle for extracts administration) orally; Group B (negative control) were infected, but not treated; Group C (positive control) were infected and treated with standard antimalarial drug (artemether & lumefantrine combination); Group D and E were infected and treated respectively with 300 and 500 mgkg⁻¹b.wt of the aqueous seeds extract. The anti-plasmodium activity of the seed extract was determined using Peter's curative test procedure to calculate the percentage decrease in mean parasitemia load of the mice. The haematological parameters evaluated in this study were Percentage Packed Cell Volume (% PCV), Haemoglobin (Hb), Red Blood Cells (RBC), White Blood Cells (WBC), Platelets count (PLT), and White Blood Differential (lymphocytes, Basophil, Monocytes, Neutrophil, Eosinophil). The findings revealed a significant ($p \leq 0.05$) concentration-dependent antiplasmodial activity of *C. papaya* seed extracts higher than that of arthemeter-lumefatrin combination at 500 mgkg⁻¹b.wt dose. Significant changes ($p \leq 0.05$) were observed in the haematological profiles of the *P. berghei*-infected mice treated with different concentrations of the extracts (with 300 and 500 mgkg⁻¹b.wt), using distilled water and arthemeter-lumefantrine combination as negative and positive controls respectively. Their levels of Hb, PCV and RBC increased significantly with a subsequent significant reduction in their WBC, lymphocytes and platelets count. Among the WBC indices, a significant ($p < 0.05$) increase in the Monocytes and Neutrophils was observed in Mice treated with 300 and 500 mgkg⁻¹b.wt of the aqueous seeds extract, with no significant changes in their Basophils and Eosinophils concentrations. However, at 300 mgkg⁻¹b.wt of the aqueous seed extract, all the thrombocytic parameters compare well with the control, perhaps indicating an optimal thrombopoietic dose concentration. This study showed that aqueous seed extract of *C. papaya* stimulated leucopoietin and erythropoietin release in *P. berghei*-infected mice. Therefore, the findings has validated the folkloric use of *C. papaya* seeds in the treatment of malaria parasite infections and also demonstrated its capacity to treat anaemic conditions caused by them.

BOOK OF ABSTRACTS

BBC-5

Factors Militating against Effective Teaching and Learning of Biology in Secondary Schools in Ondo West Local Government Area, Ondo State.

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ABSTRACT

This study examined the factors militating against effective teaching and learning of Biology in Secondary Schools in Ondo West Local Government Area, Ondo state. Four (4) research questions were formulated to guide the study. The study adopted the descriptive research design. The grand total population of 4,264 students was used in all public Senior secondary schools found in Ondo West Local Government Area, Ondo State. Relevant data were collected from a sample of one hundred (100) students from five (5) selected public secondary schools in Ondo West Local Government Area, Ondo State. A simple random sampling technique was adopted for the study, the research instrument used was a structured questionnaire (FMAETLBSSQ). The data collected was analyzed using simple percentage. The research instrument was scrutinized and judged by the three Experts in Science Education. The results from the study revealed that insufficient numbers of qualified teachers affect students' mass failure in Biology and unavailability of instructional materials for teaching of Biology subject influences students' mass failure in Biology subjects. The study concludes that insufficient numbers of qualified Biology teachers and instructional materials for teaching affect Biology subject in the study area, in Ondo West Local Government Area of Ondo State. The study recommended that Government, both at the federal and state levels, should employ more qualified teachers for secondary schools to ensure efficiency and optimal performance in Biology subjects.

Keywords: Biology, Militating, Effective, Teaching, Learning, Factors

BOOK OF ABSTRACTS

BBC-6

Conversion of Roselle Juice (Zobo) made from the Calyces of *Hibiscus sabdariffa* to Better Probiotic Quality and Prolonged Shelf Life using *Lactobacillus plantarum*.

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ABSTRACT

One of the greatest limitations of the beverage from *Hibiscus sabdariffa* (Zobo drink) is that it has a very short shelf-life of 24 hours or less if not refrigerated. Therefore, there is urgent need to explore various preservation methods such as the use of probiotics to extend its shelf - life. Probiotics are live and vital microorganisms that confer health benefits when consumed in adequate amounts, as parts of food or supplement. They are live bacteria that are good for health, especially the digestive system. This research was carried out to convert *Hibiscus sabdariffa* juice brink (Zobo) into a probiotic drink with improved nutritional quality and shelf-life using *Lactobacillus plantarum*. The microbial quality and phytochemical constituents were analysed and the initial glucose concentration was determined using 5-dinitrosalicylic acid (DNSA) method. The juice was allowed to undergo 72 h of fermentation after inoculation with MacFarland standardized *Lactobacillus plantarum* estimated to be equivalent to 10^7 CFU/ML. After the stipulated period of fermentation, the final phytochemical constituents and sensory analysis were carried out, and the improved shelf-life was estimated to fall within the range of 2-4 days as a result of the production of lactic acid by the bacteria which increased the acidity of the juice to prevent the growth of spoilage organisms. The final glucose concentration showed that the glucose level increased rather than decreased, which indicates the expression of amylase, an enzyme that can convert other carbon sources to glucose, this will help sustain the organism for a long time as it produces more lactic acid in the beverage. Sensory analysis showed an improved organoleptic quality. During the analysis of microbial quality, an average of 10^9 CFU/ML of *Lactobacillus plantarum* cells were recovered from the Roselle juice after fermentation which indicates cell multiplication in the juice.

Keywords: *Hibiscus sabdariffa*; Zobo drink; probiotics; *Lactobacillus plantarum*

BOOK OF ABSTRACTS

BBC-7

Substrate Specificity of Peroxidase Isolated from *Vitis vinifera*

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ABSTRACT

This study evaluated the substrate specificity of peroxidase from grape (*Vitis vinifera*) alongside properties such as the effect of pH, temperature, substrate concentration, and putative inhibitors. Peroxidase from fresh grapes was extracted in sodium phosphate buffer (0.1 M, pH 6.0) using filtration and centrifugation. The enzyme was assayed using *o*-dianisidine as substrate. A crude enzyme extract with a total activity of 61.062 $\mu\text{mol}/\text{min}$ was obtained and was subjected to ammonium sulfate precipitation (80 %). The optimum pH and temperature for the peroxidase were 6.0 and 50 °C respectively. The enzyme activity was determined and characterized based on the effect, substrate specificity, and effect of putative inhibitors. The activity of the precipitated peroxidase enzyme was 363.717 $\mu\text{mol}/\text{min}$ with a specific activity of 226.756 U/mg, purification fold of 3.881, and percentage yield of 595.642. The Michaelis-Menten's constant (K_m) and the maximum velocity (V_{max}) values were 3.667 Mm and 3333.33 $\mu\text{mol}/\text{min}$ respectively. The specific yield values of each of the substrates were: 0.929 (*o*-dianisidine); 2.777 (2, 6-dimethoxyphenol), 1.701 (α -Naphthol), and 16.426 (ABTS), with the order of affinity: ABTS > 2, 6-dimethoxyphenol > α -Naphthol > *o*-dianisidine. Inhibition studies conducted with urea, sodium cyanide, sodium azide, SDS, and EDTA, revealed that all the inhibitors were able to inhibit the enzyme activity but sodium cyanide completely inhibited the enzyme across 1 mM, 5 mM, and 10 mM while SDS inhibited least at 1 mM. The ability of the peroxidase enzyme from grape to catalyze a wide range of substrates makes it a robust potential candidate for possible industrial applications, hence, it is cost-effective.

BOOK OF ABSTRACTS

BBC-8

Redefining Food Analysis with Modern Biotechnology: Significance of Omics Analytical Techniques Integration, Chemometrics and Bioinformatics

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ABSTRACT

Food analysis is a scientific discipline that has evolved from traditional methods into sophisticated approaches due to advances in analytical chemistry and modern biotechnology. With the global demand for safe, nutritious, and sustainable food, omics techniques have become pivotal in ensuring food authenticity and safety. These analytical techniques encompass genomics, metagenomics, transcriptomics, proteomics, and metabolomics, offering comprehensive insights into food composition and functionality. Besides, omics analytical techniques offer multidisciplinary insights into food science and analysis. Despite their diverse potential, these techniques remain underutilized in food analysis due to knowledge, technical, and cost barriers, necessitating further action for improvement. This review explored the contributions of omics analytical techniques, chemometrics, and bioinformatics in revolutionizing modern food analysis, highlighting their significance and potential breakthroughs through multi-omics integration and sophisticated data platforms. However, the abundance and complexity of omics data necessitate efficient handling and analysis, where bioinformatics and chemometrics play crucial roles. Integrating varied omics data, which coincide with standardizing processes and quality control, and developing prediction models are anticipated for sustainable food analysis.

Keywords: modern biotechnology, food analysis, omics, multi-omics, foodomics, food safety, analytical techniques

BOOK OF ABSTRACTS

BBC-9

Carcinogenic Risk Assessment of Heavy Metals from the Consumption of Artificially Ripened Banana

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The use of artificial ripening agents such as calcium carbide to enhance fruit ripening has become prevalent mostly due to commercial purposes. However, these artificial ripening agents are carcinogenic, and their consumption can cause serious health problems. Twenty-five female albino rats were acclimatized for two weeks and divided into five groups. Group 1 (Normal feed and water), Group 2 (feed + 20g of naturally ripened banana), Group 3 (Feed + 20g of banana ripened with African bush mango), Group 4 (Feed + 20g of banana ripened with 7g calcium carbide), Group 5 (Feed + 20g of banana ripened with 30g calcium carbide). The levels of Arsenic (As), Lead (Pb), and Chromium (Cr) were determined using Atomic Absorption Spectrophotometry, and carcinogenic risk was estimated. The result showed that the carcinogenic risk values for Pb and Cr were below the USEPA standard (ILCR >1E-4) and as such are not indicative of high chances of cancer. Arsenic values exceeded USEPA standards (ILCR>10-4) and are indicative of a highly increased chance of contracting cancer over time. Therefore, the use of artificial ripening agents should be discouraged to prevent adverse health implications.

Keywords: carcinogenic, artificial ripening, heavy metals, calcium carbide, risk assessment.

BOOK OF ABSTRACTS

BBC-10

Effect of Media Supplements on the Growth Support of Bacteria Isolated from Fishpond in Nigeria

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ABSTRACT

Aquaculture poses challenges of waste accumulation such as ammonia in fishponds which affects fishes' growth and are disastrous to human health when consumed. This research aimed at evaluating the effects of carbon and nitrogen sources on the growth of bacteria isolated from fishpond. One Gram-positive (PA5) and one Gram-negative (PB3) organism were selected and were subjected to different concentrations of carbon sources (glucose, sucrose, and glycerol) and nitrogen sources (peptone, yeast extract, ammonium nitrate, and ammonium sulphate) for five days. The cell growth was determined as optical density (OD) at a wavelength of 620 nm. Glucose supported the growth of PA5 better than sucrose and glycerol, however, sucrose supported the growth of PB3 better than glucose and sucrose. For nitrogen sources, organic sources yielded better growth than inorganic sources. Furthermore, the hampered growth of PB3 observed with ammonium nitrate-supplemented samples, was not influenced by the concentration used; thus, fortressing their toxicity effect on PB3 growth. The study validates that carbon and nitrogen sources fed into ponds can influence organism growth and utilization efficiency in biofloc technology employed in aquaculture systems.

Keywords: fish, bacteria, pond, carbon, nitrogen, biofloc

BOOK OF ABSTRACTS

BBC-11

Molecular Identification of Some Wild Mushrooms in Igugu Community, in Udenu Local Government Area of Enugu state, Using the ITS and SSU regions.

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ABSTRACT

Wild mushrooms have been utilized for their important values such as food and medicine. The use of mushrooms for medicine and food is validated by their therapeutic properties and high nutritional contents respectively. Most mushrooms are not yet identified, and toxic ones may be mistakenly consumed, leading to potential health crises for consumers. This study aimed to identify wild mushroom species by barcoding two DNA regions, the Internal Transcribed Spacer and the Small Sub-Unit 18s nuclear ribosomal gene, and comparing both results. Twelve mushroom samples were collected from Igugu Community in Udenu Local Government Area of Enugu State and subjected to molecular identification. DNA was extracted from the mushroom samples using the silica binding purification method and amplified using PCR. The amplicons were viewed using 2 % agarose gel electrophoresis before Sanger sequencing. Sequence data obtained was analyzed using DNA Subway software, followed by a nucleotide BLAST search on NCBI GenBank and BOLD databases to verify the results. The SSU marker's sequence quality was found to be superior to that of the ITS region. The ITS region identified 83.3% of the samples, while the SSU gene identified only 58%. ITS proved to be more reliable for fungal species identification than the SSU. After choosing a consensus identity, the twelve mushrooms were identified as follows: *Lentinus squarrosulus* (samples 1, 11, and 12), *Lentinus sp.* (samples 7 and 8), *Trametes polyzona* (samples 4 and 9), *Calvatia gigantea* (sample 3), *Coriolopsis polyzona* (sample 5), *Boletellus shichianus* (sample 2), *Gymnopilus cerasinus* (sample 6), and Uncultured fungus clone (KC672417) (sample 10). Consensus identity was based on the highest sequence similarity and morphological similarities between the BLAST hits of both markers and the samples. This demonstrates the potential of DNA barcoding in identifying wild mushrooms, but its effectiveness is largely dependent on the chosen marker.

Keywords: Molecular Identification, Wild mushrooms, Internal Transcribed Spacer, Small Sub-Unit, DNA barcoding, Sequence, GenBank, BLAST.

BOOK OF ABSTRACTS

BBC-12

Medical Waste Management in Enugu State, Nigeria – A Comparative Study

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ABSTRACT

This study presents a comprehensive comparative analysis of medical waste management practices in three prominent hospitals within Enugu State, Nigeria: Bishop Shanahan Hospital, University of Nigeria Teaching Hospital, and Parklane Hospital. The research aimed to assess the efficiency and effectiveness of waste disposal methods, identify the most prevalent types of medical waste generated, and evaluate the existing waste management systems in place. The data collection process encompassed a multifaceted approach, incorporating questionnaires, interviews, direct observations, and site visits. This holistic approach ensured a thorough examination of the waste management practices employed within each hospital. The statistical analysis of collected data through the questionnaires using Microsoft Excel revealed key insights into the types of medical waste predominantly generated by these healthcare facilities. Sharps waste emerged as the most prevalent, accounting for 86.05% of cases, followed by Infectious waste at 76.74% and Chemical waste at 59.30% while Pathological waste, Radioactive waste and Pharmaceutical waste had the least cases with 14.58%, 14.58% and 14.00% respectively. These findings underscore the critical need for specialized disposal methods and waste segregation for these high-risk waste categories. Furthermore, the study unveiled that open dumping is a frequently utilized means of waste disposal across the hospitals, while incineration is employed in a limited number of cases. These results highlight the pressing necessity for improved medical waste management practices that prioritize safety, environmental sustainability, and regulatory compliance. In conclusion, this comparative analysis provides valuable insights into the current state of medical waste management in Enugu State hospitals. The identified trends and challenges serve as a foundation for future improvements in waste disposal techniques, with the ultimate goal of safeguarding public health and the environment. The findings of this research can inform policy development and guide the implementation of more effective medical waste management strategies within healthcare institutions in Enugu State and beyond.

Keywords: Medical waste, Management, Sharps, Infectious waste, Pathological waste, Pharmaceutical waste, chemical waste, Radioactive waste, Segregation, Incineration.

BOOK OF ABSTRACTS

BBC-13

**Giving-up Density (GUD) of Two Brands of Feed (Animal Care® and Vital® feed)
Resulted in the Association of Different Growth Parameters of Albino Rats**

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ABSTRACT

Since length-weight relationship *provides information on growth patterns of animals*, while giving up density (GUD) which measures the remaining quantity of food after animals quits eating could both serve as a link between the forms of feed provided, the one preferably consumed and how it the feed promotes the animals' taste and growth performance. The aim of this research was to evaluate the effect of giving up density on the length-weight relationship of albino rats fed with two brands of feed. Specifically, this study evaluated the mean preference and residues of Vital® and Animal Care® brands of feed administered to the albino rats; the study also evaluated how the brands of feed correlated with the body morphometrics of the animals. A total of 16 albino rats (3 weeks old; weighing 23-25g) were acclimatized for 7 days and shared into two groups. Group 1 consisted of six rats administered a pellet (100g) Vital® feed formulation, while the second group of the same size was fed with the mash (100g) Animal Care® feed formulation for one month. In spite that the results of the proximate analyses indicated more protein and carbohydrate in Animal Care®, the mean weekly residue measured indicated that the rats had more of the Animal Care® feed as left over (i.e. a had lesser taste) (211.2g) when compared with the Vital® feed (130.7g). In correlation analyses, the body mass (M) and head length (HL) of the Vital® feed rats positively correlated ($p < 0.05$) to the tail length (TL), while only the body mass (M) of the Animal Care® rats correlated positively with their total body length (TBL). Since Animal Care® feed rats acquired more weight, there is the possibility that the more protein content may have given the rats a growth advantage over the Vital® formulated feed. However, studies should investigate whether the possibility of this study's outcome could be translated in other albino rats of different species.

Keywords: Length-Weight Relationship, Giving up Density, Albino Rats, Animal® Care and Vital® Feeds

BOOK OF ABSTRACTS

BBC-14

Effect of Methanol Extract of *Curcubita Maxima* Leaves and Pulp on Gentamicin-Induced Nephrotoxicity

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ABSTRACT

Despite the broad spectrum therapeutic utility of gentamicin, the abuse of gentamicin is still related to serious side effects such as nephrotoxicity. Vegetables have been utilized from ancient times for the management of ailments, moreover most recent scientific researches have shifted towards this direction. This study was aimed at assessing the effect of the methanol extracts of the leaves and pulp of *Curcubita maxima* on gentamicin-induced nephrotoxicity. Ground samples of dried leaves and pulp of *Cucurbita maxima* (pumpkin) were screened for their vitamins and mineral composition following standard procedures. The experiment involved twenty-four rats divided into six groups of four rats each; Group 1 was the normal control, group 2 was induced with 100 mg/kg bodyweight (bw) of gentamicin and left untreated, group 3, 4, 5 and 6 were induced with 100 mg/kg bw and treated with 100 and 200 mg/kg bw of the leaves and pulp respectively. The effect of the methanol extract was assessed by measuring the kidney function parameters, the serum electrolytes, the level of the enzymatic and non-enzymatic antioxidants and examining the histology of the kidney using standard procedures. The *Curcubita maxima* leaves and pulp were found to contain certain vitamins and minerals especially Vit. B₂, B₁₂, C, E and selenium. Biochemical analysis results indicated that induction with gentamicin brought about significant ($p < 0.05$) increase in the serum urea, creatinine and uric acid levels as well as serum potassium and chloride concentration in the negative control compared to the normal control. Also significant ($p < 0.05$) decrease in the enzymatic, non-enzymatic antioxidants, sodium and bicarbonate were observed in the negative control compared to the normal control. The histology of the kidney verified the biochemical analysis. However the administration of the methanol extracts brought about a significant ($p < 0.05$) return of the level of these parameters towards the normal value in the test groups compared to the negative control. This suggests that *Curcubita maxima* leaves and pulp may be a potential source of nutritional and pharmacological products which will be effective in the management of gentamicin induced nephrotoxicity.

Keywords: Gentamicin, nephrotoxicity, electrolytes, antioxidants, toxicity.

BOOK OF ABSTRACTS

BBC-15

Impact of Selected Preservatives and Food Processing Substances Used for Ripening of Fruits on Hemoglobin Oxidation in Apparently Healthy Individuals

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ABSTRACT

The use of unauthorized quantities of food preservatives, processing substances, and fruit ripening agents has raised significant apprehension regarding potential health repercussions. This study evaluated the influence of selected preservatives and food processing substances on oxygen-hemoglobin and oxidation of hemoglobin. All laboratory analyses followed standard methods. High and low doses of different food additives led to a significant ($p < 0.05$) concentration-dependent decrease in oxy-Hb concentrations, especially a high dose of Bifenthrin insecticide led to zero oxy-Hb concentration. There was a concentration and time-dependent reduction in absorbance maxima of oxy-Hb reacted with high and low doses of the different food additives, especially bifenthrin when compared to ethylene glycol, calcium carbide, potassium carbide, sodium glutamate, and ethanol. The present study demonstrated significant variations in oxy-Hb concentration in response to diverse food additives, warranting further investigation into their potential impacts on human health.

Keywords: Impact, Food additives, Food processing substances, Oxy-Hemoglobin

BOOK OF ABSTRACTS

BBC-16

Cholinesterases Inhibition, Antioxidant Activity and Phytochemical Profiling of Crude Methanol Extract of *Psorospermum fabrifugum* (Christmas berry) Root; An *In vitro* and *In silico* Studies.

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ABSTRACT

Medicinal plants contain many compounds with therapeutic potential. Owing to their accessibility, cost-effectiveness, and little-known adverse effects, they are extensively used in the management of various diseases. Identifying and quantifying the bioactive compounds in them and establishing the nature of their interaction with some physiological enzymes can help understand the therapeutic mechanisms and standardize the plant-based medicinal extracts. This study used gas chromatography/flame ionization detector (GC-FID) and high-performance liquid chromatography (HPLC) analysis to determine the bioactive components in the methanolic extract of *Psorospermium fabrifugum* root. The enzyme inhibitory potential of the extract was investigated against acetylcholinesterase, butyrylcholinesterase and Lactate dehydrogenases. Analysis of the methanol extract of *Psorospermium fabrifugum* root revealed alkaloid (1.4%), tannins (0.9 mg/GEq/g), phenols (1.8 mg/GEq/g), flavonoids (4.022 mg/GEq/g). GC_FID analysis of the phytochemicals showed a high concentration of Naringin (18.184 µg/mL), Flavan-3-ol (21.184 µg/mL), Ribanilidine (42.078 µg/mL), Rutin (14.088 µg/mL), steroids (17.307 µg/mL), Phytate (25.69 µg/mL), Oxalate (13.665 µg/mL) and Epihedrin (18.902 µg/mL) and proanthocyanin (7.633µg/mL) respectively. HPLC fingerprinting of the flavonoids revealed (+)- Catechin (3.960 mg/100g), Luteolin (8.649 mg/100g), Narigin (4.290 mg/100g), Rutin (5.007 mg/100g), Quercetin (4.921 mg/100g) and Kaempferol (3.720 mg/100g) as the major flavonoid content of *P. fabrifugum* extract. In vitro, antioxidant scavenging ability was observed at 100mg/mL of the extract for the antioxidant potentials (DPPH, FRAP and NO) tested. The extract exhibited varying inhibitory activities (> 50% at 400 mg/mL of the extract) on the enzymes tested except for Butyrylcholinesterase) and IC₅₀ values of 9.07±2.0, 21.34±2.0 and 18.87±2.0 mg/mL for Acetylcholinesterase, Butyrylcholinesterase and Lactate dehydrogenase respectively. Results revealed that some of the phytochemicals in the extracts have an affinity for the targeted enzymes with binding energies higher than that of the standard drugs. The results revealed that the *P. fabrifugum* root possesses antioxidant activity and enzyme inhibitory activity on some of the physiological enzymes that have been implicated in neurodegenerative diseases such as Alzheimer's disease. The *in vitro* and *in silico* inhibition of these physiological enzymes suggest that the root of *P. fabrifugum* can be effective in the management of Alzheimer's disease.

Keywords: Medicinal plant, Alzheimer's disease, Enzyme inhibition, Antioxidants, phytochemicals

BBC-17

BOOK OF ABSTRACTS

Effects of *Vitex doniana* Leaf Diets on Prostate-Specific Antigen, and Antioxidant levels of Testosterone Propionate-Induced Benign Prostatic Hyperplasia Rats

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ABSTRACT

Benign Prostatic Hyperplasia (BPH) is a progressive pathologic condition associated with aging men between 50 years and above. Oxidative stress induces prostatic tissue damage to the structure and function of the prostrate proteins, and causes alterations in the DNA repair machinery and post-translational modifications. Prostate Specific Antigen (PSA), a glycoprotein in humans is secreted by the prostatic epithelial cells and performs various functions during copulation and fertilization. Serum PSA levels are often elevated in prostate disorders such as BPH and are used as a clinical marker for disease prognosis. *V. doniana* is a green vegetable which belongs to a family called Verbenaceae. The aim of this study is to determine the effects of different formulated diets of *Vitex doniana* leaves on the serum prostatic indices of testosterone propionate- induced benign prostatic hyperplasia in rats. **Methods:** The fresh leaves of *Vitex doniana* was harvested from their natural habitat in Amagu Akegbe-Ugwu, Enugu State, Nigeria. The *V. doniana* leaf (VDL) feed was formulated into four experimental diets namely; diets I, II, III and IV. The proximate contents of the feed were analyzed. Thirty male Wistar rats weighing within the range of 72 g and 162 g were grouped into 6 Groups of five (5) rats each. Group 1 was used as the normal control and the other groups received subcutaneous injection of testosterone propionate at 5 mg/kg body weight in olive oil for 4 weeks to induce BPH. Groups 1 and 2 were fed with Diet I and water, Group 3 was given dutasteride 0.1 mg/kg, Diet 1 and water, Groups 4, 5, and 6 were fed with the formulated diets of *V. doniana* leaf incorporated at 15%, 30% and 45%, (Diets II, III, and IV) respectively, from day 1-28. After 28 days, the rats fasted for 12 h, and were anesthetized by a brief exposure to trichloromethane vapour, and blood samples were collected from the medial canthus. The sera were carefully separated and biochemical prostatic indices were analyzed. The PSA levels of the rats prior to BPH induction showed that the PSA levels of all the rats were less than 1. At the end of the BPH induction, the rats in Groups 2, 3, 4, 5 and 6 had an elevated PSA level, (5.98±0.64, 6.10±0.73, 8.53±0.43, 6.85±0.23, and 6.92±0.20) respectively and those in Group 1 were not elevated (0.93±0.19). The rats PSA levels after the 28 days treatment with the formulated *Vitex doniana* leaf diets were reduced, and those in Group 6 (3.13±0.15) had an appreciable reduction. The effects of the different treatments on oxidative stress markers showed that, the catalase activities of the rats fed with the VDL diets were significantly elevated ($p < 0.05$), in dose dependent manner, compared with those in the untreated group. The SOD activities of the rats fed with the VDL diets were significantly elevated, in dose dependent manner, compared with those in the untreated groups at $p < 0.05$. The GPx activities of the rats fed with the VDL diets were significantly raised ($p < 0.05$), compared with those in the untreated group. The GSH activities of the rats fed with VDL diets was significantly elevated ($p < 0.05$), compared with those in the untreated group. The MDA activities of the rats fed with VDL diets were significantly reduced ($p < 0.05$), compared with those in the untreated group. The formulated diets had effects on the PSA of testosterone-induced BPH rats. The formulated diets basically the diet IV had an appreciable reduction on the PSA levels on the BPH induced rats. *Vitex doniana* leaves can be used in the management of BPH.

Keywords: *Vitex doniana*; PSA; Antioxidants; BPH; Dutasteride.

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BBC-18

Isolation and Utilization of *Schizopora flavipora* for Dye Decolourization.

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ABSTRACT

Environmental pollution from industrial activities poses a great danger to the ecosystem as it affects human existence and agricultural activities. The most significant challenge confronted by the textile industries is the discharge of dye effluents which contain toxic chemicals posing a considerable threat to the flora and fauna. Chemical methods of environmental clean-up is poised with a lot of challenges such as toxic byproduct generation, high cost, disruption of natural process and lack of sustainability. Biological method of treating effluents using fungi is one of the renewed and accepted methods in effluent treatment. In this study, the fruiting body of the white rot fungus (*Schizopora flavipora*) growing on a decaying wood was isolated using a potato dextrose agar (PDA). The sample was sub cultured using in bijou bottles and petri dishes to get pure cultures for further analysis. Molecular identification of the organism was carried out viz the DNA isolation, polymerase chain reaction, electrophoretic procedures and gene sequencing to get the phylogeny. The genomic characteristics of *Schizopora flavipora* was identified through the electrophoretogram of the amplified genome of the organism, revealing a base pair range of 500-700 which is characteristic of fungi. Remazol brilliant blue (RBB) dyed cellophanes were placed on the PDA in the petri dishes and the fungal isolate placed on the dyed cellophanes and kept in an aseptic condition at room temperature for dye decolourization. The fungal isolate identified by electrophoretic analysis was tested for its efficiency to decolorize Remazol brilliant blue (RBB) dye in the petri dishes. The isolate showed 50% decolorizing efficiency in decolorizing Remazol brilliant blue dye on the 14th day of inoculation and 80% decolourization efficiency on the 28th day of inoculation. This study shows that *Schizopora flavipora* can be used in decolorizing and making dye effluents less toxic. The findings of this study offer a foundation for further exploration of *Schizopora flavipora* as a sustainable solution for dye pollution in various industrial sectors.

Keywords: *Schizopora flavipora*, Dye-decolorization, Remazol brilliant blue, pollution.

BOOK OF ABSTRACTS

BBC-19

Growth Responses of *Abelmoschus esculentus* (L.) Moench under Stresses of Drought and *Meloidogyne incognita* Infection

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ABSTRACT

Growth and agricultural production of crops including, *Abelmoschus esculentus* (okra), a staple and nutritious vegetable cultivated and consumed in sub-Saharan Africa, is threatened and constrained by abiotic and biotic stresses caused by global climate change. While individual stressors cause devastating impacts to agricultural production, the possible combination of different multiple stresses (either jointly or sequentially), could pose a greater threat to global food production and food security. This study aimed at exploring morphological responses of okra plants cv. 'Meya' subjected to individual, sequential and concurrent stresses of drought and *Meloidogyne incognita*. Results showed both stresses significantly reduced growth and yield components of plants. Individual drought stressed plants significantly reduced growth compared to plants stressed with only nematode infection. Varied morphological differences were observed between plants stressed in sequence and those that received both stresses concomitantly. Plants subjected to dehydration stress prior to nematode infection coped better with the stress combination in comparison to plants that were challenged with nematode infection before dehydration stress and concurrent drought-nematode stress. This okra cultivar was either highly or moderately resistant to nematode infection by moderate formation and establishment of galls and egg masses. Survival mechanisms of this cultivar under both stresses could be primarily linked to its water-use efficiency as well as several cascades of changes in signal transduction pathways.

Keywords: *Meloidogyne incognita*; Nematode; Okra; Pathology; Biotic and Abiotic Stress.

BOOK OF ABSTRACTS

BBC-20

Heavy Metals Accumulation in *Milvus migrans parasitus* with Additional Information on its Phylogeny

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ABSTRACT

Heavy metals release into the environment through a variety of sources is a matter for concern to humans and *Milvus migrans parasitus* is a good bio indicator for analysis due to its occupation of different terrestrial environments in different continents as a result of its seasonal migrations. Muscle tissues of some of these kites (n = 10) from 2017 to 2022 were used for phylogenetic analysis whereas the muscle tissues of all the kites were used for heavy metals profiling using Atomic Absorption Spectrophotometer (AAS) mg/kg. For the heavy metals analysis the following were detected: Mg (10.39±0.37), Fe (6.26±0.33), Zn (5.06±0.15), Mn (3.71±0.074), Pb (1.85±0.21), Cu (1.77±0.08), and Cd (0.83±0.02) mg/kg with no detection (ND) of Cl and the As. It is inferred that these birds pick up these elements within and outside West Africa where they migrate seasonally. Also, in Nigeria, there have been little or no studies on the phylogeny of yellow-billed kites around West Africa. In this study, principally wide molecular approaches involving mitochondrial markers - cytochrome oxidase 1 (*COI*) loci as well as ND2 Gene genetic analysis were used to support the current knowledge about their phylogeny.

Keywords: yellow-billed kite, genetic relationship, heavy metals, Helminth parasites, subspecies, West Africa.

BOOK OF ABSTRACTS

BBC-21

Probing the Phytochemicals and Alpha-Amylase Inhibitory Action of *Leptadenia Hastata* Silver Nanoparticles

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ABSTRACT

Nanotechnology provides a fresh approach to maintaining the standard quality, distribution, and bioactivity of therapeutic compounds. *Leptadenia hastata* Decne is a commonly used food source and is prescribed as a traditional African medicine for the treatment of various diseases, such as hypertension, skin disorders, wounds, ulcers, and prostate complaints. It is one of the medicinal plants used locally in the treatment and management of diabetes mellitus, especially in the northern parts of Nigeria. In this study, we aimed to synthesize silver nanoparticles (AgNPs) using *Leptadenia hastata* leaves and to determine the alpha-amylase inhibitory action of *Leptadenia hastata* nanoparticles (LHNPs). Phytochemicals in the green synthesized LHAgNPs were assessed using gas chromatography-flame ionization detection (GC-FID). Furthermore, alpha-amylase inhibitory activity of the LHNPs was employed to elucidate its anti-diabetic potential using an *in vitro* experimental model. The GC-FID phytochemical profiling identified thirty (30) phytocompounds in the *L. hastata* AgNPs. The compounds were predominantly nobiletin (9.866e), baicalin (9.023), tangeretin (8.502), and ellagic acid (7.344), while the least was kaempferol (1.048). These phytochemicals belong to the class of flavonoids, alkaloids, and polyphenols. Moreover, *L. hastata* nanoparticles had good alpha-amylase inhibitory activity, which was maximal at 500 µg/mL. The inhibitory effect of the LHAgNPs was comparable with that of the standard drug, acarbose, as shown by their IC₅₀ values of 23.24, and 33.12 µg/mL, respectively. Therefore, *L. hastata* silver nanoparticles could be a potential candidate for the treatment of diabetes.

Keywords: Alpha-amylase, diabetes, GC-FID, *Leptadenia hastata*, nanoparticles, phytochemicals.

BOOK OF ABSTRACTS

BBC-22

Exploration of Molecular Interaction of *Barteria Nigritana* Phytoligands and Extract against Alpha-Amylase

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ABSTRACT

Barteria nigritana, a medicinal plant native to West Africa, has been traditionally used for its therapeutic properties. However, its potential as an α -amylase inhibitor has not been scientifically validated. This research explored molecular interactions of phytoligands from *Barteria nigritana* against α -amylase, which is linked to the pathophysiology of diabetes mellitus. We extracted the pulverized leaves by cold maceration in 1.5 L of ethanol for 72 hours, and then concentrated it in a rotary evaporator. Phytochemical analysis was done using GC-FID to identify bioactive compounds present in the plant. Molecular docking studies were carried out to predict the binding affinity of the GC-FID-identified bioactive compounds with α -amylase. *In vitro* inhibitory potentials of the extract against α -amylase activity helped to validate the molecular docking studies results. *B. nigritana* contained 29 bioactive compounds, predominantly flavonoids, with catechin having the highest amount (29.60 ppm). *B. nigritana* exhibited excellent inhibitory potentials against α -amylase, as the top 3 scoring compounds (baicalin, epigallocatechin, and robinetin) interacted with the key amino acid residues in the active site (ASP 197, GLU 233, and ASP 300) of α -amylase. Furthermore, it demonstrated good inhibitory actions against α -amylase, with a maximal inhibition of 75.197 ± 0.181 recorded at 625 $\mu\text{g/mL}$ and a minimal inhibition of 71.987 ± 0.048 recorded at 104 $\mu\text{g/mL}$. The findings suggest that *B. nigritana* has strong α -amylase inhibitory activity, which is probably because of the phytochemicals. Therefore, it could serve as a substitute solution for managing and treating diabetes and its associated complications.

Keywords: *Barteria nigritana*, phytochemicals, molecular docking and alpha-amylase inhibition.

BOOK OF ABSTRACTS

BBC-23

Mycobacterium Tuberculosis and Rifampicin-Resistant Strains Diagnosis using Genexpert Mtb/Rif Assay and their Co-Infection with HIV/AIDS

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ABSTRACT

The aim of this study is to determine the prevalence of *Mycobacterium tuberculosis* (MTB) and rifampicin-resistant (RIF) strains of MTB in Aguata Zone of Anambra State, Nigeria. This is a retrospective study of five years (2018-2022) of archival records of patients screened for MTB and RIF resistance using GeneXpert MTB/RIF assay. The samples used were 2,549 sputum samples and 30 stool samples (from infants that could not produce sputum) from patients suspected to have pulmonary tuberculosis. The results were analysed using a two-way Analysis of variance (ANOVA). A total of 2,579 samples were analysed and the participants comprised 1,102(42.7%) males and 1,477(57.3%) females. In all, 207(8.03%) were TB positive, while 449(17.4%) were HIV positive. Out of the 1,102 males that participated in this study, 125(11.3%) and 160(14.5%) were positive for MTB and HIV respectively while 82(5.6%) and 289(19.6%) out of the 1,477 females in the study were positive for MTB and HIV respectively. Among the 207 participants with MTB, 31(6.9%) were coinfecting with HIV/AIDS. Highest TB infection was detected among the age group 31-45, 80(38.6%), followed by the age group 16-30, 58(28.0%) while the least infection was recorded among 0-15, 5(2.4%) and 61 & above age groups, 23(11.1%). Likewise, HIV infection was detected more among the age group 30-45. Rifampicin-resistant strains of MTB and Rif -indeterminate were detected in 5(2.4%) of each of the positive cases while 197(95.2%) of the positive cases were susceptible to Rifampicin.

Keywords: *Mycobacterium tuberculosis*, GeneXpert MTB/RIF, Pulmonary tuberculosis, HIV/AIDS and Rifampicin resistance.

BOOK OF ABSTRACTS

BBC-24

Evaluation of Biological-Based Soil Amendments on Soil Erosion

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ABSTRACT

Soil erosion poses a serious threat to the sustainable use of soil for crop production for the continual survival of the human race. Biological-based soil amendments also referred to as organic amendments are being used to stimulate microbial activity which enhances the availability of nutrients in the soil to plants. Also, organic amendments are used for soil conservation purposes, but there is need for comprehensive consideration of their comparative effectiveness on controlling soil losses. The present study is, therefore, an attempt to prepare and determine the efficiency of soya beans chaff, saw dust and debris (Dry Grasses) on runoff and soil erosion control. The sandy-clay loam soil was collected from 18cm below the top soil, the soil was treated with the above listed conservation materials and the experiment was done using the rainfall simulator. The Debris (Dry Grasses) had a reduction rate of 67.94% sediment concentration compared to the control plots, Soya beans chaff (44.44% reduction), and saw dust had 52.20% reduction. The results shows that they all reduced sediment concentration (soil loss) compared to the control (soil without amendment) and the effect is more in treatment with dry grasses. Also, the saw dust had more effects on runoff reduction compared to other treatments, But in summary, the soya beans chaff had simultaneous effect on both runoff and sediment concentration.

Keywords: Sediment concentration, Runoff, Soil preparation and Rainfall simulator.

BOOK OF ABSTRACTS

BBC-25

Therapeutic Potentials of Soursop (*Annona muricata*) Seeds Extract on Benign Prostatic Hyperplasia in Rats

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ABSTRACT

Benign prostatic hyperplasia (BPH) is a non-malignant enlargement of the prostate, which causes urinary voiding difficulties among older men. Orthodox therapies, such as finasteride, used in treatment of BPH are expensive. Therefore there is a need to find a cheaper and safer plant based alternative for the management of BPH. Medicinal plants have been extensively studied for their health promoting properties. *Annona muricata* has garnered attention for its antioxidant and medicinal properties. This study evaluated the therapeutic potential of *A. muricata* in the management of BPH. The qualitative analysis of *A. muricata* seed extract revealed the presence of terpenoids, steroids, flavonoids, saponins and alkaloids in high amounts. GC-FID analysis of phytochemical constituent of *A. muricata* seed extract revealed high concentration of ribalinidine (25.172µg/mL), phytate (19.250 µg/mL) and naringin (17.901µg/mL). Acute toxicity test of the extract showed no death or adverse reaction up to 5000 mg/kg b.w. The *in vitro* antioxidant activity of the extracts of *A. muricata* (seed) was analysed against 2,2-diphenyl-1-picrylhydrazyl (DPPH), FRAP and lipid peroxidase inhibition. The result revealed optimum antioxidant activities against DPPH (33%) at 200 mg/ml extract concentration, FRAP (28.9%) at 600mg/mL and lipid peroxidase (77.2%) at 200mg/mL respectively. There was a significant ($p < 0.05$) increase in PSA level, between the normal control (Group 1) and positive control (Group 2) signifying successful BPH induction. Treatment of BPH-induced rats with *A. muricata* seeds extract significantly ($p < 0.05$) decreased PSA level when compared with control. This result indicates that the extracts have modulatory effects on prostate enlargement (BPH). *In vivo* antioxidant activity was analyzed and Serum GPx was found to be non-significantly ($p > 0.05$) higher compared to group 2. SOD and catalase concentrations were found to be significantly ($p < 0.05$) lower compared to group 2. The haematological parameters, (PCV, RBC, Hb, Platelet and Total WBC), significantly ($p < 0.05$) increased after treatment, when compared to group 2. Histological assessment of the prostate gland showed that *A. muricata* seed extract was able to normalize the prostate the treatment groups compared to group 2. The results suggests that *A. muricata* seed represents a promising alternative for the management of BPH.

BOOK OF ABSTRACTS

BBC-26

Investigation of the Acute Toxicity and *In Vivo* Antidiarrhoeal Activity of The Ethanol Extract and Fractions of *Ipomoea Triloba* by Model Infection and Protection Tests in Mice against Selected Clinical Diarrheogenic Bacterial Isolates

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ABSTRACT

This research work was aimed at investigating the acute toxicity and *in vivo* antidiarrheal activity of the extracts and fractions of *Ipomoea triloba*, a plant used locally for the treatment of acute infectious diarrhoea in South-south Nigeria. Antibiogram of the bacterial-diarrhoeaic isolates carried out by the agar-diffusion technique indicated a predominant resistance by the isolates. Plasmid curing of the bacterial-diarrhoeaic isolates assessment for antidiarrhoeal activity indicated a predominantly plasmid-borne resistance. Combined antidiarrhoeal activity of the ethanol extract and fractions with standard antibiotic (tetracycline) assessed by the activity index profile (AIP) indicated predominantly antagonism and more infrequently additively, synergism or indifferent interactions. Acute toxicity (LD₅₀) of the ethanol extract intraperitoneally assayed in albino mice (15.0-18.0 g body weight) indicated a relative non-toxicity with an estimated value of 946.68 mg/kg body weight. *In vivo* antidiarrhoeal activity and protection efficacy of the ethanol extract assayed by mouse protection test (MPT) infection model offered appreciable (50.0 - 83.3 %) protection to the bacterial-diarrhoeaic isolates challenged mice, compared with the relatively moderate (33.3 - 50.0 %) protection by the control. Conclusively, having established the safety profile of the plant extract thus further studies can be carried out to obtain the active principles responsible for such property and it can be introduced into the treatment regimen as a plausible remedy against acute hypersecretory infectious diarrhoea.

BOOK OF ABSTRACTS

BBC-27

Biocidal Properties, Phytochemistry, Physicochemical Characteristics, and Microbial Properties of Fermented African Locust Bean (*Parkia biglobosa*) Effluent

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ABSTRACT

The wastewater generated during the local production of "Iru" condiment from African Locust Bean (*Parkia biglobosa*) was employed to evaluate its biocidal impact on selected insects, including cowpea weevil, rice weevil, hide beetle, and cockroach. The study encompassed an assessment of the bioactive compounds, phytochemical, physicochemical, and microbial properties of the fermented locust bean effluents. The bioactive compounds in the African locust bean effluent using Gas chromatography - mass spectrometry (GC-MS) were catechin, naringenin, dihydrocytisine, flavonones, cardiac glycoside, phytate, sapogenin and others. Phytochemical analysis revealed the presence of alkaloids, flavonoids, glycosides, and tannins in the effluent. Physicochemical parameters exhibited variations between the control effluent and the fermented African locust bean effluent from the laboratory. Notable differences included total hardness (198.71 – 139.10 mg/l), total dissolved solids (1100 – 1500 mg/l), total solids (280 – 360 mg/l), total alkalinity (7.50 – 6.00 mg/l), and total acidity (as CaCO₃) (8.80 – 4.64 mg/l). Mineral compositions also revealed distinct differences, with the control effluent exhibiting higher levels of potassium (112.57 mg/l), magnesium (18.01 mg/l), and phosphate (70.37 mg/l), while the test effluent showed elevated levels in chloride (1561.8 mg/l), iron (5.91 mg/l), and sulphate (5.109 mg/l). Microbial analysis identified bacterial profiles such as *Bacillus cereus*, *Bacillus subtilis*, *Proteus mirabilis*, *Escherichia coli*, and *Staphylococcus aureus*, with *Bacillus subtilis* being the most prevalent. Fungal isolates included *Fusarium sp.*, *Saccharomyces cerevisiae*, *Aspergillus fumigatus*, *Aspergillus niger*, and *Penicillium sp.* Evaluation of the fermented African locust bean effluent's impact on insect mortality demonstrated significant biopesticidal potential against cowpea weevil, rice weevil, and hide beetle. The effluent exhibited the highest mortality rates of 10 and 9 after 10 minutes for cowpea and rice weevil, respectively, and the lowest mortality of 7 after 20 minutes. The study suggests that further research could establish fermented African locust bean effluent as a cost-effective, less hazardous, and readily available biopesticide for preserving cowpea and rice produce.

Keywords: Bioactive compound, Biocidal Effect, Effluent, Microbial, *Parkia biglobosa*

BOOK OF ABSTRACTS

BBC-28

Nutritional Profile of *Carpolobia alba* Sourced from Nsukka Local Government Area

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ABSTRACT

Several plants native to West Africa, have long been utilized traditionally for their nutritional and medicinal characteristics. The objective of this study was to analyze the proximate composition, vitamin and mineral concentration of *Carpolobia alba* in order to evaluate its nutritional value and potential health advantages. The plant was gotten from Nsukka, Enugu state, Nigeria and identified by a botanist. It was cleaned, dried, ground and stored for analysis. Wet digestion and Soxhlet extraction methods were employed to study the amount of vitamins. The standard AOAC method was used to identify the concentration of minerals as well as some proximate like ash content. Standard methods were used to identify the concentration of anti-nutrients present. The leaves were found to have significant amounts of vitamins such as vitamin A (1607 IU), vitamin C (53.96 mg/100g) and vitamin E (6.14 mg/100g) as well as a high carbohydrate concentration (43.48 %). Protein (19.68%), fats (0.15%), fibre (17.46%), ash (11.54%) and moisture (7.69%) was also revealed in the leaves. However anti-nutrient like phytates (48.91 mg/100 g) and oxalates (80.88 mg/100 g) were also found present in the leaves. Mineral composition found in the leaves include: calcium (2366 mg/100g), iron (1.65 mg/100g), phosphorus (34.12 mg/100g), potassium (655.82 mg/100g) and zinc (4.58 mg/100g). An examination of *Carpolobia alba* can furnish us with requisite knowledge for formulating dietary recommendations and interventions to address malnutrition and deficits in essential nutrients, especially among vulnerable populations such as children, pregnant women, and the elderly.

Keywords: Nutritional profile, mineral, vitamins, proximate

BOOK OF ABSTRACTS

BBC-29

Antimicrobial Potential of *Littorina littorea* Shell Chitosan and its Metallic Nanocomposites

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ABSTRACT

The emergence of nanotechnology has gained significant attention and increasing research on nano-size materials which led to its application(s) in the fields of medicine and agriculture among others. Chitosan (CS) is a cationic polysaccharide obtained from the deacetylation of chitin. Chitin was obtained from the shells of littorea shells and deacetylated to chitosan. Chitosan was used with silver (Ag), copper (Cu), magnetic (Fe), and zinc (Zn) nanoparticles (NP) for the synthesis of nano-composites for evaluation of their antimicrobial properties. Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and X-ray diffraction (XRD) were carried out. Interestingly, the susceptibility test showed that ZnONP/CS was the most potent antimicrobial agent against *P. fluorescens*, *P. aeruginosa*, *S. aureus*, *B.subtilis*, and *E.coli*. Hence the study showed that chitosan-metal nanoparticles improved antimicrobial properties. Therefore, chitosan from *Littorina littorea* waste material proved cost-effective and a good source of nanomaterials for biomedical applications.

Keywords: Chitosan, nanoparticles, characterization, antimicrobial

BOOK OF ABSTRACTS

BBC-30

Antimicrobial Activity, Phytochemistry and Acute Toxicity Profile of *Kigelia africana*

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ABSTRACT

Kigelia africana (Lam.) Beneth belongs to the family Bignoniaceae. It is widespread across Africa and is used in the treatment of various ailments and infections. The present study was aimed at investigating the antimicrobial activity of the stem bark of the plant. Clinical isolates of *Proteus mirabilis*, *Candida albicans*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Salmonella typhimurium* were used in the study. Agar well diffusion technique and broth dilution method were used to determine the antimicrobial properties and minimum inhibitory concentrations (MIC). The results obtained revealed that the ethanol extract significantly ($P < 0.05$) exhibited more antimicrobial activity than the aqueous extract. Fractionation of the ethanol extract was carried out with chloroform, ethyl-acetate, acetone, and methanol to obtain corresponding fractions. Antimicrobial activity testing of the fractions showed that the ethyl-acetate fraction exhibited the highest antimicrobial effect. Phytochemical analysis of the crude extracts and the various fractions revealed the varied content of alkaloids, saponins, essential oils, tannins, glycosides and flavonoids, which are reported to be mainly responsible for the recorded antimicrobial effect. Acute toxicity studies performed on the ethanol extract using albino rats suggested that the extract is non-toxic ($LD_{50} > 5000$ mg/kg body weight). The results authenticate the folklore claim of medicinal properties of the plant.

Keywords: antimicrobial, phytochemistry, acute toxicity, extracts

BOOK OF ABSTRACTS

BBC-31

Impact of Three Endophytic and Two Rhizospheric Fungi Isolated from *Vigna unguiculata* subsp. *sesquipedalis* on Early Seedling Growth of *Zea mays*.

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ABSTRACT

The conventional use of chemical fertilizer for improved agricultural productivity is fast becoming hazardous to the environment, hence, the need for biofertilizer as alternative. This study was conducted to evaluate the growth promoting potential of three endophytic and two rhizospheric fungi isolated from *V. Unguiculate* subsp. *sesquipedalis*, on early seedling growth of *Zea mays*. The endophytic fungi were isolated from surface sterilized leaf, stem and root of *V. unguiculata*, while rhizospheric fungi were isolated from soil tightly adhering to the root. The isolates were identified as *Aspergillus flavus* KKU-AF48, *Fusarium oxysporum*, *Vishniacozyma tephrensensis* (leaf, stem and root isolates respectively). The two isolates obtained from the rhizosphere were identified as *Trichoderma koningiopsis* and *Aspergillus flavus* CH-01. The growth parameters of *Zea mays* checked include: length of shoot and root, total leaf area, number of leaves and roots, fresh and dry weight of the plant and chlorophyll contents. Soil nitrogen content, organic matter (OM), electric conductivities (EC), and pH of the soil were carried out also. The result showed that seeds inoculated with the fungal strain gave significantly higher shoot lengths, root length, number of roots and Chlorophyll contents than the un-inoculated (control). The highest shoot length (16.49 ± 0.54 cm) was obtained with *Aspergillus flavus* CH-01. The highest root length of 36.87 ± 1.77 cm was obtained from *Vishniacozyma tephrensensis*. The highest nitrogen content of the soil was observed in seeds inoculated with *Aspergillus flavus* CH-01 (218.57 ± 9.37 ppm). This study suggests that endophytic and rhizospheric fungi could be used as bio-fertilizer for promoting growth of *Zea mays* and improving agricultural soil fertility.

Keywords: Bio-fertilizer, endophytic fungi, Rhizospheric fungi, Growth promoting, *Zea mays*.

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BBC-32

The Effect of Different Drying Methods on the Chemical Composition of Uchakiri (*Vitex doniana*) and Akokoro (*Ficus capensis*)

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ABSTRACT

This study investigated the effects of drying methods (sun-drying and shade-drying) on the proximate composition, vitamin content and mineral composition levels in the leaves of *Vitex Doniana* and *Ficus Capensis*. Fresh leaves were subjected to sun-drying and shade-drying processes, and the compositional changes were analysed. Data from the analysis was calculated from mean and standard deviation using Statistical Package for Social Science (SPSS) version 21. Analysis of variance (ANOVA) was used to determine significant differences of acceptance at $p < 0.05$ and Duncan's New Multiple Range Test (DNMRT) was used to compare the means. The results revealed that drying, particularly shade-drying, significantly altered the nutritional vitamin content and mineral composition of the leaves. Proximate analysis revealed moisture content of 5.75% and 5.80% in fresh and shade-dried *Vitex doniana*, respectively, compared to 1.90% in sun-dried samples. Crude fiber ranged from 2.49% (fresh) to 32.00% (shade-dried), while carbohydrates were highest at 82.62% (fresh) and lowest at 67.54% (sun-dried). In *Ficus capensis*, moisture was 2.85% (fresh) and 2.90% (shade-dried) versus 2.40% (sun-dried). Crude fiber peaked at 34.85% (shade-dried), and carbohydrates were highest at 82.94% (fresh) and lowest at 51.38% (shade-dried). Vitamin A levels reached 1867.70 μ g/100g (shade-dried) and 1817.15 μ g/100g (sun-dried) in *Vitex doniana*, compared to 99.03 μ g/100g (fresh). In *Ficus capensis*, vitamin A was 1551.50 μ g/100g (shade-dried), 1332.10 μ g/100g (fresh), and 251.75 μ g/100g (sun-dried). Mineral analysis revealed iron at 119.90 mg/kg (shade-dried *Vitex doniana*) and 131.40 mg/kg (sun-dried *Ficus capensis*). Calcium peaked at 2716.10 mg/kg (shade-dried *Vitex doniana*) and 2978.60 mg/kg (sun-dried *Ficus capensis*).

Keywords: Drying methods, sun-drying, shade-drying, proximate composition, vitamins, minerals, *Vitex Doniana* and *Ficus Capensis*

BOOK OF ABSTRACTS

BBC-33

Effect of pH on the Activity of Glucoamylase Obtained from *Aspergillus Niger* in a Submerged Fermentation Process using Guinea Corn Starch as Carbon Source

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ABSTRACT

Amylase enzymes play a crucial role in starch processing industries as they break down polysaccharides to simple sugars. Amylases are produced by microbial organisms for industrial use. The use of microorganisms especially fungal species, and the employment of low cost substrates such as agricultural products for the enzyme production serves as an economical means for obtaining the enzymes. Glucoamylase (C3009H4570N782O1012S13) is an exoenzyme that removes glucose units sequentially from the nonreducing ends of starch and oligosaccharides. Glucoamylase also cleaves the α -1, 6- and α -1, 3-bonds, although at a slower rate. Glucoamylase is used in the processed-food industry, fermentation technology, textile, and paper industries. In the experimental study, *Aspergillus niger* was isolated and sub-cultured for the production of glucoamylase using submerged fermentation process. An eleven-day experimental study was carried out to determine the day of peak glucoamylase activity and for protein production. Glucoamylase activity was assayed using Bernfeld's or 3, 5-dinitrosalicylic acid (DNSA) method, while protein was determined using the Lowry's method. Peak glucoamylase activity was obtained on the 6th day of the submerged fermentation using guinea corn starch as a carbon source. The crude glucoamylase harvested on day six had an enzyme activity of 208.5459 $\mu\text{mol}/\text{min}$ with a total protein estimation of 1.8188 mg/ml, and a specific activity of 114.6613 U/mg. The crude enzyme was subjected to ammonium sulphate precipitation using 70% ammonium sulphate saturation to precipitate protein with the highest glucoamylase activity and gel filtration chromatography was then used to further purify the precipitate obtained from the ammonium sulphate precipitation, which gave activities of 125.82 $\mu\text{mol}/\text{min}$ and 83.09038 $\mu\text{mol}/\text{min}$ respectively. The optimum pH for glucoamylase activity was 5.0. The high glucoamylase activity and optimum pH present this enzyme as potential alternative for industrial application.

Keywords: *Aspergillus niger*, submerged fermentation, glucoamylase; pH, specific activity

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BBC-34

Valorization of Corn Chaff Waste into Bioethanol

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ABSTRACT

Lignocellulosic waste, such as corn chaff, can be valorized into bioethanol. This has the dual advantages of simultaneously producing valuable products and bioremediation of the waste substrate. This work evaluated the potentials of maximizing ethanol production from corn chaff waste, using *Pichia kudriavzevii* LC671435, by exploring various pretreatment methods. Highest ethanol concentrations of 16.38 ± 0.517 and $15.87 \pm 0.001\%$ were produced at 72 and 96 h from substrates pretreated with 5 and 2% dilute acid (H_2SO_4), respectively. On the other hand, highest ethanol concentrations of 15.22 ± 0.007 and $13.41 \pm 0.340\%$ were generated from the 2 and 5% alkaline-pretreated substrates, respectively, at 96 h of fermentation. While the untreated corn chaff and glucose controls gave highest ethanol concentrations of 10.64 ± 0.018 and $7.48 \pm 0.333\%$ at 120 and 144 h of fermentation, respectively. The pH of almost all the set-ups decreased from the initial 7.0 ± 00 with increasing ethanol production. Furthermore, *P. kudriavzevii* grew steadily after an initial lag phase in all the set-ups until 120 h of fermentation, except for the glucose control which kept growing by 144 h. This study therefore shows the prospects of generating and maximizing bioethanol production from corn chaff waste through pretreatment of the substrate.

Keywords: Bioethanol, Fermentation, Lignocellulose, Corn chaff, Valorization, Yeast.

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BBC-35

***In Silico* Drug-Likeness/ADME-T Studies and Molecular Docking of Compounds from *Tephrosia bracteolata* Leaves against Some Targets of Diabetic Complications**

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ABSTRACT

Diabetes mellitus, a chronic metabolic disorder, often leads to severe complications such as neuropathy, nephropathy and retinopathy, primarily due to hyperglycemia-induced oxidative stress and inflammation. Identifying and targeting the molecular mechanisms underlying these complications is crucial for developing effective therapeutic strategies. This study focused on molecular docking and drug-likeness/ADME-T tests of some compounds identified through GC-MS analysis of *Tephrosia bracteolata* leaves. These compounds were then subjected to docking simulations with key target proteins associated with diabetic complications. The targets considered include Angiotensin Converting Enzyme (ACE), Dipeptidyl Peptidase IV (DPP-IV), Sodium-Glucose Co-transporter-2 (SGLT-2), Aldose reductase (AR) and Alpha-amylase (α -amylase). 3D Structures of target proteins were obtained from protein databank (www.rcsb.org) with PDB ID: 1O86, 3WQH, 7VSI, 3S3G and 1B2Y respectively. The ligands' SDF (structure-data file) structures, namely Myo-Inositol, 2-methoxy-4-vinyl phenol, 1-D-thioglucitol and 4-Piperidinone, were retrieved from the PubChem database. Site-specific auto-docking was performed and the binding affinities (expressed in Kcal/mol) were determined using Autodock Vina from PyRX. The 2D diagrams of the molecular interactions between the targets and ligands were visualized using discovery studio 2024. Furthermore, the ligands underwent Drug-likeness and ADME-T analyses using the SwissADME and ProTox Tools. The docking results revealed that methoxy-4-vinyl phenol exhibited strong binding affinities towards ACE, DPP-IV, SGLT-2 and AR while Myo-Inositol exhibited strong binding affinity towards α -amylase. ADME-T analysis revealed that the compounds possess favorable ADMET profiles indicating good oral bioavailability, metabolic stability and low toxicity. Furthermore, drug-likeness evaluation using Lipinski's rule of five and other criteria suggested that these compounds have promising drug-like properties. The findings of this study emphasize the therapeutic potentials of these compounds in the management of diabetic complications, making them suitable candidates for further drug development processes.

Keywords: Drug-Likeness, ADME-T Studies, Molecular Docking, Myo-Inositol, 2-methoxy-4-vinyl phenol, DPP-IV, SGLT-2

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BBC-36

Drivers for Herbal and Conventional Drug Consumption in Western Nigeria

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ABSTRACT

Given the tremendous increase in the consumption of herbal remedies and substances across the Nigerian western region and the prevalent reliance of the majority of the populace on it for primary healthcare, justification for its use remains rather controversial. Critics of these traditional remedies claim that the product lacks credibility in terms of its mode of preparation, adequacy in prescription, adverse reaction, universal acceptability, accessibility, and full disclosure. Despite these criticisms, herbal remedies significantly compete with conventional drugs both locally and across international spheres. Amidst the denigration and seeming endorsement of conventional medicines as a modernization of the shortfall of herbal remedies, there is still increased production and consumption of these remedies within Western Nigeria. Major motivations for this practice remain under-researched and unclear. Therefore, this study set out to examine the role of recommendation, packaging, price, and medicinal efficacy on consumers' purchase decisions of herbal and conventional medicines in Western Nigeria. The study adopted the descriptive research design, specifically, the survey method. A sample size of 348 was determined using Freund and William's formula for determining sample size from an infinite population, and respondents were selected using the purposive sampling technique. The multiple regression statistical tool was used to test the hypotheses. The results show that recommendation and packaging did not significantly influence consumption of either herbal or conventional medicines; however, price and medicinal efficacy show a significant effect. The study therefore recommends that drug manufacturing companies adopt pricing strategies that are commensurate to the consumer profile and that herbal drug manufacturers should enhance the medicinal efficacy of their product with full disclosure as a way of building credibility among consumers.

Keywords: Herbal substances, Medicinal efficacy, Motives, Conventional medicines, Drugs

BOOK OF ABSTRACTS

BBC-37

Antibiotics Resistance Genes in Evolved Opportunistic Pathogens in the Gut of Gastroenteritis Patients in Nasarawa State, Nigeria

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ABSTRACT

Background: Opportunistic pathogens are found in microbiome of humans with most of them having evolved from normal flora to virulent and pathogenic organisms. In the gut microbiome, several bacteria have evolved to become pathogenic and cause infections at the slightest opportunity. Most of these bacteria have developed antibiotics resistance. Our study highlights the resistance profile of these pathogens.

Method: gDNA was extracted from eight faecal samples collected from gastroenteritis patients and sequenced with Illumina Novaseq 6000 platform. Bacteria were identified after binning into metagenome-assembled genomes (MAGs). Antibiotics resistance genes were determined from sequenced data using the Comprehensive Antibiotics Resistance Database (CARD).

Results: Opportunistic bacteria diversity in the eight samples sequenced were *P. mirabilis*, *S. maltophilia*, *E. cloacae*, *A. pittii* and *M. morgani*. The antibiotics resistance gene distribution in these MAGs were *aph(3)llc*, *aph(6)Smalt*, *blaDHA-18*, *blaL1*, *tet(J)*, *catA4*, *blaCMH-3*, *blaOXA-273*, *blaADC-132*, *abeS*, *abaQ*, *adeF*, *dfrA*, *fosA*, *oqxA10*, *oqxB9* and *blaMOR-2*. These genes were responsible for aminoglycosides, cephalosporins, chloramphenicol, tetracyclines, fluoroquinolones, macrolides, carbapenems, trimethoprim, Fosfomycin etc.

Conclusion: These opportunistic bacteria in the gut could act as reservoirs for antibiotic resistance genes in addition to being difficult to treat if they move to a site where they can cause infections. It is important to closely study the evolution of these opportunistic pathogens to help inform the choice of therapeutics.

Keywords: opportunistic pathogen, evolution, antibiotics resistance, genes, virulence

BOOK OF ABSTRACTS

BBC-38

Benzhexol Hydrochloride – Induced Changes in Haematological Parameters of Albino Rats

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ABSTRACT

Benzhexol is a drug used to reduce tremors, muscle stiffness and other disorders associated with Parkinson's disease. Thirty-two male albino rats (10 - 12 weeks old) average weight 165.0 ± 4.25 g were randomized into groups (A-D). Group-A served as control, while animals in groups B, C, and D received Benzhexol at 10, 20, and 30 mg/kg body weight respectively for 14 days and thereafter the drug was withdrawn for 7-day recovery. Haematological parameters were analyzed using standard procedures. The packed cell volume was not affected but haemoglobin (Hb) decreased compared to the control on day-14 in the three doses of drug used. Hb returned to similar level as the control following 7-day withdrawal. Red blood cell count decreased on day-14 at all three drug doses compared to the control. The decrease was only significant at the 20 and 30 mg/kg of the drug. White blood cell counts in contrast increased on day-14 significantly compared to the control at all three drug dosage. Neutrophil count significantly increased significantly on day-14 of exposure to 10, 20 and 30 mg/kg benzhexol. Lymphocytes count decreased significantly compared to the control on day-14. Both neutrophil and lymphocytes returned to normalcy following 7-day withdrawal from the drug. Monocytes and basophil were unaffected by the drug while eosinophil was not detected. Mean corpuscular volume mean haemoglobin concentration and mean corpuscular haemoglobin concentration were unaffected by the drug at the concentrations used.

Keywords: Drug, rat, blood cells, toxicity

BOOK OF ABSTRACTS

BBC-39

Phytochemical Screening and Oral Toxicity Study of Ethanol Fraction of *Terminalia ivorensis* Roots in Albino Rats.

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ABSTRACT

Terminalia ivorensis is a species of tree that belongs to the family of Combretaceae and is referred to as Black Afara in English, Framire in French, *Terminalia* in Spanish, Awushin in Igbo, Afara Dudu in Yoruba, and Baushe in Hausa. It is a massive deciduous forest tree that grows to a height of 15 to 46 meters worldwide and is found in tropical and subtropical countries. The root systems of *Terminalia* trees are frequently fairly shallow. As the trees age, the tap roots disappear. This study investigated the phytochemical screening, acute and sub-acute toxicity of ethanol fraction of *Terminalia ivorensis* roots in albino rats. The result of the phytochemical compositions of ethanol fraction of *Terminalia ivorensis* roots shows varying quantities of flavonoids, tannins, and phenols which were found to be present in high concentration. However, the acute test, the limit test dose of 5000 mg/kg was administered to Wistar rats and then observed for 24h. Sub-acute toxicity was observed after administering daily oral doses of 250; 500 and 1000 mg/kg body weight for 28 days. Adverse effects and mortality were observed throughout the experimental period. Body weight, organ weight, hematological and biochemical assessments were evaluated. The result shows that the ethanol root fraction of *Terminalia ivorensis* was not toxic and no death was recorded throughout the study. Sub-acute toxicity study showed no observable changes in the organ weight ratios based on the various doses of ethanol root fraction of *Terminalia ivorensis* when compared to normal control. Throughout the sub-acute toxicity study, no death or toxic effects were detected in experimental animals for 28 days. However, hematological and biochemical parameters did not show any treatment-related abnormalities. The ethanol root fraction of *T. ivorensis* could not cause any mortality and signs of toxicity, it would be well tolerated.

Keywords: Phytochemical screening, Acute, Sub-acute toxicity and Biochemical parameters.

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Chemical Characterization, *In Vivo* Antioxidant, Anti-inflammatory and Anti-apoptotic Properties of *Peperomia pellucida* in Modulating Vascular Tone in Swiss Mice Exposed to Aluminium Chloride

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ABSTRACT

Regulation of balance between vasoconstriction and vasodilation has become a therapeutic target to vascular complications. However, Aluminium chloride, a naturally abundant environmental toxicant has been reported to disrupt this balance via increased oxidative stress and inflammation in several studies. Whether *Peperomia pellucida*, a popular medicinal plant known for its pharmacological benefits can modulate vascular tone in mice exposed to aluminium chloride is yet to be unravelled. This study investigated the effect of *Peperomia pellucida* ethanol leaf extract on aluminium chloride induced vascular dysfunction in male Swiss mice. Phytochemical profiling of *Peperomia pellucida* was done using GC-MS and vascular effect of *Peperomia pellucida* was investigated by administering 50 mg and 100 mg of the extract alongside aluminium chloride orally for 14 days. Aorta was harvested for biochemical (SOD, CAT, GSH, MDA, nitrites), ELISA (endothelin-1, TNF- α and IL-6) assays as well as immunohistochemical studies (occludin and caspase-3). GC-MS profiling showed 8 phytocompounds with 3,5-Dimethoxybenzamide as the highest peak area. Antioxidant armouries such as SOD catalase, glutathione as well as vascular occludin expression was significantly enhanced by *Peperomia pellucida* (50 mg/kg and 100 mg/kg) against aluminium chloride perturbations while suppressing TNF- α , IL-6, ET-1 activities and caspase-3 expression against increase caused by aluminium chloride intoxication. Our result showed that *Peperomia pellucida* leaf extract modulated vascular tone via antioxidant, anti-inflammatory and ant-apoptotic properties which was mediated by its phytocompounds

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Developing a Micropropagation Strategy for the Conservation of African Bush Apple

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ABSTRACT

The African bush apple [*Heinsia crinita* (Afzel.) G. Taylor], locally known as “atama”, is an endangered orphan crop with substantial nutritional and medicinal value to many African communities particularly in southern Nigeria. We sought to develop alternative strategies for the conservation of *H. crinita*'s germplasm *in vitro* and also provide a pathway for its genetic breeding via biotechnological intervention. Accordingly, we developed an *in vitro* system for the direct induction of multiple shoots from stem and hypocotyledonary explants of the crop using combinations of two cytokinins (N6-benzyladenine – BA, thidiazuron – TDZ) and the auxin, naphthalene acetic acid (NAA) in Murashige and Skoog (MS) medium. For BA/NAA combinations, BA was tested at 0, 0.5, 1.0, 1.5, 2.0 mg/L concentrations while NAA was tested at 0, 0.1, 0.2, 0.5, 1.0 mg/L concentrations. Regarding TDZ/NAA combinations, TDZ was tested at 0, 0.02, 0.04, 0.11, 0.22 mg/L concentrations while NAA was tested at 0, 0.002, 0.004, 0.010, 0.020 mg/L concentrations. We achieved 100% seed surface sterilization with 10 mins shaking of *H. crinita* seeds in 1% sodium hypochlorite solution containing 5% active chlorine. Generally, BA/NAA combinations induced more shoots per explant compared to TDZ/NAA combinations and the highest number of shoots per explant (13.7 shoots/hypocotyl and 30.3 shoots/stem) was achieved at 1.0 mg/L BA + 0.1 mg/L NAA treatment combination. *In vitro*-regenerated shoots were 100% successfully rooted on half-strength hormone-free MS medium and acclimatized to generate *H. crinita* plantlets with over 90.0% efficiency. To the best of our knowledge, this study provides the first basic information on the *in vitro* induction of multiple shoots as well as complete plant regeneration from explants of *H. crinita*.

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BBC-42

***In-vitro* Antioxidant and Anti-diabetic Potential of Ethyl Acetate Fraction of
Anacardium occidentale Leaves**

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ABSTRACT

Reactive oxygen species (ROS) have been linked to various illnesses including diabetes, heart disease, and cancer. The use of medicinal plants has proved effective in combating ROS and its associated complications. This study was carried out to investigate the *in-vitro* antioxidant and anti-diabetic potential of the ethyl acetate fraction of *Anacardium occidentale* leaves. This was done by investigating the qualitative and quantitative phytochemicals and mineral content of ethyl acetate fraction using standard procedures. The antioxidant properties of ethyl acetate fraction were determined by assaying 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging activity, Nitric oxide scavenging activity (NOSA), and 2,2-azinobis (3-ethylenzothiazoline-6-sulfonic acid) (ABTS) scavenging activities. The anti-diabetic properties were also determined by assaying for the activities of alpha-amylase and alpha-glucosidase. The result of the phytochemical screening of the ethyl acetate fraction of *Anacardium occidentale* leaves indicated a high concentration of flavonoids which was found to be 37.60 mg/ml, followed by alkaloids (29.71 mg/ml), steroids (28.42 mg/ml), tannins (24.51 mg/ml), glycosides (17.42 mg/ml), total phenol (14.80 mg/ml), saponins (13.93 mg/ml), with the least concentration found in terpenoids (10.31 mg/ml). GC-FID analysis also revealed the presence of phytochemicals such as; catechin, anthocyanin, kaempferol, spartein, sapogenin, naringenin flavones, and flavonones. The mineral bicarbonate was found to be present in the highest concentration, followed by chloride, sodium, potassium, iron, zinc, and copper, with selenium having the minimum concentration. In addition, the ethyl acetate fraction of *Anacardium occidentale* leaves exhibited good scavenging activity and also demonstrated anti-diabetic properties by inhibiting the activity of alpha-amylase whose activity is usually implicated in diabetic conditions. However, its ability to inhibit alpha-glucosidase was not established in this study under the studied concentrations. It could be inferred from this study that *Anacardium occidentale* leaves possess antioxidant and anti-diabetic properties. These activities could be based on the vase phytochemicals inherent in the ethyl acetate fraction of *Anacardium occidentale*.

Keywords: diabetes, phytochemicals, *in vitro*, GC-FID, fraction

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Antimicrobial Peptides: A Novel Approach to Combat Antibiotics Resistance

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ABSTRACT

Innovative techniques to tackle antibiotic-resistant bacteria have been motivated by the ongoing threat that resistant bacteria species provide to global health. Antibiotics have been widely employed to fight bacterial infections through several techniques such as inhibition of cell walls, protein and nucleic acid synthesis, and destruction of cell membranes. However, incorrect and inadequate use of these antibiotics plays a major role in the development of antibiotic resistance. Antimicrobial peptides (AMPs), also called cationic host defense peptides, have become recognized as an innovative and promising strategy for combating bacteria that are resistant to antibiotics. These tiny, naturally occurring peptides are found in a variety of species, including humans, and they have a wide range of antimicrobial properties that can kill a variety of bacteria, fungi, and even viruses and are part of the innate immune system. Antimicrobial peptides differ from traditional antibiotics in several aspects, including their multimodal method of action, which includes interference with intracellular functioning, destruction of microbial membranes, and immune-modulatory actions. They also have a great capacity for adaptation, specificity, and evolution alongside microbial resistance mechanisms, which reduces their susceptibility to the emergence of resistance. These peptides have successfully combated drug-resistant bacterial strains including Methicillin-resistant *Staphylococcus aureus* (MRSA) and multidrug-resistant *Pseudomonas aeruginosa*. The study, therefore, aims to review the potential of antimicrobial peptides as an alternative to overcome the growing threat of antibiotic resistance. Despite the promise of AMPs as new antibiotics, there are still challenges in developing them for therapeutic use. Manufacturing, toxicity, and stability of AMPs are all concerns that need to be addressed. However, advanced strategies like protein engineering to modify AMPs, chimeric AMPs, and the use of nanoparticles as delivery systems offer promising solutions to overcome these hurdles. Antimicrobial peptides offer a convincing solution to the growing problem of antibiotic resistance. They are an important addition to the antibacterial arsenal due to their distinct modes of action and flexibility, thus, providing hope for combating antibiotic-resistant bacteria and improving public health worldwide.

Keywords: Antimicrobial peptides, antibiotics resistance, susceptibility, nano particles, protein engineering.

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BBC-44

Properties and Application of *Pichia kudriavzevii* HBUAS72401 Cellulase in Hydrolysis of Organic Acid-Pretreated Rice Husk.

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ABSTRACT

Efforts toward converting waste to wealth have currently become a global concern owing to the growing population that have resulted in increased waste generation. This study is aimed at production, characterization and application of cellulase from *Pichia kudriavzevii* HBUAS72401 the saccharification of organic acid pretreated rice husks. *Pichia kudriavzevii* strain HBUAS72401 isolated from rice husk was optimized for cellulase production using submerged fermentation process. The enzyme underwent a two-fold purification steps using ammonium sulphate precipitation and gel chromatography with specific activities of 10.52 U/mg and 22.05 U/mg respectively. The partially purified cellulase had a molecular weight of 63 kDa, and optimum pH of 5.5 and temperature of 60°C. Its Michellis Menten constant (K_m) was 0.067 mg/ml and V_{max} of 3,333.3U. Potassium (K^+) and zinc ion (Zn^{2+}) displayed maximum activating and inhibitory effects, respectively on *Pichia kudriavzevii* HBUAS72401 cellulase when compared to the rest of the metal ions (Co^{2+} , Mn^{2+} , Na^+ , Mg^{2+} , Fe^{2+} , Cu^{2+}) investigated. The crude cellulase was used to hydrolyze rice husk pre-treated with organic acids (succinic, tartaric, and citric acid) for 30, 60, 90, and 120 minutes over three days. After 24 hr of enzyme hydrolysis, succinic acid pre-treated rice husk for 90 minutes yielded the highest concentration of reducing sugar (27 mg/dL) and tartaric acid pre-treatment for 30 minutes had the least yield (13 mg/dL). The partially purified cellulase was also used for hydrolysis under the same conditions, with citric acid pre-treated rice husk for 90 minutes showing the highest concentration of reducing sugar (18 mg/dL) after 3 days of hydrolysis whereas rice husk pretreated with citric acid for 30 minutes gave the least yield (3 mg/dL) after 24 hr of enzyme hydrolysis. The results of this study have shown that cellulase obtained from *Pichia kudriavzevii* HBUAS72401 has the potentials for industrial application in bioethanol production from lignocellulosic biomass.

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BBC-45

Effects of *Telfairia occidentalis* Seed-Based Ketogenic Diet on Testosterone Propionate-Induced Benign Prostatic Hyperplasia in Wistar Rats

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ABSTRACT

Benign prostatic hyperplasia (BPH) is a disease that commonly affects most men as they age. In order to surmount this growing challenge, many approaches including diet has been proposed for the treatment of the disorder. This research is aimed at evaluating the effect of *Telfairia occidentalis* seed derived ketogenic diet (KD) on testosterone induced benign prostate hyperplasia in rats. Thirty five (35) rats grouped into seven of five rats each were used for the study. Rats in Group 1 and 4 were used as control, while the rats in Groups 2, 3, 5, 6, and 7 were treated with 5 mg/kg b. w. of testosterone propionate (TP) for 28 days to induce BPH. At the end of 28 days, rats in Groups 1 and 2 were fed with standard rat chow and water *ad libitum*, those in Group 3 was treated with dutasteride (0.1 mg/kg b.w.) and standard rat chow, the rats in Group 4 were treated with KD diet only, Group 6 rats were treated with Only KD, while those in Group 7 received both KD and dutasteride (0.1 mg/kg b.w.) for 21 days. After 21 days, blood samples were collected for serum biochemical analysis (Prostatic serum antigen (PSA), β -hydrobutyrate and lipid profile) using appropriate methods. Preliminary results of the proximate content of both the ketogenic diet and standard rat chow showed that the ketogenic diet had a significantly ($p < 0.05$) higher lipid ($36.02 \pm 0.21 \text{ mg/g}$), and ash content ($20.03 \pm 0.30 \text{ mg/g}$) while the standard rat chow had higher carbohydrate, protein and moisture contents. The ketogenic diet had a significantly ($p < 0.05$) higher lipid and crude fat content and metabolic energy level (480.39 Cal/kg) compared to the normal rat chow (361.77 Cal/kg). The ketogenic diet fed groups had significantly ($p < 0.05$) higher levels of serum β -hydrobutyrate compared with the groups fed on normal rat chow. At the introduction of the ketogenic diet, rats fed on KD had a significant weight loss compared with those feed with standard feed. The prostate specific antigen (PSA) levels of the rats showed that among the BPH groups, the Group treated with combined KD and dutasteride had a significantly reduced PSA level (3.29 ng/mol) compared with those treated with dutasteride only (3.47 ng/mol). The study showed that rats fed with ketogenic diet had an increase in serum lipid profile parameters (TG, LDL, HDL, VLDL, and TAG) compared with those fed with the standard rat chow. However, there was remarkable reduction in serum LDL-HDL ratio of the rats fed with KD compared with those fed on standard rat chow. This study showed a promising potential in the use of ketogenic diet in the management of BPH, however, while further studies is still require to fully understand the impact of KD on body metabolism, it is important to note that KD intake should be properly monitored by trained health professionals to avoid deleterious effect as a result of long term unmonitored KD intake.

Keywords: Benign prostatic hyperplasia, *Telfairia occidentalis*, ketogenic diet.

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BBC-46

Evaluation of Microbial Load of Reusable Menstrual Pads and the Associated Risks of Infection

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ABSTRACT

Menstruation is a natural and healthy part of life for women and girls worldwide, with approximately 1.8 billion women globally experiencing it monthly. This study aimed to evaluate the microbial composition and infection risks associated with reusable menstrual pads (RMPs). A total of 26 samples were collected from RMP users. The participants used the pads, and the researchers retrieved them. The participants were directed on how to wash the pads using different methods: water only, detergent only, bar soap only, detergent and disinfectant, and detergent, disinfectant, and ironing. Microbiological analysis was conducted to assess microbial growth on nutrient agar, chocolate agar, and Sabouraud dextrose agar. Findings showed low microbial concentration in 53.8% of the positive specimens. The predominant isolates being *Staphylococcus* species (isolated in 26.9% of samples), *Lactobacillus species* (isolated in 26.9% of samples), *Candida species* (isolated in 19.2% of samples), and *Fusobacterium nucleatum* (isolated in 23% of samples). All RMPs washed with water only were positive for bacterial culture with count of > 100cfu/ml. Those washed with detergent and bar soap revealed microbial count of 50-100cfu/ml. RMPs washed with detergent and disinfectant, dried and then ironed, showed no significant growth or very low microbial counts compared to other cleaning methods. The combination of detergent, disinfectant, and ironing is the most effective cleaning method for reducing microbial load on reusable menstrual pads.

Keywords: Reusable menstrual pads, Cleaning methods, Bacterial burden, Disinfection, Menstrual hygiene

BOOK OF ABSTRACTS

BBC-47

Knowledge and Perception of Cardiopulmonary Resuscitation

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ABSTRACT

AIM: To assess the knowledge and perception of cardiopulmonary resuscitation among B.Sc. Human Physiology students in UNEC.

MATERIALS AND METHODS: A cross-sectional study was used to assess the knowledge and perception of cardiopulmonary resuscitation on 160 Human Physiology students. The study employed a stratified random sampling method to divide the students based on academic years with a minimum number of 40 students within each strata. A self-made questionnaire was used to get students responses of their knowledge and perception of cardiopulmonary resuscitation. Ethical Clearance was obtained from the College of Medicine Ethical Committee.

RESULTS: The findings reveal that a significant majority (76.9%) of students demonstrate a commendable level of CPR knowledge. A strong positive perception of CPR's importance is evident, with most students (76.25%) strongly agreeing on its life-saving significance. Additionally, a substantial majority (88.75%) believe that timely CPR interventions significantly increase survival chances during cardiac emergencies. Interestingly, an overwhelming majority (93.75%) express a strong willingness to undergo further CPR training. The study also showed that age and academic level had the most significant effect statistically ($p < 0.001$) on the perception and knowledge of the participants.

Keywords: Cardiopulmonary resuscitation, knowledge, perception, blood circulation, breathing, cardiac arrest.

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BBC-48

Discovery of Trypanocidal Bioactive Leads by Docking Study, Molecular Dynamic Simulation and *In Vivo* Screening.

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ABSTRACT

Nine selected potential antitrypanosomal hits from plants obtained by docking calculation according to the docking protocols implemented in Molecular Operating Environment were further screened by evaluating their binding affinities toward an ‘all important’ antitrypanosomal drug target –trypanothione reductase (TryR), which is absent in humans, using a more stringent scoring function obtainable in AutoDock vina.

All the compounds showed binding affinity for TryR at the range of @4.90: 1.78 to @8.70: 0.22 Kcal/mol. Also, the compounds demonstrated affinity toward an analogous enzyme to TryR, glutathione reductase (GR) that is found in vertebrates which suggests that they could pose a selectivity challenge. However, on comparison, β -sitosterol; the candidate that scored topmost against three out of six earlier studied antitrypanosomal drug targets (uridylyl transferase - UTF, farnesyl diphosphate synthase - FDS and adenosine kinase -ADK), showed a significant ($P < 0.05$) binding affinity for TryR (-8.70: 0.22 Kcal/mol) over GR (-7.5: 0.36 Kcal/mol). The complexes formed between β -sitosterol and the proteins: UTF, FDS and ADK, remained stable over 100 ps molecular dynamic simulation.

In *in vivo* studies, 200 mg/kg b.w. of the candidate, significantly ($P < 0.05$) inhibited the pathogen in *T. b. brucei* infected mice from third day post treatment.

This study presents β -sitosterol as an interesting antitrypanosomal candidate

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BBC-49

Comparative Studies on the Antioxidant Properties of Ethylacetate Fraction of Cashew Leaves (*Anacardium occidentale*) and its Zinc Oxide Nanoparticles

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ABSTRACT

The present study aimed at evaluating and comparing the antioxidant properties of ethyl acetate fraction (EAF) and zinc oxide nanoparticle (ZnONP) synthesized from *Anacardium occidentale*. The structural, morphological, and optical properties of ZnONP were characterized using ultra-violet visible spectrophotometry (UV-Vis), Fourier transform-infrared spectroscopy (FT-IR), scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM/EDX) and X-ray diffraction (XRD) analysis. The antioxidant property was determined using thiobarbituric Acid Reactive Substances (TBARS) test, (DPPH) 2, 2-diphenyl-1-picrylhydrazyl scavenging test, (ABTS) 2, 2'-azino-bis-(3-ethylbenzothiazoline-6-sulfonic) acid test, total antioxidant capacity (TAC) test and ferric ion reducing antioxidant power (FRAP) assay. The ultra-violet visible spectrophotometry showed a progressive SPR band appearance between 370 and 400 nm in wavelength, indicating ZnONP formation. The SEM image revealed that the ZnONP possesses a crystalline morphology. Elemental analysis via EDS confirmed a high carbon content of 80.20 %, nitrogen content of 9.03 %, and zinc content of 1.08 %. FTIR analysis identified a characteristic absorption peak at 730 cm⁻¹, confirming the presence of zinc oxide bonds and the successful formation of ZnONPs. X-ray diffraction further verified the crystalline structure, and using the Debye-Scherrer formula, the particle size was calculated to be 17.19 nm. Additionally, the average Bragg's angle was measured at 38.38°, with the full width at half maximum (FWHM) recorded at 0.508. In the TBARS assay, lipid peroxidation by EAF and ZnONP at 12.5 mg/ml was 100 % and 36 % respectively. For the DPPH assay, ZnONP lowest scavenging activity was 63.8 % at a concentration of 12.5 mg/ml and the highest was 86.1% at a concentration of 3.125 mg/ml. The EAF showed the highest scavenging activity of 88.9 % at a concentration of 12.5 mg/ml and the lowest was 71.7 % at a concentration of 3.125 mg/ml. The highest ABTS-free scavenging activity for ZnONP at concentrations (12.5 and 3.125 mg/ml) was 100 % and the lowest was 99.3 % at a concentration (5.357 mg/ml). Then EAF highest scavenging activity was 82.4 % at a concentration of 1.388 mg/ml and the lowest was 19.4 % at a concentration of 12.5 mg/ml. The highest recorded TAC for ZnONP, EAF, and Ascorbic acid was 1.5 %, 1.2 %, and 1.4 % respectively at a concentration of 12.5 mg/ml while the lowest was 0.6 %, 0.5 %, and 0.3 % at a concentration of 1.388 mg/ml. For FRAP the highest for ZnONP was 4.7 % at a concentration of 12.5 mg/ml, lowest was 4.3 % at a concentration (1.388 mg/ml). For EAF, the highest was 1.12 % at a concentration (1.388 mg/ml), lowest was 0.96 % at a concentration (12.5 mg/ml). The highest for ascorbic acid was 0.83 % at a concentration of 8.333 mg/ml while the lowest was 0.54 % at a concentration of 3.125 mg/ml. The use of *Anacardium occidentale* enables a swift and eco-friendly method for the biosynthesis of ZnONPs.

Keywords: nanoparticle, fraction, antioxidant, TAC, DPPH, FTIR, UV-Vis

BOOK OF ABSTRACTS

BBC-50

Impacts of Single and Combined Administration of Ethanol Leaf Extracts of *Mangifera indica* and *Gongronema latifolium* on Liver Enzymes and Electrolyte Profile of Male Albino Wistar Rats.

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ABSTRACT

Investigation of the impacts of single and combined administration of ethanol leaf extracts of *Mangifera indica* and *Gongronema latifolium* on the Liver enzymes and electrolyte profile of male albino Wistar rats weighing 185-221g was carried out for a period of one month. Sixteen animals were randomly grouped into four groups of four rats each. Groups 1 and 3 were treated orally with 200mg/kg of *Mangifera indica* and *Gongronema latifolium* respectively. Group 2 was treated with the combined extracts at 50:50 dosage ratio. Group 4 was not treated and served as control. All animals were allowed free access to commercial rats mash and water throughout the treatment period. Results of the serum liver enzymes revealed a significant increase ($p<0.05$) in AST in group 3 when compared to groups 1 and 2. Serum ALT and ALP recorded significant increase and decrease ($p<0.05$) respectively in all treatment groups when compared to the control group. A significant increase ($p<0.05$) in the serum ALT and ALP were recorded in group 1 when compared to groups 2 and 3. Serum electrolyte levels revealed a significant increase ($p<0.05$) for potassium (K^+) ion in all treatment groups when compared to the control. Group 3 showed significant increase ($p<0.05$) in serum K^+ when compared to groups 1 and 2. Group 1 was significantly increased ($p<0.05$) compared to group 2. Serum sodium (Na^+) ion recorded significant decrease ($p<0.05$) in group 2 when compared to groups 1, 3 and control. Chloride (Cl^-) ion level recorded significant increase ($p<0.05$) in groups 1 and 3 when compared to groups 2 and control. Bicarbonate (HCO_3^-) levels showed significant increase ($p<0.05$) in groups 1 and 2 when compared to groups 3 and control. These results revealed that leaf extracts of the two plants could alter serum liver enzymes and electrolyte profile in single and combined treatment, however, traditional herbalists should use the plants with strict moderation for the treatment of some ailments.

Keywords: Liver enzymes, electrolyte profile, *M. indica*, *G. latifolium*, Albino Wistar rats.

BOOK OF ABSTRACTS

BBC-51

**Effect of Aqueous Extract of Asaja Beans on the Haematological Profile of Albino Rats
(*Rattus norvegicus*).**

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ABSTRACT

The effect of the aqueous extract of Asaja beans on the haematological profile of albino rats (*Rattus norvegicus*) was evaluated for 28 days using standard methods. Sixty male albino rats were randomly assigned to four groups in a completely randomized design of five rats per treatment with each treatment having three replicates. The four groups consists of the control group A, which received equal volume of distilled water and 3 treatments, B, C and D that were administered orally 100mg/kg, 300mg/kg and 500mg/kg body weight respectively. Blood was collected weekly from the rats through the ocular puncture method. Phytochemical screening revealed the presence of Alkaloids, Flavonoids and Saponins. The results showed no significant difference ($P > 0.05$) among treatments for Red Blood Cell, Packed Cell Volume, Haemoglobin, Mean Corpuscular Volume, Mean Corpuscular Haemoglobin, and Mean Corpuscular Haemoglobin Concentration. There was significant effect for the White Blood Cell count in Week 1 ($P < 0.05$). Neutrophil and Lymphocytes also showed significant difference in week 2 ($P < 0.05$) while there were no significant difference for other weeks when compared to the control group ($P > 0.05$). Conclusively, there is need to explore the effects of a higher dosage or a prolonged experimental duration so as to really determine the actual effect of Asaja beans and the mechanism of action on the body.

Key words: Haematological profile, Aqueous extract, Phytochemical screening and *Rattus norvegicus*

BOOK OF ABSTRACTS

BBC-52

Comparative Assessment of Heavy Metal Uptake Efficacy Among Indigenous Plant Species (*Mirabilis jalapa*, *Pennisetum purpureum*, *Panicum maximum*, and *Sida acuta*) in Crude Oil-Contaminated Soil in Akwa Ibom State, Nigeria

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ABSTRACT

This study focuses on comparative assessment of heavy metal uptake efficacy using selected plant species (*Mirabilis jalapa*, *Pennisetum purpureum*, *Panicum maximum* and *Sida acuta*) in oil producing communities in Akwa Ibom State, Nigeria. The changes in the concentration of heavy metals: Cupper (Cu), Manganese (Mn), Lead (Pb), Zinc (Zn), Iron (Fe), Cobalt (Co), Cadmium (Ca) and Nickel (Ni) in rhizosphere soil of the plant species cultivated in the uncontaminated (0% crude oil) and contaminated (5%, 10%, 15% and 20%) soil samples from Mbo, Esit Eket, Ikot Abasi was monitored at 30 days interval for 90 days using standard analytical techniques. Findings revealed that the concentration of the heavy metals increased as the concentration of the crude oil increased and decreased slowly over a period (90 days). The concentration of Cu, Mn, Pb, Zn, Fe, Co, Cd and Ni in the rhizosphere soil of *M. jalapa*, and *S. acuta* was 2.79 mg/kg, 3.10 mg/kg, 1.06 mg/kg, 2.00 mg/kg, 3.01 mg/kg, 0.01 mg/kg, 0.10 mg/kg and 0.02 mg/kg after 90 days. 2.79 mg/kg, 3.10 mg/kg, 1.06 mg/kg, 2.00 mg/kg, 3.01 mg/kg, 0.01 mg/kg, 0.10 mg/kg and 0.02 mg/kg for *P. purpureum*. 2.81 mg/kg, 3.09 mg/kg, 1.06 mg/kg, 2.00 mg/kg, 3.03 mg/kg, 0.01 mg/kg, 0.11 mg/kg and 0.01 mg/kg for *S. acuta*, and 2.81 mg/kg, 3.09 mg/kg, 1.07 mg/kg, 2.00 mg/kg, 3.01 mg/kg, 0.02 mg/kg, 0.11 mg/kg and 0.01 mg/kg for *P. maximum*. The concentration of heavy metals increased as the concentration of the crude oil increased and decreased slowly over a period (90 days). Analysis of the phytoremediation potentials of the plant species revealed that all the plant species except *P. purpureum* died on exposure to the different crude oil concentrations (5%, 10%, 15%, 20%) over the period of 90 days. The findings also revealed that the *P. purpureum* was not only resistant to hydrocarbons but was able to accumulate hydrocarbons at varying concentration in its tissues. Based on the findings of the study, it can be recommended that *P. purpureum* is one of the potent plants that can be explored for heavy metal uptake from contaminated sites.

Keywords: heavy metal uptake, efficacy.

BOOK OF ABSTRACTS

BBC-53

Naphthyl Acetic Acid Production and Nitrogen-Fixing Capacity of Diazotrophic Bacteria Isolated from Okra Plant Rhizosphere.

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ABSTRACT

Plant-growth-promoting bacteria (PGPB) that are capable of producing phytohormones and fixing atmospheric nitrogen can play the role of biofertilizer to plant growth and development. Phytohormones play critical roles in plant growth and development. Some plant-associated microorganisms can produce phytohormones to modulate host plant growth and development. In this study, we aimed to isolate and characterize diazotrophic bacteria from okra farm soil that produce Naphthyl Acetic Acid (NAA), a synthetic auxin hormone. In this study, the aimed was to isolate and characterize diazotrophic bacteria capable of producing naphthylacetic acid (NAA), from Okra plant rhizosphere. Selective media (Manitol Ashby) were used to isolate diazotrophic bacteria following the depletion of okra soil. Using nitrogen-free bromthymol blue (NFB) medium for nitrogen fixation, fifteen (15) isolates were isolated and screened. Using Salkowski reagent, the results showed that 7 isolates out of the 15 isolated diazotrophic bacteria produceing different levels of NAA, ranging from 0.36 to 1.88 mg/L. Compared to other groups, sample Uk3iv produced more NAA (1.88 mg/L), whereas UK3ii produces the least amount (0.36 mg/L). UK3iv exhibited the greatest overall growth performance, likely due to its superior nitrogen fixation and NAA production abilities. The results suggest that NAA-producing diazotrophic bacteria can serve as effective plant growth promoters for sustainable agriculture.

Keywords: rhizosphere, diazotrophic, bromthymol blue, hormone

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BBC-54

Inhibitory Effect of *Alstonia boonei* Compounds on Inducible Nitric Oxide Synthase (iNOS) Activity: An *in silico* and Pharmacokinetic Study

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ABSTRACT

Inducible nitric oxide synthase (iNOS) is an enzyme that catalyzes the synthesis of nitric oxide (NO) and is expressed in response to various pro-inflammatory stimuli, such as cytokines, bacterial lipopolysaccharides (LPS), and other inflammatory mediators. Numerous *in vivo* studies have suggested the anti-inflammatory properties of *Alstonia boonei* extract and phytochemicals. This study employs an *in silico* method through molecular docking techniques to assess the anti-inflammatory properties of compounds derived from *A. boonei* stem bark by targeting inducible nitric oxide synthase (iNOS). The protein structure of iNOS with PDB ID: 2NSI was retrieved from the RCSB Protein Data Bank. *A. boonei* compounds were extracted using methanol and the phytochemicals present were identified using Liquid Chromatography-Mass Spectrometry (LC-MS) Analysis. The identified phytochemicals from the *A. boonei* plant were investigated by docking with the crystal structure of the iNOS receptor and compared with the standard drug ibuprofen. From the docking result, nine *A. boonei* phytochemicals had better binding scores compared to the reference drug (ibuprofen) indicating better affinity of these compounds and potential therapeutic activity compared to the standard drug. Also, the drug-likeness and ADMET properties of the docked compounds were determined and all the compounds passed Lipinski's rule of five and showed good drug-likeness characteristics favourable for optimal membrane permeability and oral bioavailability (pharmacokinetics) except for 6-[5,7-dihydroxy-2-(4-hydroxyphenyl)-4-oxochromen-6-yl]-5,7-dihydroxy-2-(4-hydroxyphenyl)chromen-4-one, NCGC00384589-01 and Strictosidinic acid which had high MW (538.46g, 638.61g and 516.54g, respectively) and high HBDs (6, 8 and 7, respectively). Also, NCGC00384589-01 showed high HBA (15) and high NOR with Strictosidinic acid (12 and 7, respectively) indicating possible poor intestinal absorption and oral bioavailability of these compounds. From the ADMET properties of the *A. boonei* phytochemicals investigated, all the selected compounds can be absorbed by human intestines. Also, all the compounds proved to show no acute toxicity and most did not show a mutagenic effect in the Ames test data. It can be concluded that the selected compounds exhibit favorable characteristics as iNOS inhibitors and could be further explored for the development of better anti-inflammatory therapies.

Keywords: *Alstonia boonei*, inflammation, inducible nitric oxide synthase, LC-MS, Drug-likeness

BOOK OF ABSTRACTS

BBC-55

Medicinal Value of the Stem Bark of the White Stickpea (*Zapoteca portoricensis*): The Anti-sickling Potential, Oxidation and Haemolytic Effect on AA and SS Blood Cells

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ABSTRACT

The White Stickpea (*Zapoteca portoricensis*) belongs to the family of Fabaceae/Mimosidae. This plant has been used traditionally to treat diseases such as tonsillitis (sore throat), fever, convulsion, breast enlargement, stomach disorder, purgative and amenorrhoea. Some phytochemical constituents of this plant have been reported to have medicinal activity. However, there has not been a report of the anti-sickling activity of this important plant. Sick cell disease is a genetic disease common in people of African descent, known to be selected for its protection in heterozygotes against malaria, but in homozygotes leads to serious life complications. This study considers the anti-sickling, oxidative, phytochemical and haemolytic potentials of the traditionally used medicinal plant, *Zapoteca portoricensis* through the application of UV-visible spectroscopy, Microscopy, and the gas chromatography flame ionization detector. The plant extract showed a marked capacity to revert 2% sodium metabisulfite-induced sickle-cell red blood cells to assume the shape of normal red blood cells, affecting 85.3% of the cells when 250µg/ml of the ethanol extract of *Zapoteca portoricensis* stem bark was present for 10 minutes, compared to the control which retained 90.74% of sickle cells. The effect of higher concentrations at 500µg/ml and 1000µg/ml of the plant extract with changes in time were also assessed. Furthermore, the UV-visible spectroscopy spectra for the control (Hb) without extract at 540mM and 577mM gave a haemoglobin concentration of 0.119mM while in the presence of the plant extract, the haemoglobin concentration decreased to 0.057mM indicating a minimum and tolerable level of oxidation of haemoglobin. Also, haemolysis studies indicate little or no increase in haemolysis due to the plant extract. Finally, the phytochemical analysis of the plant extract indicates the presence of bulky aromatic compounds, such as butein, genistein, epicatechin, ellagic and vanillic acid, suggesting that its anti-sickling mechanism might involve the interaction of these hydrophobic compounds with the deformed plasma membrane of sickle cells or interact with the valine or other hydrophobic amino acid residues on the beta subunit that may affect the tertiary structure of sickle haemoglobin.

Keywords: Medicinal, *Zapoteca portoricensis*, Oxidation, Phytochemicals, Anti-sickling, Haemolytic.

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BBC-56

Evaluation of antimicrobial activity of formulated water-in-oil cream containing extracts of *Cajanus cajan* (pigeon pea) L. leaves

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ABSTRACT

Decoctions prepared from leaves of *Cajanus cajan* L. are used in folk medicines for skin irritations, sores and inflammation of gums to hasten its healing. Various solvents namely: n-hexane, ethyl acetate, ethanol and water in order of increasing polarity were used to extract leaves of *Cajanus cajan* L and their phytochemical constituents were determined using standard procedures. The active extracts were used to formulate water-in-oil creams of different concentrations following previous preliminary studies of the antimicrobial activities of the extracts. The prepared creams were characterized for their various parameters including organoleptic properties, homogeneity, pH, viscosities and skin irritation potentials. They were then evaluated for activities against the following typed organisms: *Staphylococcus aureus* NCTC 6571, *Pseudomonas aeruginosa* ATCC 27853, *Bacillus subtilis*, *Escherichia coli* NCTC 10418, *Salmonella typhi* and *Candida albicans* using agar well diffusion method. Preliminary phytochemical screening of *C. cajan* leaves showed presence of alkaloids, phenols, flavonoids, saponins, and terpenoids. Ethanol and ethyl acetate extracts inhibited the growth of all the bacteria and showed antimicrobial activity against *Candida albicans* while the aqueous extract did not show any activity. The minimum inhibitory concentrations of the active extracts were in the range of 3.125 mg/mL – 50 mg/mL. The patterns of the antimicrobial activities of the creams were the same with that of the extracts. Batch C3 containing 5% ethanol extract had the highest antimicrobial activity against *B. subtilis* and batch C5 containing 1% ethyl acetate extract showed activity against all organisms. DSC studies of the creams showed that the extracts and the excipients were compatible. Also, the products did not irritate rabbit skin indicating that the creams were safe for topical applications.

Keywords: *Cajanus cajan*, Antimicrobial activities, Phytochemicals, Topical cream, minimum inhibitory concentration, susceptibility.

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BBC-57

Antioxidant Potentials of Methanol Extract of *Alstonia boonei* (stem bark) against Cadmium-induced Neuro-oxidative Stress in Wistar Albino Rats.

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ABSTRACT

Cadmium, a heavy metal with no physiological function in the human body, is considered a biohazard. This study therefore was aimed at evaluating the antioxidant potential of *Alstonia boonei* plant extract against cadmium-induced neuro-oxidative stress in Wistar albino rats. Thirty-six (36) male Wistar albino rats were randomly divided into 6 groups of six rats each. Group 1 served as normal control, group 2 served as the negative control, group 3 served as standard control and group 4 received 200 mg/kg b.w of crude methanol extract only. Groups 5 and 6 were intoxicated with cadmium orally (5 mg/kg b.w) every day and were treated with low (100 mg/kg b.w) and high (200 mg/kg b.w) doses of crude methanol extract. The experiment lasted for 28 days. Rats were decapitated to collect brain samples, which were washed and homogenized in phosphate buffer (pH 7.4) and centrifuged at $12,000 \times g$ for 30 minutes at 4°C . The supernatants were collected and used for further analysis. Biochemical analysis showed a significant ($p < 0.05$) increase in the level of MDA in group 2 when compared with group 1. A significant ($p < 0.05$) decrease was also observed in the level of MDA in all treatment groups when compared with group 2. A significant ($p < 0.05$) decrease was also observed in the level of SOD, catalase, glutathione and glutathione peroxidase activity in group 2 when compared with group 1. A significant ($p < 0.05$) increase was also observed in the level of SOD, catalase, glutathione and glutathione peroxidase activity in all treatment groups when compared with group 2. The study has shown that *Alstonia boonei* plant extract possesses neuroprotective potentials against cadmium-induced toxicity.

Keywords: Cadmium, Neuroprotective, *Alstonia boonei*, Oxidative stress, Glutathione.

BOOK OF ABSTRACTS

BBC-58

Quantitative Assessment of Artemether-Lumefantrine Antimalarial Drug Combination using HPLC-UV Method: A Systematic Review

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ABSTRACT

Malaria is the world's most important parasitic infection, ranking among the major health and developmental challenges for the poor countries of the world. The increasing use of Artemether-Lumefantrine antimalarial drug combination as an effective treatment for resistant malaria demands the need of analytical methods to simultaneously quantify these drugs in tablets to evaluate its quality. The goal of this systematic review is to address the identified research gaps and to evaluate the quantitative assessment of Artemether-Lumefantrine antimalarial drug combination using HPLC-UV method. A qualitative systematic review methodology was adopted which involved the qualitative and narrative review through Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Population, Exposure and Outcome (PEO) framework analysis. The data sources were from PubMed, Science Direct, NCBI, Research Gate, Cochrane Library, ProQuest, Link Springer, Wiley Online Library, Europe PMC, ASCO, Biomed Central and e-journals from trustworthy e-sources. The relevant publications were selected based on the plausible keywords: antimalarial drug combination, Artemether-Lumefantrine and HPLC-UV method. Out of 100 studies from different databases, only five (5) studies were included. Based on the comprehensive systematic review, HPLC-UV was the preferred method for Artemether and Lumefantrine as it is inexpensive, useful, fast, simple, species-specific, highly accurate, required less time consumption for analysis and this can be employed for the routine analysis. Mobile phase and flow rate are significant in HPLC-UV method as the movement through the chromatographic column depends on the time spent in the mobile phase compared with that in the stationary one and on the flow rate of the mobile phase. The determination of the UV detection, relative standard deviation (RSD) as well as of the percentage of recovery of Artemether and Lumefantrine are significant as they provide information on the ability of the preferred method to determine the presence of Artemether and Lumefantrine, quantify the yields in terms of its precision and accuracy and determine the efficiency of a purification process.

Keywords: Antimalarial, Artemether-Lumefantrine, HPLC-UV, systematic review

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BBC-59

Assessment of Air Pollution Tolerance Index (APTI) and Expected Performance Index (EPI) of Plants along Nsukka. - Enugu Road.

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ABSTRACT

Air pollution is a worldwide ecological problem that threaten human health through harmful emissions as in vehicular exhaust emission. There is a need to examine the ecological roles of plants growing around major roads to identify their susceptibility and resistance towards air pollutants. To explore plants ability to absorb air pollutants, Air Pollution Tolerance Index (APTI) and Expected Performance Index (EPI) of some plants growing along Nsukka - Enugu road in Enugu State, Nigeria were conducted. Twenty-eight plant species comprising herbs, shrubs and tree species were sampled and the determination of APTI used combined biochemical parameters measurements. APTI showed that herbs are sensitive with APTI range of < 7 to 11.91, shrubs are mostly moderate tolerant with a range of 9.38 to ≤ 17.43 while tree species are tolerant ranging from ≥ 10.58 to ≥ 23.26 at $t \leq 1.51$, $p > 0.05$ in the both sites. Based on APTI grades, *R. vomitoria* (11.91) had the highest sensitive index while *E. canadensis* (6.45) had the least. Also, *P. americana* (16.11) had the highest moderate tolerant index and *R. communis* had the least while *T. catappa* (23.26) produced the highest tolerant index and *G. arborea* (17.50) had the least in the experimental site. EPI revealed that plants can be categorized as fit, very fit and unfit for plantation and those under the excellent to best' performer category can be highly recommended as 'very fit' for plantation to control air pollution. *D. edulis* (94.74%) was in the 'Best' performer category and the best-recommended species for plantation planting to monitor and control air pollutants.

Keywords: Air pollution; APTI, Biochemical, EPI, Plant species

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BBC-60

Quality Assessment of Psyllium Husk as a Gluten Replacer in the Production of Bread from Brown Rice Flour

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ABSTRACT

The study investigated to assess the effect of psyllium husk as a gluten replacer in gluten-free bread produced from brown rice flour. The brown rice flour and psyllium husk were blended in different ratios of 100:0, 97:3, 94:6, 91:9, 88:12, 85:15, and 82:18 respectively and designated as A, B_{97/3}, C_{94/6}, D_{91/9}, E_{88/12}, F_{85/15}, and G_{82/18} respectively, while 100:0 wheat flour bread served as the control (H). The composite flours were analyzed for their functional properties; the doughs were analyzed for proofing, and dough weight while the bread samples were analyzed for proximate, chemical, sensory and microbial properties. Bulk density, water absorption capacity, oil absorption capacity and swelling capacity of the flour blends increased with a corresponding increase of the psyllium husk. Proofing reduced with a corresponding increase in the quantity of the psyllium husk. The moisture, crude fibre, fat, ash, carbohydrate and protein content of the bread samples ranged from 12.29% to 16.20%; 0.94% to 1.53%; 3.44% to 5.50%; 0.49% to 1.27%; 71.23% to 72.54% and 5.26% to 10.55% respectively. As the psyllium husk increased, the moisture content and fiber content increased while the fat, carbohydrate, ash and protein content decreased. Vitamin and mineral content of the loaves was reduced as psyllium was substituted for the brown rice. Sensory scores of the bread samples revealed that acceptable bread can be produced from brown rice flour and psyllium husk, especially at 97% brown rice flour and 3% psyllium husk and 94% brown rice flour and 6% psyllium husk substitution levels

Keywords: Bread, brown rice, psyllium husk, composite flour, sensory properties

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BBC-61

Assessment of the Protective Influence of Selenium Nano Particle against Hepatic Oxidative Stress Induced by Ciprofloxacin in Wistar Rats.

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ABSTRACT

This study seeks to evaluate the protective influence of Selenium nanoparticles against ciprofloxacin-induced oxidative stress in the liver of female Wistar rats. Selenium nanoparticles have gained attention due to their antioxidant properties and therapeutic application including anti-inflammation therapy, detoxification and protection of the liver tissues of Wistar rats. Four groups of five rats were randomly assigned during the 7 days of investigation as follows: Group 1: Received distilled water (2ml/kg body weight) orally every day for 7 days. Group 2: Was given ciprofloxacin (CFX) orally dissolved in distilled water at a dose of 135mg/kg body weight for 7 days. Group 3: Received selenium nanoparticles (SeNps) orally dissolved in distilled water at a dose of 50mg/kg body weight for 7 days. Group 4: Received selenium nanoparticles particle and ciprofloxacin dissolved in distilled water at doses of 50 and 135mg/kg body weight for 7 days. This result shows the concentration of superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-px), glutathione S-transferase (GST), reduced glutathione (GSH), myeloperoxidase (MPO) activities and nitric oxide (NO) levels. The experiment shows that there is an increase in the enzymatic activities of myeloperoxidase (MPO), Catalase (CAT) and nitric oxide (NO) levels and there was a significant restoration in the enzymes activities of superoxide dismutase (SOD), reduced glutathione (GSH), glutathione S-transferase (GST) and glutathione peroxidase (GSH-px) due to the intervention of Selenium nanoparticles. This indicates that selenium nanoparticles have a protective influence against ciprofloxacin-induced oxidative stress in the hepatic tissue of female Wistar rats.

Keywords: Ciprofloxacin, hepatic tissue, selenium nanoparticles, anti-inflammation, oxidative stress

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BBC-62

Feeding Behavior and Body Condition of *Clarias Gariepinus* Exposed to Sunlight

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ABSTRACT

Fish production is very essential to our country's economy. The production could make up for the country's nutrient requirements. The aim of this study was to investigate the feeding behavior and body condition of catfish (*Clarias gariepinus*) exposed to sunlight. The objectives of this study were: (i) to observe the feeding behavior of the fish underexposed and unexposed direct sunlight, (ii) to determine how the body mass, body length and body condition factor of *Clarias gariepinus* varied underexposed and unexposed sunlight. The juvenile fish of approximately 8 weeks were purchased and acclimatized for 7 days; then, shared into the exposed and unexposed groups. The exposed fish were left under direct sunlight, while the unexposed fish were left under normal environmental conditions for one month. The results indicated that the exposed fish were gasping for air and some of them died possibly due to prolonged exposure to the heat generated by sunlight leading to hypoxia. The analysis of variance (ANOVA) indicated a significant difference ($P < 0.05$) between the condition factors of the exposed and unexposed groups. More so, the sunlight-exposed fishes experienced poorer body weight and length-weight relationships. Suggesting that during warmer sunlight, the metabolic activities of the exposed fish may have elevated their metabolic activities which may have led to the draining of stored energy nutrients and poorer growth. However, more studies are needed to investigate if sunlight could affect the body condition of other fish species differently.

Keywords: *Clarias gariepinus*, hypoxia, sunlight, body condition, fish behavioral changes

BOOK OF ABSTRACTS

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Comparative Studies on the Consolidated Bioprocessing and Simultaneous Saccharification and Fermentation for Bioethanol Production Using *Pichia kudriavzevii* Strain AUMC 10190 Isolated from Cassava Mill Effluent Site

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ABSTRACT

The energy demand is on the increase as the global population is rapidly rising with fossil fuel depletion, this has given rise to the need for alternative energy sources such as bioethanol. In this study, response surface methodology (RSM) using the central composite design (CCD) was employed to optimize the suitable conditions necessary for maximal bioethanol production using *Pichia kudriavzevii* AUMC 10190 isolated from cassava effluent. Two different ethanol fermentation processes were compared: consolidated bioprocess (CBP) and simultaneous saccharification and fermentation (SSF). A ten-day optimization study showed that day 9 and 6 were most suitable to produce bioethanol and α -amylase, respectively. Alpha-amylase isolated from *Pichia kudriavzevii* AUMC 10190 showed an optimum pH of 7.0 and temperature of 60 °C. The findings showed that SSF produced bioethanol effectively with the concentration, productivity, and fermentation efficiency of 36.3 g/L, 0.256, and 41.98%, respectively, while CBP produced bioethanol with the concentration, productivity and fermentation efficiency of 32.3 g/L, 0.134 and 68.506%, respectively. Our results showed that SSF is a more attractive process for the microbial production of bioethanol compared to CBP using *Pichia kudriavzevii* AUMC 10190. Hence, this study suggests that *Pichia Kudriavzevii* AUMC 10190 is an efficient yeast for bioethanol production through SSF and can be employed for further biotechnological advances.

Keywords: Consolidated bioprocess, Simultaneous saccharification and Fermentation, Bioethanol, Process optimization, Response surface methodology.

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BOOK OF ABSTRACTS

BBC-64

Formulation and Evaluation of Nano-Paediatric Suspension of Darunavir Prepared with Na-CMC and HPMC as Suspending Agents

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ABSTRACT

Darunavir is a novel Human Immuno-deficiency Virus (HIV) protease inhibitor used in the management of human HIV infections and is effective in children and infants. Nano-paediatric suspensions of darunavir were prepared by high-pressure homogenization method using two different suspending agents: sodium carboxymethyl cellulose (Na-CMC) and hydroxypropyl methylcellulose (HPMC). The suspensions were further sonicated to get the particle sizes in the nano range for possible enhancement of stability and drug release. The prepared nano-suspensions were evaluated for some of their physicochemical properties and stability such as organoleptic properties, particle size and size distribution, pH, sedimentation volume, specific gravity, and drug release. The sonicated suspensions produced had their particle sizes in the nano range with the batch prepared with HPMC as a suspending agent showing smaller particle sizes, smaller particle size distribution and higher drug release. The pH was within 6.3 ± 0.2 for the Na-CMC batch and 6.8 ± 0.1 for the batches prepared with HPMC. Also, the HPMC batches showed better stability as evidenced by the sedimentation volume measurement. The pH and the specific gravity were fairly consistent upon storage indicating good stability of the preparations. The particle sizes which were in the nano ranges may suggest better drug dissolution and release.

BOOK OF ABSTRACTS

BBC-65

Synergistic Effect of Co-digestion of Paper Waste and Chicken Manure for Enhanced Biogas Production

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ABSTRACT

In this study, the synergistic effect of anaerobic co-digestion of paper waste (PW) and chicken manure (CM) was examined using established analytical procedures. The experiments were conducted in laboratory-scale bioreactors with a working volume of 50 mL, with varying feedstock ratios (1:1, 2:1, 3:1) maintained at a thermophilic temperature (45°C) for 32 days. Daily and cumulative biogas production was quantified using the downward displacement of water technique. The results demonstrated noteworthy differences ($p < 0.05$) in biogas yields among the reactor bottles containing co-digested feedstock of paper waste and chicken manure at ratios of 1:1, 2:1, and 3:1 compared to the mono-digestion of chicken manure or paper waste alone. Notably, the 1:1 mixing ratio produced the highest biogas yield, reaching 335.35 mL/gVS, nearly double the cumulative yield obtained from mono-digestion of individual substrate. Bacterial isolates present in the substrates and inoculum were: *Staphylococcus* sp, *Lactobacillus* sp., *Micrococcus* sp., *Bacillus* sp., *Escherichia coli*, *Shigella* sp., *Salmonella* sp., *Clostridium* sp. and *Klebsiella* sp. The C/N ratio for paper waste and chicken manure was 31.2 and 12.8, respectively, while the corresponding pH was 6.1 and 7.9. The positive synergy indices (ranging from 1.1 to 2.1), derived from the co-digestion experiments, underscores the synergistic enhancement of biogas production from the co-digestion of chicken manure and paper waste when compared to the mono-digestion of lone feedstock. This research highlights the synergistic effectiveness of anaerobic co-digestion as a means to maximize biogas production from waste biomass.

Keywords: synergistic effect, synergy index, codigestion, biogas production, paper waste, chicken manure

BOOK OF ABSTRACTS

BBC-66

Effects of Combined Pretreatment: Milling, Hydrothermal and Fungal Amendment on Biogas Production from Co-digestion of Paper Waste and Chicken Manure

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ABSTRACT

This study investigated the role of pretreatment in enhancing biogas production from anaerobic co-digestion of chicken manure (CM) and paper wastes (PW) using standard techniques. Comparative assays of the effect of combined pretreatment methods (milling, hydrothermal, and fungal) on daily and cumulative biogas production were assessed in batch-type anaerobic digestion (AD) system fed with varying proportions of paper wastes and chicken manure ratio (20:80, 50:50, 80:20, 100:0). Milled and hydrothermally pretreated paper waste was inoculated with *Aspergillus niger*, while the uninoculated paper wastes served as control. Laboratory scale bioreactors (100ml) used for anaerobic digestion were operated simultaneously under a thermostatic temperature of 45°C for 30 days. The results from the physicochemical analysis of the substrate (paper wastes) showed that a combination of milling, hydrothermal and fungal pretreatment resulted in 88.1% cellulose, 92.2% hemicellulose and 79.1% lignin removal. The results from the biogas yield showed that maximum daily biogas production of 140 mL/gVS was achieved in Reactor C on day eight where 80% of fungi-treated paper waste was digested whereas, the highest cumulative biogas yield (507.5 mL/gVS) was observed in 20:80 co-digestion (Reactor A). This data revealed significant differences ($p < 0.05$) when compared with the control experiments (with no fungal inoculation). Bacterial isolates from the substrate (paper wastes), co-substrate (chicken manure), and inoculum (cow dung) used belong to the genera, *Bacillus*, *Lactobacillus*, *Corynebacterium*, *Micrococcus*, *Leuconostoc*, *Staphylococcus*, and *Streptococcus*. The current study revealed the suitability of *Aspergillus niger*, combined with milling and hydrothermal treatment for enhancement of biogas production from the anaerobic digestion of paper wastes and chicken manure.

Keywords: combined pretreatment, *Aspergillus niger*, biogas production, paper waste, chicken manure

BOOK OF ABSTRACTS

BBC-67

Investigations on *Chlorella sorokiniana* Potentials in *Clarias gariepinus* Aquaculture Water Waste.

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ABSTRACT

The challenge to maintain environmental compatibility while meeting the high aquaculture demand is daunting. Aquaculture requires solutions to its several environmental challenges to be sustainable. This study was carried out to evaluate the potential of *Chlorella sorokiniana* in the remediation of *Clarias gariepinus* wastewater and the conversion of the wastewater-borne nutrients into high-quality biomass. This study examined the performance of *C. sorokiniana* in the treatment of *C. gariepinus* water waste designed at different percentages (50 %, 75 %, and 100 % of the effluent and BG 11 was used as the control). The cell concentrations and specific growth rate were monitored during the microalgae cultivation for 14 days. The microalgae growth in the aquaculture wastewater was compared to the growth in the BG11 medium. The microalgae growth rate, as well as cell concentration of the aquaculture wastewater was significantly higher than that of the control group. For the remediation, the 75 % treatment group had the best efficiency with total ammonia (TA), total nitrogen (TN) and total phosphorus (TP) at 84 %, 85.5 % and 82.5 % respectively. The nutrient parameters (TA, TN and TP) of the *C. gariepinus* aquaculture water waste were quantified and were found to be significantly lower after treatment with *C. sorokiniana*. The protein content of *C. sorokiniana* grown in the 100 % wastewater treatment group has a higher protein content (49.40 %) compared to the control group (37.50 %), indicating the suitability of *C. sorokiniana* as an aquaculture feed.

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Correlates of Personal Protective Equipment Utilisation among Building Construction Workers in Nsukka Metropolis, Enugu State

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ABSTRACT

This study examined the correlates of Personal Protective Equipment (PPE) utilisation among building construction workers in Nsukka Town, Enugu State using a descriptive survey design. A sample size of 364 building construction workers was drawn using a multistage sampling procedure from a population of 4000 building construction workers in Nsukka town. A self-structured questionnaire titled "Correlates of PPE Utilisation among Building Construction Workers Questionnaire (CPUBCWQ)" with a reliability coefficient of 0.93 was used as the instrument for data collection. Data collected and returned were coded into SPSS version 25 and analysed using percentage, mean, and standard deviation for the research questions and regression for the hypotheses. The findings of the study revealed that PPE was utilised in Nsukka town to a high extent. Demographic characteristics of respondents and workplace safety culture correlated with PPE utilisation to a very high extent ($P=0.000<0.05$). Based on these findings, it was concluded that Personal Protective Equipment utilisation among building construction workers in Nsukka town was high. Workplace culture and demographic characteristics of respondents moderately correlated with PPE utilisation among building construction workers in Nsukka town, Enugu State. It was therefore recommended that building construction managers should continue to enforce industrial safety practice regulations.

Keywords: Correlates, Utilisation, Construction, Equipment, Workplace, Population

BOOK OF ABSTRACTS

BBC-69

Biodegradation of Water Hyacinth (*Eichhornia crassipes*) Lignin Detected by Fourier-Transform Infrared Spectroscopy and Scanning Electron Microscopy

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ABSTRACT

Lignocellulosic biomass has attracted much attention for renewable energy generation as an alternative to depleting fossil fuels due to their natural abundance and eco-friendliness. However, the recalcitrance nature of the lignin in the biomass presents a serious problem in harnessing hydrolyzable polymers for biofuel production. The study, therefore, aimed to evaluate the degrading potential of *Aspergillus flavus* on water hyacinth lignin as an effective tool for lignin removal. *Aspergillus flavus* was obtained from dumpsite soil following conventional microbiological techniques. The organism was examined for its ligninolytic potential using water hyacinth extract as a carbon source on a mineral salt medium. The desired isolate was identified by morphological and molecular characterization. The proximate composition and lignin content of the plant materials were evaluated before treatment. Acid, alkali, and steam pretreatment methods were used to extract biomass. After various pretreatment methods, the filtrate was adjusted to a pH of 3.0, 9.0, and 7.0 for acid, alkali, and steam, respectively, and allowed to stand for 20 days. The percentage of lignin after degradation was obtained, control (41%), steam (42.16%), acid (67%), and alkali treated (40.87%). The result obtained revealed a reduction in lignin content as time increases and an increase in pH of various media, the percentage of lignin degraded was highest in the acid-treated sample (67%) and least in the uninoculated sample (control, 0.41%). In general, FTIR and SEM results showed that acidic, alkaline, and steam treatment methods had more serious impacts on lignin structure than the control sample. The pores observed in SEM images are caused by *Aspergillus flavus* breaking down the lignin structure. *Aspergillus flavus* had a positive effect on the depolymerization of lignin.

Keywords: Biodegradation, Lignocellulose, *Aspergillus flavus* Pretreatment, FTIR, SEM

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BBC-70

Bacterial Load of Vehicles and Receptacles used in the Sales and Distribution of Table and Sachet Water in Enugu Metropolis and Environs

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ABSTRACT

Water is essential for life and economic activities, especially in developing countries where scarcity and contamination are major issues. As a result, sachet and bottled water have become alternative sources of drinking water. However, these alternatives are prone to contamination from parasitic cysts, debris, and bacteria. This study was aimed at evaluating the bacterial load in trucks, vans, and other receptacles used for distributing table and sachet water in Enugu metropolis. A total of 160 samples were collected from various receptacles, trucks and vans. They were analyzed using serial doubling dilution, morphological features on culture media and biochemical test were used to identify the isolates. The bacteria load in CFU/ML and the antimicrobial susceptibility were determined using disc diffusion test. A high poly microbial contamination was recorded. Out of 160 samples collected 279 isolates were isolated. It was observed that wastewater had the highest contamination level, constituting over 27% of total isolates, followed by bowls at over 21%. Among the 279 bacterial isolates identified, *Escherichia coli* were the most prevalent (24.01%), while *Staphylococcus aureus* (22.94%) was also significant. *Klebsiella pneumoniae* (11.83%) and *Proteus mirabilis* (9.32%), were notable in wastewater and bowls. *Enterococcus faecalis* and *Shigella spp* were the least frequent. The viable number of bacteria load ranges between 7.26×10^6 – 19.27×10^9 CFU.ML. Antimicrobial susceptibility testing revealed that Levofloxacin and Gentamycin were effective against all Gram-positive isolates, while Gentamycin, Augmentin, and Ciprofloxacin were most effective against Gram-negative bacteria. The high prevalence of poly-microbial contamination some of which are multiple drug resistance is a health threat to consumers when consumed. There should be awareness of good sachet and table water handling hygiene by vendors and also periodic monitoring of water vending and distribution after production by the relevant authorities.

Keywords: Sachet water, Distribution, Microbial load, Coliform

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BBC-71

Evaluation of Serum Kidney Injury Molecule 1 Levels of Diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria.

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ABSTRACT

Early detection and interventions are crucial for the management of diabetic kidney disease (DKD) but currently, its diagnosis relies mainly on albuminuria and declining glomerular filtration rate (GFR), which are late markers of kidney injury. Serum kidney injury molecule 1 (S.KIM-1) has shown promise as an early biomarker for detecting renal tubular injury in diabetic patients but there is a dearth of data on this in the diabetic population in Nigeria. This study was therefore carried out to evaluate the level of S.KIM-1 in diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria. Ninety (90) subjects comprising 50 diabetics (cases) and 40 apparently healthy non-diabetics (controls), aged 18 years and above participated in the study conducted between February and May, 2023. Questionnaire was used to capture the bio-data and other vital information and anthropometric measurements were taken. Blood samples were collected and fasting blood glucose (FBG) and serum creatinine concentrations were analysed spectrophotometrically while S.KIM-1 levels were determined using enzyme linked immunosorbent assay (ELISA). Data were analysed using student's t-test, one-way analysis of variance, (ANOVA) and spearman's rho correlation. $P < 0.05$ was considered statistically significant. Result showed that the S.KIM-1 levels of the diabetics were higher ($p < 0.05$); (23.72 ± 6.55 ng/ml) when compared with that of the non-diabetics (9.50 ± 4.65 ng/ml) but there were no significant statistical differences ($p > 0.05$) in the S.KIM-1 levels based on the duration of the diabetes. Furthermore, there were strong positive correlations ($p < 0.05$) between S.KIM-1 and weight, body mass index (BMI), FBG, and serum creatinine in all the subjects ($p = 0.021$, $r = 0.243$; $p = 0.008$, $r = -0.279$; $p = 0.0001$, $r = 0.690$; and $p = 0.0001$, $r = 0.765$ ($p = 0.0001$, $r = 0.781$ and $p = 0.0001$, $r = 0.790$ respectively). Our findings revealed that S.KIM-1 levels are elevated in diabetics and should be further evaluated as a kidney function biomarker in our setting using larger sample size.

Keywords: Serum kidney injury molecule-1, Diabetics, Diabetic kidney disease, Biomarker, University of Nigeria Teaching Hospital.

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Production and Quality Evaluation of Crackers From Blends of Wheat (*Triticum Aestivum*) and Kidney Beans (*Phaseolus vulgaris*) Flour Flavoured with Onion (*Allium cepa*) Powder

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ABSTRACT

The study investigated the production and quality evaluation of crackers from blends of wheat (*triticum aestivum*) and kidney beans (*phaseolus vulgaris*) flour flavoured with onion (*allium cepa*) powder. Onion powder and kidney beans were substituted with wheat flour at 100:0:0, 90:10, 80:15:5, 70:25:5, 60:35:5, and 50:45:5 respectively. Results showed that substituting wheat and kidney beans flour blends flavoured with onion powder affected the parameters analyzed. The following analysis were carried out for quality evaluation; Proximate properties, minerals, vitamins, functional, anti-nutrients, physical, microbial compositions and sensory scores of the formulated crackers using standard analytical methods for all the analysis conducted, significant ($P < 0.05$) differences existed in all the parameters analyzed. After analysis, the following results were obtained Moisture (6.690 - 9.701 %), Protein (7.707 - 9.8 %), Fat (6.890 - 7.556 %), Carbohydrate (71.449 - 77.914 %), Phosphorus (133.540 - 397.410mg/100 g), Calcium (66.500 - 112.85 mg/100), Vit A (0.188 - 0.280 μ g/100 g), Vit C (2.000 - 6.535mg/100), OAC (130.035 - 143.53%), WAC (103.805 - 160.580%), Tannin(0.019 - 0.173 %), Oxalate (0.703 - 1.087 %), Phytate (0.033 0 - 0.097 %), Spread ratio (5.395 - 8.497), Breaking strength (24.400 - 71.050), Total viable count (1.1×10^1 to 1.5×10^1 cfu/g) and mould count (0.0 cfu/g in all samples). The sensory scores showed that sample A (100% wheat) and sample F (50 % wheat and kidney beans flour flavoured with 5 % onion powder) were generally accepted by the panelist. Crackers produced from wheat, kidney beans and onion were found to have high nutritional value that promotes health and wellbeing of the consumers.

Keywords: Crackers, Kidney beans, Wheat, Onion, proximate.

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BBC-73

Haematological Effect of *Alstonia Boonei* Methanol Extract in Lipopolysaccharide-Induced Model of Inflammation

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ABSTRACT

The haematological effect of *Alstonia boonei* methanol extract in normal and inflamed rats was evaluated using lipopolysaccharide (LPS)-induced model of inflammation. Twenty (20) Wistar albino rats were divided into five (5) groups of 4 rats each. Apart from group 1 (Normal control), groups 2-5 were induced with 10 mg/kg b.wt of lipopolysaccharide dissolved in normal saline. After 30 minutes of LPS induction, group 3 (standard control) and the *A. boonei* groups (groups 4 and 5) were treated with the standard drug (50 mg/kg b.wt. of ibuprofen) and different doses (250 mg/kg and 500 mg/kg) of the extract respectively and then left for eight (8) hours before blood collection for haematological analysis. The result of the phytochemical analysis of *Alstonia boonei* methanol extract indicated the presence of flavonoid, stilbenes, coumarin, gallic acid, quercetin, catechol, etc. The result showed that LPS induction caused a significant ($p < 0.05$) increase in total white blood cell (TWBC) and neutrophil counts (N) of untreated relative to normal control. Also, a significant ($p < 0.05$) decrease was observed in lymphocyte (L) and platelet counts of the untreated compared to normal control. However, treatment with both doses (250 mg/kg and 500 mg/kg) of the extract caused a significant ($p < 0.05$) decrease in TWBC, L and N relative to the untreated group. Moreover, treatment with (500 mg/kg) dose of the extract caused a significant ($p < 0.05$) increase in eosinophil and platelet counts compared to untreated group while (250 mg/kg) dose of extract caused a significant ($p < 0.05$) decrease in erythrocyte sedimentation rate (ESR) compared to untreated group. The result of this study indicate that *A. boonei* methanol extract possesses anti-inflammatory activity as a consequence of the observed significant increases and reductions in the haematological parameters. This is indicative that *A. boonei* could serve as an alternative for the treatment of inflammation, hence, supporting its usage for anti-inflammatory treatment.

Keywords: *Alstonia boonei*, Haematological effect, Methanol extract, Inflammation

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BBC-74

Mechanism of Artemisinin Resistance in *Plasmodium falciparum*

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ABSTRACT

Malaria continues to be a global health burden, threatening around half of the global population with Plasmodium parasite infection. Despite significant efforts in malaria eradication, the current trends indicate emerging roadblocks in the progress towards reducing the global malaria burden. One of the biggest roadblocks towards malaria control is the ability of *P. falciparum* to dictate antimalarial resistance rapidly. Artemisinin (ART) is a sesquiterpene lactone compound derived from *Artemisia annua* with potent antimalarial activity. Artemisinin activation is triggered by Fe²⁺ heme generated as a result of hemoglobin digestion. Notably, during the erythrocytic phase of the parasitic life cycle, *P. falciparum* invades the host red blood cells and then hemoglobin endocytosis ensues. The emergence of artemisinin resistance is a major obstacle to global malaria eradication/elimination programs. The emergence of artemisinin resistance is a major obstacle to the global malaria eradication/elimination programs. Artemisinin resistance is mostly related to the mutations in the propeller domain of the kelch13 (k13) gene that encodes protein Kelch13 (K13). The K13 protein has an important role in parasite reaction to oxidative stress. Parasites with mutations in PfKelch13, the major marker for ART resistance, are known to reduce hemoglobin endocytosis, induce unfolded protein response (UPR), elevate phosphatidylinositol-3-phosphate (PI3P) levels, and stimulate autophagy. Nonetheless, PfKelch13-independent resistance is also reported, indicating extensive complementation by reconfiguration in the parasite metabolome and transcriptome. Partner drugs require a different mode of action, or mechanism of resistance, to reduce the chances of multidrug-resistant selection. Apart from Kelch 13 protein, studies have also revealed the emergence of non-synonymous polymorphisms in plasmodium proteins such as ferredoxin, apicoplast ribosomal protein S10, multidrug resistance protein 2, and chloroquine resistance transporter are also major indicators of artemisinin resistance. To combat the menace of malaria amid rising resistance, combination therapy involving artemisinin-based drugs and other drugs like primaquine could be explored. Also, finding vaccines that can block transmission along with significant mosquito repellants is an option.

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BBC-75

Effect of Metal Ions on the Activity of Laccase Isolated from *Pleurotus ostreatus*

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ABSTRACT

This present study aimed to investigate the effect of metal ions on laccase activity isolated from *Pleurotus ostreatus*. Laccase was produced under a solid-state fermentation system using rice bran as a carbon source and lignocellulosic support. The crude enzyme was purified using ammonium sulfate precipitation and gel filtration and a total activity of 262.1173 U/ml was obtained. The optimum pH and temperature of laccase isolated from *Pleurotus ostreatus* were obtained as 5.5 and 50 °C respectively. The K_m and V_{max} obtained from the Line-Weaver Burk plot of laccase from *Pleurotus ostreatus* were 653.95 μ M and 500 U/ml, respectively. Generally, laccase activity from the white rot fungi species varies based on metal ion concentration (1-100 mM). Increasing the concentration of Mg^{2+} ($MgSO_4$) from 1mM to 10mM showed a slight increase in enzyme activity and a rapid decline in the activity of the enzyme as the concentration increased from 10 mM to 100 mM. In contrast, increasing the concentration of Zn^{2+} ($ZnSO_4 \cdot 7H_2O$), $MnSO_4$ and Ba^{2+} ($BaSO_4$) from 1 mM to 100 mM showed a progressive decrease in the enzyme activity. Interestingly, Cu^{2+} ($CuSO_4$) showed higher enzyme activity as the concentration of Cu^{2+} increased from 1 mM to 100 mM. The result obtained in this work provided valuable information on the type and nature of metal ions that influence enzyme activity given its biotechnological applications.

Keywords: Metal ion, laccase, white rot fungi.

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BBC-76

Chemical Profiling and *In vitro* Antioxidant Screening of the Flowers of *Cassia fistula* L. (Fabaceae)

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ABSTRACT

Cassia fistula L. (Fabaceae) commonly referred to as "Aragvadha" meaning "disease killer" is renowned for its therapeutic properties. This research investigates the phytochemical composition and antioxidant properties of *Cassia fistula* flowers to explore their potential medicinal and industrial applications. Historically used in traditional medicine the plant's chemical composition and antioxidant activity have been inadequately studied. This research addresses that gap by analyzing the methanolic extract of dried flowers. The process involved macerating dried and ground samples with 95% methanol for 48 hours followed by filtration and solvent evaporation at 25 ± 2 °C. The phytochemical analysis revealed the presence of flavonoids tannins alkaloids phenols and anthocyanins which are known for their antimicrobial and antioxidant properties. Quantitative analysis showed alkaloids (1.04 ± 0.03 mg/g) flavonoids (4.80 ± 0.07 mg/g) phenolics (30.10 ± 0.10 mg/g) tannins (0.45 ± 0.03 mg/g) saponins (0.51 ± 0.01 mg/g) terpenoids (6.84 ± 0.03 mg/g) and anthocyanins (2.04 ± 0.03 mg/g). High-Performance Liquid Chromatography (HPLC) identified bioactive compounds such as resveratrol (6.74 µg/ml) catechin (10.11 µg/ml) and flavone (17.27 µg/ml). The fatty acid profile included linoleic acid (18.45 µg/ml) and stearic acid (25.47 µg/ml) while the amino acid profile highlighted glutamate (21.38 g/100g) and aspartate (12.29 g/100g). The antioxidant activity was evaluated using four models: Nitric oxide radical scavenging assay total antioxidant capacity assay DPPH radical scavenging assay and reducing power assay with ascorbic acid as the reference. The IC_{50} values were 83.61 µg/ml for Nitric oxide scavenging 70.46 µg/ml for Total Antioxidant Capacity and 82.05 µg/ml for DPPH radical scavenging compared to ascorbic acid values of 2.73 µg/ml and 58.21 µg/ml respectively. The flower extract demonstrated increasing antioxidant capacity with higher concentrations. The outcomes of this study provide valuable insights into the phytochemical diversity and antioxidant potential which bridges traditional medicine and modern science by providing empirical evidence for the health benefits of *Cassia fistula*, validating traditional uses, and potentially integrating these findings into mainstream healthcare practices.

Keywords: Phytochemicals, Antioxidants, Remediation, Bioactive compounds

BOOK OF ABSTRACTS

BBC-77

Blood Parameters of African Catfish *Clarias gariepinus* Fed Diet Included with Black Soldier Fly (*Hermetia illucens*) Larvae Meal

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ABSTRACT

A feeding trial was conducted to evaluate the potential of black soldier fly (*Hermetia illucens*) larvae (BSF) as a Fishmeal (FM) protein alternative in the diet of African catfish (*Clarias gariepinus*). Four (4) iso-nitrogenous diets were formulated with BSF meal protein replacing FM protein at 0% (control) (CD), 30% (D30), 60% (D60), and 90% (D90). The haematological indexes of the fish were evaluated after 112 days. The result obtained shows the substitution of the BSF in the diet of the fish seems not to affect the health status as dictated by the blood parameters of the treatment groups which is like the control group and the inclusion of BSF in the diet didn't affect the blood parameters significantly. Hence, the WBC ($29.65 \times 10^9/L$ to $34.15 \times 10^9/L$); Lymph ($29.05 \times 10^9/L$ to $32.20 \times 10^9/L$); Neut ($1.38 \times 10^9/L$ to $2.25 \times 10^9/L$); RBC ($2.20 \times 10^9/L$ to $2.40 \times 10^9/L$); HB (8.10g/dl to 9.05 g/dl); HCT (30.78% to 33.50%); and MCHC (26.15g/dl to 30.00 g/dl) were all similar across the treatment group and the control. MPV (11.35fl) and PLT ($135.00 \times 10^9/L$) were higher in fish fed the D30 diet compared to the other fish groups while those fed the control (141.60fl) and D90 (41.85pg) had the highest MCV and MCH respectively. Therefore, it was concluded that BSF meal protein can partially replace FM protein in the diet of African catfish by up to 30% without any adverse effect on their health status.

Keywords: BSF, Fish Nutrition, Fishmeal, Haematological parameters, Fish Health Status,

BOOK OF ABSTRACTS

BBC-78

**Evaluation of the Neuropharmacological Potential of *Zapoteca portoricensis* (Jacq)
HM. Hernández in Experimental Murine Models**

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ABSTRACT

Zapoteca portoricensis (Jacq) HM Hernández is a medicinal plant of the Fabaceae family. It is traditionally used in Southern Nigeria as an anticonvulsant, antispasmodic, and in the treatment of gastrointestinal disorders with acclaimed success. In this study, the anti-depressant and sedative potential of the methanol root extract and fractions of *Z. portoricensis* were investigated using murine models. In each test (open field test, forced swimming test and elevated plus maze), mice were allotted into five groups (n = 5) and administered distilled water (control), *Z. portoricensis* root extract and fractions (100, 200, 400 mg/kg, p.o), as well as diazepam (0.5 mg/kg). In the open field test, *Z. portoricensis* extract (ZPE) decreased the number of line crossing, centre square duration, rearing, and grooming non-dose dependently while increasing freezing time. N-hexane fraction (HF) and methanol fraction (MF) exhibited similar results. In the forced swimming test, ZPE (100 mg/kg) significantly decreased the duration of immobility and increased swimming duration. The fractions significantly ($p < 0.05$) decreased the duration of immobility and increased the duration of swimming with HF producing the highest effects. In the elevated plus maze, ZPE exhibited a dose-dependent increase in the number of entries in the open arms, while the fractions caused a decrease in open-arm entries. EF (400 mg/kg) exhibited a significant ($p < 0.05$) decrease compared with the control. Results obtained from this study revealed that *Z. portoricensis* root extract and fractions may serve as a useful sedative and antidepressant agent.

BOOK OF ABSTRACTS

BBC-79

Epidemic Cholera Trends in Nigeria

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ABSTRACT

Cholera is an acute diarrhoeal infection caused by eating food or mostly drinking water that is contaminated with the bacterium *Vibrio cholerae*. Cholera is a highly contagious dehydrating disease that results in epidemics and pandemics. The risks of infection include open defecation and lack of clean/safe water. Seven pandemics of cholera have been recorded since 1817. Although epidemiologic surveillance constitutes an important component of the public health response, available surveillance data from Nigeria have been relatively limited. This research employed a Rapid Review Methodology search using online Google Scholar. Other reports were obtained from Google, Researchgate, PubMed/MEDLINE and AJOL. Seventy-four updates were obtained from info@ncdc.gov.ng sites. Search results revealed that Nigeria experiences several cholera outbreaks characterized by a high case fatality rate (CFR), notably, the epidemic of 1991 resulting in 59,478 cases and 7654 deaths. Since then there have been sporadic cases. By October 2010, there were over 40,000 cases, 1500 mortality and a CFR of 3.75%. Between the years 2016 and 2018, there were outbreaks in 3 Northern States. An upsurge was reported in October 2020, which then transitioned into a large epidemic up till 2021. Since then every year, cholera outbreaks kill hundreds of people in the north and the disease gets more rampant each year. Bauchi had the highest record of Cholera in Nigeria as of 2021. From January 1, 2024, till now, there are above 1000 cholera cases in 96 local government areas of 30 states. Most recently, 17 confirmed cases and 15 fatalities were recorded in 29 wards across multiple LGAs in Lagos. The recurrent outbreaks of cholera have raised questions about its epidemiological trends. However, understanding the seasonality and location of outbreaks can improve cholera control activities in vulnerable areas. Vigorous health promotion activities are also essential.

BOOK OF ABSTRACTS

BBC-80

**Dissection of the Agro-morphological Variations in 30 Elite Genotypes of
Phaseolus vulgaris L.**

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ABSTRACT

Climate change causes global food insecurity, affecting 800 million people in developing nations. With a projected 10 billion global population by 2050, boosting food production by 60% - 110% using plant genetic variations is crucial. *Phaseolus vulgaris* (common bean), a staple food, is the third most important source of calories after maize and cassava, serving millions of low-income households. Common bean cultivation encounters difficulties, such as vulnerability to both biotic and abiotic pressure, despite being a widely cultivated crop. This study was aimed to evaluate the agro-morphological potentials of 30 elite genotypes of *Phaseolus vulgaris* in derived savannah zone to identify varieties that have higher-yielding potential. The study panel is a subset of the African-European diversity panel which comprised mainly African and European genotypes complemented by South American genotypes, and planted in a randomized complete block design with 5 replicates. Agronomic characteristics were recorded using the common bean descriptor list by the International Board for Plant Genetic Resources. The data were analyzed using ANOVA and LSD was used to separate significant means at $P \leq 0.05$. Significant differences were found among the genotypes for all traits studied. The number of pods ranged from Kiangala (0.60 ± 0.40^i) to NCB11 (22.60 ± 1.86^a). Pod length was highest in PHA1077 (13.80). Positive correlations were observed between seed size and pod position, while growth habit had negative correlations with the number of pods (-0.054) and seeds per pod (-0.114). Medium-seeded genotypes showed greater adaptability in the region while climbing genotype NCB10 showed high yield potential. The findings of this study have implications for sustainable agriculture, crop breeding programs, and food security enhancement.

Keywords: *Phaseolus vulgaris*, Genotypes, Agro-Morphological traits, Yield potential, Genetic diversity.

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BBC-81

Exploring Potential Inhibitory Compounds from *Parkia biglobosa* against *Plasmodium falciparum* Triose Phosphate Isomerase (PfTIM): A Molecular Docking and Free Binding Energy Study.

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ABSTRACT

The spread of malaria parasite resistance coupled with the high cost and unfavorable side effects associated with current antimalarial drugs have necessitated the development of novel antimalarial compounds. Although several antimalarial drug targets have been elucidated, the lack of a functional tricarboxylic acid cycle in the asexual stage of malaria parasite development has made the glycolytic enzymes of *Plasmodium falciparum* an attractive antimalarial drug target. Triose phosphate isomerase (TIM) catalyzes the isomerization of D-glyceraldehyde-3-phosphate to dihydroxyacetone phosphate. This study, therefore, screened compounds from *Parkia biglobosa* for their inhibitory potential against PfTIM. The binding affinities of the compounds for the target were determined using Molecular docking, and free binding energy calculations were determined using molecular mechanics with generalized born and surface area (MMGBSA). The drug-like properties of the selected compound were further determined using Lipinski's descriptors. Myricetin, quercetin, cryptochlorogenic acid, and butein demonstrated a docking score of -11.27, -8.11, -6.88 and -6.52kcal/mol respectively. The MMGBSA analysis of the complexes showed free-binding energies of -33.84, -38.27, -42.95, -41.32, and -45.33kcal/mol respectively. Our data also showed that the selected compound demonstrated favorable pharmacokinetics and pharmacodynamics properties. Our study, therefore, shows significant potential for the development of new antimalarial drugs. However, further *in vivo* studies are necessary to determine the toxicity and efficacy of these compounds.

Keywords: Molecular docking, MMGBSA, Lipinski's descriptors, pharmacokinetics, pharmacodynamics.

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BBC-82

Mechano-responsive Cell Modification: Leveraging the Motor Clutch Model for Next Generation Cell Therapies

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ABSTRACT

This topic represents a cutting-edge area of research that could significantly impact the field of cell therapies. By exploring how the motor clutch model can be leveraged to modify and optimize cells for therapeutic purposes, researchers could potentially enhance the efficiency of existing cell therapies and develop entirely new treatment approaches. This research explores the innovative concept of mechano-responsive cell modification using principles derived from motor clutch models to develop next-generation cell therapies. By integrating mechanical engineering insights with biotechnological applications, this study aims to enhance the precision and efficacy of cell-based therapies, pushing the boundaries of biotherapeutics and biosciences. The motor clutch model describes the interactions between myosin motors, actin bundles, and molecular clutches that link the cell to its external environment. Understanding this model can lead to drug development in the medical biotechnology field whereby there is a development of drugs that target cell migration mechanisms, potentially useful in cancer treatment or wound healing. The knowledge of how cells respond to substrate stiffness through the motor clutch mechanism is essential for designing biomaterials for tissue engineering and regenerative medicine. The model can inspire the creation of new diagnostic technologies that assess cell mechanical properties as indicators of disease states. In conclusion, the motor clutch model serves as a crucial bridge between basic cellular biophysics and applied medical biotechnology. It provides a mechanistic understanding that informs the development of new therapies, diagnostic tools, and biomaterials. As our understanding of this model deepens, it continues to open new avenues for innovation in biomedicine and biotherapeutics, potentially leading to more effective treatments for a wide range of diseases.

BOOK OF ABSTRACTS

BBC-83

Physicochemical Parameters and Bacteriological Evaluation of Raw Cow Milk from Prince Abubakar Audu University Dairy Farm

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ABSTRACT

Milk is a food that inherently favours microbial growth and due to its characteristics, several precautions must be taken to prevent contamination in its production, processing and consumption, which are routinely subject to changes. Raw milk is a complex mixture which is highly nutritious, contain high level of water (85%) and a pH close to neutral which makes it highly perishable and a suitable medium for the growth and multiplication of microorganisms. This study was carried out to measure the physicochemical parameters and evaluate the bacteria associated with raw milk from a dairy farm. A total of seven (10) raw milk samples were -gotten from different lactating cows. The samples were examined for pH, organoleptic property, and density. Isolation of bacteria was done using the pour plate method, gram staining and various biochemical test were conducted to identify the organisms. The pH, density and titratable acidity of the milk samples ranges from 3.4 to 7, 0.89-1.08g/cm³, 0.12-0.30% respectively. The total bacterial count ranged from 3.1x10³ to 7.2x10⁶ CFU/ml, and total coliform count ranges from 4.1x10³ to 6.0x10⁵ CFU/ml the bacteria isolated were *Staphylococcus aureus*, *Lactobacilus* sp, *Klebsiella* sp, *Escherichia coli* and *Streptococcus* sp. The high bacteria count obtained in this study is an indication of poor sanitary condition and this calls for strict hygienic measure during handling of raw milk and its products.

BOOK OF ABSTRACTS

BBC-84

Endophyte: A Reservoir of Biotherapeutic Agents

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ABSTRACT

Antimicrobial discovery has traditionally focused on sources from plants, animals and microorganisms. However, with the reoccurring incidences of multidrug-resistant organisms (MDROs) towards the in-use antibiotics and the problem of over-exploration of plants that are heavily altering the ecosystem, the need for other sustainable means of acquiring novel drugs becomes imperative. In a bid to ameliorate these issues, researchers have resorted to the use of some endosymbiotic microorganisms, known as endophytes. These microorganisms inhabit the internal part of plants, which have been verified to possess great potential to bioengineer novel products, for therapeutic purposes. The discovery of endophytic microorganisms has come with so many promises of alleviating the challenges of increasingly multidrug-resistant strains of pathogenic microbes, which have become a global issue in health care delivery. In this research, Gas Chromatography-Mass with a Flame Ionization Detector (GC-FID) was used to separate and analyze the bioactive compound present in the ethyl acetate extract of endophytic fungi from the leaf part of *Mitracarpus scaber*. The result of this research depicted a plethora of bioactive compounds that are of good pharmacological use. Additionally, an aspect of this research that is striking is that through biotechnological approach, endophyte was mass produced which increased the availability.

Keywords: Endophyte, *Mitracarpus scaber*, Fatty acid profile, Bioactive compounds

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BBC-85

Effect of Methanol Fraction of *Millettia aboensis* Stem Bark Extract on Loperamide-Induced Constipation in Wistar Albino Rats

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ABSTRACT

This study evaluated the effect of the methanol fraction of *Millettia aboensis* stem bark extract on loperamide-induced constipation in Wistar albino rats. The phytochemical analysis of the methanol fraction of *Millettia aboensis* stem bark revealed varied proportions of phytochemical constituents in this decreasing order; phenols (4.96±0.09), flavonoids (4.69±0.16), terpenoids (2.20±0.14), saponins (2.07±0.0.7), alkaloids (1.99±0.14), glycosides (1.84±0.08) and tannins (1.06±0.04). The median lethal dose effect (LD₅₀) of the fraction recorded no death at both the lowest tested dose (10 mg/kg b.w) and the highest tested dose (5000 mg/kg b.w) which indicates that the fraction is relatively safe. The study of the effect of the methanol fraction of *Millettia aboensis* stem bark on loperamide-induced constipation in rats showed no significant ($p > 0.05$) increase in the feed intake, however, there was a significant ($p < 0.05$) increase in the water intake, water content of fecal pellets, weight of fecal pellets, and number of fecal pellets of the treated groups compared to the untreated rats and also a significant ($p < 0.05$) increase on the percentage propulsion thereby showing the effectiveness of the methanol fraction of *Millettia aboensis* stem bark extract on the treatment of constipation. There was a significant ($p < 0.5$) increase in percentage propulsion of the group that received 600 mg/kg compared to the group that received 100 and 300 mg/kg body weight respectively revealing a dose-dependent increase. Methanol fraction of *Millettia aboensis* stem bark extract increased gastrointestinal tract motility and stooling frequency without induction of diarrhoea as a side effect. The presence of secondary metabolites present could be responsible for the biological activities observed and the increase of intestinal motility could be useful in treating constipation. The significant increase in the frequency of fecal droppings (number of pellets) on the methanol fraction treated groups may prove that the extract contains some bioactive compounds that have laxative effects when administered and therefore support the claim that this plant is used in folk medicine for the treatment of constipation.

Keywords: Constipation, *Millettia aboensis*, Loperamide, Phytochemicals

BOOK OF ABSTRACTS

BBC-86

Evaluation of Bio-active Constituents, Antimicrobial Properties and Synergistic Potential of Palm Oil (*Elaeis guineensis*) with Standard Antibiotics using Checkerboard Technique

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ABSTRACT

Palm oil (*Elaeis guineensis*) is an essential component of most African cuisines. This study aimed to determine palm oil's bio-active constituents, antimicrobial potential, and the effect of its combination with standard antibiotics. Palm oil was manually extracted from fresh palm fruits purchased from Ogige market in Nsukka L.G.A. of Enugu State, Nigeria. The bioactive compounds in palm oil were investigated using Gas Chromatography-Mass Spectrometry (GC-MS) analyses. The antimicrobial activities and Minimum Inhibitory Concentration (MICs) of the oil (dissolved in n-hexane), n-hexane alone, and pure samples of ciprofloxacin (Bayer, Germany) and fluconazole (Norvatis, Switzerland) were determined against clinical isolates of *Candida albican*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus subtilis* and *Escherichia coli* using agar well diffusion and agar dilution methods, respectively. The interaction studies between palm oil and the standard antibiotics were done using continuous variation model of the checkerboard technique. The percentage oil yield of the palm fruits was 25%. The GC-MS analysis revealed the presence of 15 bio-active compounds with potential antimicrobial properties, including 2-Amino-oxazole (11.54 %) and Pentadecane (11.34 %) as the most abundant. Palm oil demonstrated a concentration-dependent antimicrobial activity against all the test isolates. The MIC of *Elaeis guineensis* ranged from 22.5 for bacteria, to 90% for fungi isolates. Out of the 120 varied combinations of antibiotics and palm oil in the interaction study, 98% were synergistic, 2% additive, and none antagonistic. This study demonstrated that palm oil has both antibacterial and antifungal properties. The observed synergistic interactions suggest the potential for using palm oil as an adjuvant to enhance the efficacy of antibiotics in combating the escalating threat of antibiotic resistance. It also shows that the concomitant administration of standard antibiotics with food prepared with palm oil will rather potentiate than antagonize their efficacy. Further studies will focus on exploring the mechanisms underlying the observed synergistic effects of palm oil and antibiotics.

Keywords: Synergism; MIC; Palm Oil; Checkerboard; GC-MS

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BBC-87

The Effect of Spent Engine Oil (Seo) on the Phytochemical Compositions of the Leaves of *Talinum paniculatum* (Jacq) Gaertn and *Talinum fruticosum* (L.) Juss.

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ABSTRACT

Phytochemicals are bioactive compounds produced by plants to aid their protective mechanism. They are also beneficial to man due to their known inhibitory or therapeutic effects against diseases like diabetes, cancer, obesity, and cardiovascular diseases. *Talinum* species are herbaceous plants known to contain useful phytochemicals and nutrients like beta-carotene, calcium, potassium and magnesium, pectin, protein and vitamins. However, several anthropogenic activities like oil pollution and spillage, solid waste disposal, farming, and industrialization have distorted the normal ecological balance and altered the characteristic chemical structure and composition of plant species. This study aimed to determine the effect of spent engine oil (SEO) on the phytochemical composition of the leaves of *Talinum paniculatum* and *T. fruticosum*. Leaves of *T. fruticosum* and *T. paniculatum* were cultivated in polythene bags containing 12.5 kg soil/poultry manure mixture (3:1) and at 28 days 250ml, 500ml, 750ml, and 1000ml of SEO were introduced in the soil in a completely randomized design. After 8 weeks of growth during which the plants were watered daily with 200 ml of tap water, phytochemical analysis was conducted to test for alkaloids, flavonoids, tannins, phenolic compounds, saponins, glycosides, terpenoids, steroids, and cyanogenetic glycosides. Results showed no traces of flavonoids in *T. paniculatum* whereas, *T. fruticosum* had all phytochemicals present. Quantitative analysis of each phytochemical present showed that different levels of SEO significantly ($P \leq 0.05$) affected the phytochemical composition of both plant species. The unpolluted plants (control) had higher phytochemical constituents such as in the alkaloids (1247.87 ± 20.89), saponins (26.37 ± 1.13), steroids (10.23 ± 1.99) and flavonoids (191.45 ± 8.55) than the treated plants. The lowest was recorded in saponins (2.53 ± 0.5 ; 2.5 ± 0.14), steroids (1.56 ± 0.48 ; 0.94 ± 12.0), and terpenoids (3.885 ± 2.82 ; 41.14 ± 7.0) in treatments with the highest level (1000ml) of the pollutant (SEO). Some phytochemicals contained in both plants like the phenols, flavonoids, steroids, saponins, and alkaloids, are reduced with an increase in the level of SEO. Although the result obtained from the experiment shows that the plants tolerated SEO pollution appreciably at lower levels (250ml and 500ml), it (SEO) reduced most of their phytochemicals content.

Keywords: phytochemicals, spent engine oil, *Talinum species*

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BBC-88

Network Pharmacology Analysis of Methanol Extract of *Bridelia Ferruginea* Leaves in Drug-Induced Liver Injury

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ABSTRACT

Drug-induced hepatotoxicity poses a substantial public health challenge due to its capacity to induce severe liver damage. This study employs network pharmacology and pathway enrichment analysis to elucidate the molecular mechanisms underlying the hepatoprotective effects of methanol extract from the leaves of *Bridelia ferruginea*, a plant with well-documented medicinal properties in traditional African medicine. Network pharmacology was utilized to predict the potential protein targets of the bioactive compounds in *Bridelia ferruginea*. Protein-protein interaction networks were constructed using data from databases such as STRING, GeneCards and DisGenet. Key protein targets were identified, followed by pathway enrichment analysis with tools such as ShinyGO to determine significantly enriched pathways associated with liver protection. The analysis identified several key protein targets, including AKT1, STAT3, and IL6. Pathway enrichment analysis revealed significant involvement of the TNF signaling pathway, IL-17 signaling pathway, and HIF-1 signaling pathway in the hepatoprotective effects of *Bridelia ferruginea*. Molecular docking studies indicated that bioactive compounds, including Narcissin and Rutin, possess strong binding affinities to critical protein targets, suggesting their role in modulating these pathways. The integration of network pharmacology and pathway enrichment analysis provides a comprehensive predictive framework in understanding the hepatoprotective mechanisms of *Bridelia ferruginea*. The identification of key protein targets and pathways underscores the potential of *Bridelia ferruginea* as a therapeutic agent for drug-induced liver injury.

Keywords: *Bridelia ferruginea*, drug-induced hepatotoxicity, network pharmacology, pathway enrichment analysis, hepatoprotective mechanisms.

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BBC-89

Evaluation of *Musa sapientum* (banana) Leaf Extracts (BLE) as Natural Preservatives against Three Common Spoilage Fungi

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ABSTRACT

Fungal spoilage poses a monumental drawback to the sustainability and safety of fruits and vegetables, particularly in developing countries. This study aimed to investigate the potential of banana leaf extracts (BLE) (*Musa sapientum*) as natural preservatives against common spoilage fungi, including *Aspergillus niger*, *Fusarium oxysporum*, and *Rhizopus stolonifer*, recovered from spoiled bakery products. The aqueous and ethanol BLEs were analyzed for their phytochemical compositions and antifungal activities against the three fungal isolates using standard protocols. Additionally, the minimum inhibitory concentrations (MIC) of the extracts were determined to ascertain the effective concentrations. The ethanol BLE showed intense levels of saponins, steroids, terpenoids, and glycosides, while the aqueous BLE contained alkaloids, tannins, steroids, and flavonoids. The antifungal activity of the extracts was concentration-dependent, with poor susceptibility observed at lower concentrations (200 mg/mL and 400 mg/mL). However, the highest concentration (800 mg/mL) exhibited significant antifungal activity against all tested spoilage fungi. Significantly better antifungal activity ($p < 0.05$) was observed with the ethanol extract, particularly at lower concentrations. The MIC of the ethanol extract was 200 mg/mL for *A. niger*, *F. oxysporum*, and *R. stolonifer*, whereas the MIC for the aqueous extract was 800 mg/mL for all three fungi. The findings of this study suggest that ethanol BLE holds promise as a natural preservative against spoilage fungi. Further research is necessary to refine the formulation and assess the practical application of BLE as a natural food preservative.

Keywords: Banana leaf extracts, natural preservatives, phytochemicals, *Rhizopus*, *Fusarium*, *Aspergillus*

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Artemether/Lumefantrine-Loaded Nanostructured Lipid Carriers Enhance Oral Malarial Treatment

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ABSTRACT

Artemether-lumefantrine (ARM-LFN) is a widely used and WHO-recommended fixed-dose ACTs for treating uncomplicated malaria orally. However, it has limited water solubility and oral bioavailability. To address this, nanostructured lipid carrier (NLC) was prepared using dika fat and Phospholipon® 90H (P90H) (solid lipids) with Oleic acid (liquid lipid) as the lipid matrix, loaded with artemether and lumefantrine by high shear ultrasonication method. The formulations were characterized for encapsulation efficiency (EE%), *in vitro* drug release profiles, physicochemical properties, and *in vivo* study. The results showed high encapsulation efficiency of 90 - 99% affirming effective drug loading within the NLCs. *In vitro* drug release studies revealed sustained release profiles of 33.23% - 88.95% for artemether after 6 h, and 32.44 - 74.75% for lumefantrine over 8 h. Physicochemical characterization demonstrated that the NLCs had a mean particle size ranging from 90.86 to 146.0 nm, with polydispersity indices of 0.380 to 0.494, indicating relatively monodisperse size distributions. Scanning electron microscopy confirmed that the NLCs possessed spherical shapes with smooth surfaces, suggesting uniformity and stability of the formulations. Differential scanning calorimetry (DSC) analysis revealed distinct melting peaks for the drug-loaded NLCs, indicating successful encapsulation and potential stability under physiological conditions. Fourier transform infrared (FT-IR) spectroscopy showed compatibility and no new-entity formation among the excipients and the drugs. *In vivo* anti-malarial study was evaluated through parasitemia reduction in murine models, showing that the group treated with the optimized NLC formulation (C₂) achieved the highest reduction (60%). Hematological studies indicated improvements in red blood cell count, hemoglobin, and packed cell volume in animals treated with NLCs, highlighting biocompatibility and therapeutic efficacy. Generally, this study underscores the potential of artemether/lumefantrine-loaded NLCs as promising candidates for oral delivery in malarial treatment, offering sustained release, enhanced bioavailability, and improved therapeutic outcomes.

Keywords: Oral delivery, Artemether/lumefantrine ACT, Nanostructured lipid carrier, Malaria treatment, Sustained drug release.

Acknowledgement: Dr. Emmanuel C. Ossai acknowledges the financial support received from the Tertiary Education Trust Fund (TETFund) (Grant no. TETF/ES/DR&D-CE/NRF2023/SETI/HSW/00245/VOL.1) by Government of Nigeria.

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Heat Stability and Thermodynamic Studies of Alpha-Amylase Produced from *Pichia kudriavzevii* AUMC 10190 Isolated from Cassava Mill Effluent Site

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ABSTRACT

Alpha amylase is a class of starch-degrading enzyme that catalyze the hydrolysis of glycosidic bonds to release glucose, and maltodextrin. In this study submerged fermentation system (SmF) was employed to produce extracellular alpha-amylase using *Pichia kudriavzevii* AUMC 10190 isolated from cassava effluent. The DNA of the isolated organism was sequenced and found to comprise of 513 base pairs. Alpha-amylase production by the organism was optimized using pH, period of incubation, and nitrogen sources. The optimum pH and suitable fermentation period for alpha-amylase production were found to be pH 7 and day 6, respectively; while peptone (414.39 U) was the preferred nitrogen source. The specific activity of the partially purified (using Sephadex G-200) alpha amylase was 2124.52 U/mg with 2.27 folds and 82.5% yield. The pH and temperature optima on the activity of the enzyme was 4.5, and 60 °C, respectively. The enzyme retained 66.9 and 56.1% of its original activity after 30 mins and 1 hr incubation at 80 °C. At 50 °C, the deactivation constant kD was -0.0042, at 60 °C the kD was -0.0002, at 70 °C the kD was -0.0028 and lastly, at 80 °C the kD was -0.0062. The activation energy required for the denaturation of the enzyme was 95045.648 J/K/mol. The enzyme had a Z value of 23.26 °C. The enzyme was assayed at different substrate concentrations and temperatures to determine the thermodynamic parameters (ΔG , ΔH , ΔS) of the alpha-amylase, which also provides insights into the enzyme's stability and catalytic mechanism. The enzyme had 92,110.8 and -27.63 J mol⁻¹K⁻¹ for its enthalpy and entropy respectively at 80 °C with 101864.2 J mol⁻¹K⁻¹ as its Gibbs free energy with a half-life of 0.001964 sec at 80 °C. The above results show the stability of the enzyme at high temperatures, suggesting the potential of *Pichia kudraivzevii* AUMC 10190 as a beneficial tool for the production of thermophilic enzymes for biotechnological applications.

Keywords: Alpha-amylase, Thermodynamics, Process optimization, Thermophilic enzymes, *Pichia kudraivzevii*.

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Microbial Profiling and Characterization of Anaerobic Digested Poultry Litter

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ABSTRACT

Livestock farming have resulted in the release of excessive wastes which, contains abundant organic matter and microbial population. The need to develop an alternative and sustainable methods to minimize the waste generated and it effects on the environment led to the application of anaerobic digestion (AD) for the treatment of waste and generation of methane gas. The study focused on investigation of the microbiome involve in AD of poultry litter and was conducted using poultry litter as organic substrate under batch conditions at hydraulic retention time (HRT) of fifty-six (56) days in fifteen (15) liter fabricated digesters at 37°C. The pH, total solid (TS), moisture content (MC) total ammonia nitrogen, volatile solid (VS) was assessed before and after digestion while the microbial community diversity was analyzed using 16S rRNA amplicon-based next-generation sequencing (NGS). The results indicated a pH of 7.91 ± 0.04 before digestion and 7.33 ± 0.06 after digestion and a TS value of $56.40\pm 0.6\%$ before digestion and $6.30\pm 0.34\%$ after digestion. A collective biogas yield of 5.21 ± 21.00 bars were recorded. The characterization of biogas analyzed with non-dispersive infrared (NDIR) gas analyzer (gas board 3100p) revealed a percentage methane content of 50.31 ± 1.33 . The microbial community indicate Bacteroidetes (46.37%), Firmicutes (48.37%), Proteobacteria (8.17%), as the most dominant phylum. This study suggests the importance of molecular analysis as a fundamental tool to gain insight and deeper understanding of anaerobic digester performances.

Keywords: Anaerobic digestion; biogas; microbial community; retention time; substrate; systems

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BBC-93

Anaerobic Digestion Potential of Organic Feedstock for Biogasification

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ABSTRACT

Anaerobic digestion (AD) represents a promising technology for sustainable biogas production from organic feedstock. This study investigates the biogas yield potential of various organic materials, emphasizing their efficiency and sustainability. A comparative analysis of different feedstock, including food wastes, cow dung, poultry litter, pig wastes, and agricultural litters was conducted using fifteen (15) litre fabricated semi-continuous digesters to evaluate their biogas production capacities and process stability within forty(40) days at mesophilic temperature. The results indicate that food wastes ($433\pm 8.00\text{kpa}$) and cow- dung ($327\pm 14.00\text{kpa}$) offer high biogas yields and stable digestion processes, highlighting their potential as viable substrates for biogas production. The study therefore shows the importance of optimizing feedstock selection and process parameters to enhance biogas production efficiency.

Keywords: Anaerobic digestion, feedstock, biogas

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**Protective Effect of Ethanol Extract of Jackfruit Rags (*Artocarpus heterophyllus* LAM.)
on Paracetamol-Induced Hepatotoxicity in Wistar Albino Rats.**

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ABSTRACT

Growing evidence has demonstrated the nutritional and medicinal benefits of the aril and edible parts of jackfruit tree (*Artocarpus heterophyllus* Lam). The present study was aimed to explore the antioxidant and in vivo hepatoprotective potential of jackfruit rags ethanolic extract (JFREE) on paracetamol-induced hepatotoxic rats. Proximate and phytochemical analysis of JFREE was carried out. *In vivo* studies on the hepatoprotective effect of JFREE was done using thirty (30) albino rats randomly assigned into six groups (n=5). Animals in group I and II served as normal and positive control, respectively. Rats in groups (III-VI) were administered 100 mg/kg bw silymarin, 100, 200, and 400 mg/kg body weight JFREE respectively for nine (9) days. Thereafter, animals were challenged with oral dose of paracetamol (2000 mg/kg bw) on the 10th and 11th day and humanely sacrificed on the 12th day and their blood samples and liver organ were retrieved for further determinations. Proximate analysis of JFREE showed that it contains 41.54 % carbohydrate, 18.0 % crude fibre, 17.5 % moisture, 12.76 % protein, 8.40 % fats, and 1.80 % ash. Phytochemical screening revealed appreciable amounts of flavonoids (31.15 ± 9.80 mg/100g), phenolics (8005.36 ± 102.43 mg/100g), alkaloids (6905.27 ± 286.27 mg/100g), tannins (112.37 ± 0.88 mg/100g), steroids (40.78 ± 0.89 mg/100g), glycosides (8.85 ± 0.01 mg/100g). Trace amounts of antioxidant vitamins (Vitamins A, C, and E) and minerals (potassium, calcium, manganese, zinc, and iron) were detected in JFREE. *In vitro* antioxidant studies using DPPH, NO, FRAP, and TAC determinations revealed that JFREE possess potent free radical scavenging properties and antioxidant capacity. From the result, animals in group II showed increased ($p < 0.05$) serum AST, ALT, and ALT activities, increased DB, TAG, LDL, MDA and Cholesterol levels, and reduced catalase and glutathione peroxidase (GPx) activities. Also, reduced ($p < 0.05$) serum HDL and increased ($p > 0.05$) SOD, GSH, TB, TP, and Albumin were also observed in the positive control. However, administration of different doses of JFREE in the treated groups significantly ($p < 0.05$) attenuated paracetamol induced hepatotoxicity which was comparable to that of the group administered silymarin. Liver histological studies showed amelioration of paracetamol toxicity in groups administered JFREE. This study suggest that Jackfruit rags extract possess hepatoprotective effect.

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The Use of Fish Parasites as Indicators of Lead and Zinc Aquatic Pollution, Oji River, Enugu State, Nigeria

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ABSTRACT

Traditional monitoring methods might not accurately reflect the bioavailability and toxicity of metal pollutants in aquatic environments. This study assessed the use of fish parasites as indicators of lead (Pb) and zinc (Zn) aquatic pollution of Oji River, Enugu State. Water samples were collected using standard procedures and the physiochemical properties assayed. Fish were caught by the local fishermen, their sex and weight were determined. The parasitic fauna was analyzed and the heavy metals, lead and zinc concentrations quantified. A total of 40 fish specimen were examined for parasites, six were infected (five *Synodontis clarias* and one *Tilapia zilli*). The recovered parasites were nematodes. Mean levels of Pb in the water sample was 0.099 ppm (± 0.077 SD) which is above the WHO permissible limits of 0.01 ppm, and Zn was 0.029 ppm (± 0.032) which is less than the World Health Organization (WHO) permissible limits. Zn and Pb were detected in all fish muscles in fishes examined. Mean Pb level in the fish tissues, was slightly lower than the level found in the water. Level of Zn in the fish tissues was significantly higher than the level detected in the water samples. The mean level of Pb and Zn in the fish parasites were both higher than the levels of Pb and Zn in the water samples, but not significant ($p > 0.05$). The study findings supports the use of fish parasites as indicators of lead and zinc pollution; this helps to provide an approach for monitoring aquatic ecosystems. In addition, parasite communities can serve as a proxy for the overall health of the ecosystem.

Keywords: Aquatic pollution; Pollution monitoring; environmental health; environmental parasitology.

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Curcumin Protects against Ketoconazole-Induced Hepatotoxicity in Wistar Rats

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ABSTRACT

Ketoconazole (KZ) is a broad-spectrum antifungal drug which use may cause hepatotoxicity. Curcumin (CM), an isolate of *Curcuma longa L.* is used in folk medicine to treat various ailments. This study examines whether CM supplementation can protect against a rat model of KZ-induced hepatotoxicity. Thirty adult Wistar rats (220-240g) were randomly grouped and supplemented orally with CM (50, 100 and 200 mg/kg/day) prior to the oral administration of KZ (200 mg/kg/day) for 14 days. On day 15, the rats were weighed and anesthetized. Blood samples were collected, and sera were extracted for biochemical analyses. Liver samples were excised, weighed and processed for oxidative stress markers and histology. KZ significantly ($p < 0.01$) decreased body weight and significantly ($p < 0.001$) decreased liver glutathione, superoxide dismutase, catalase, and glutathione peroxidase levels when compared to control. KZ significantly ($p < 0.01$) increased liver weight and significantly ($p < 0.001$) increased serum gamma-glutamyl transferase, alkaline phosphatase, amino transferases, lactate dehydrogenase, total bilirubin and liver malondialdehyde levels when compared to control. KZ caused hepatocyte necrosis. However, CM supplementation significantly restored body and liver weights at 50 mg/kg ($p < 0.05$), 100 mg/kg ($p < 0.01$) and 200 mg/kg ($p < 0.01$) when compared to KZ. CM supplementation restored serum biochemical and liver oxidative stress markers at 50 mg/kg ($p < 0.05$), 100 mg/kg ($p < 0.01$) and 200 mg/kg ($p < 0.001$) when compared to KZ. CM restored liver structure. CUM was effective against KZ-induced hepatotoxicity in a dose-related fashion.

Keywords: liver, toxicity, ketoconazole, prevention, curcumin

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Bacterial Load of Vehicles and Receptacles Used in the Sales and Distribution of Table and Sachet Water in Enugu Metropolis and Environs

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ABSTRACT

Water is essential for life and economic activities, especially in developing countries where scarcity and contamination are major issues. As a result, sachet and bottled water have become alternative sources of drinking water. However, these alternatives are prone to contamination from parasitic cysts, debris, and bacteria. This study was aimed at evaluating the bacterial load in trucks, vans, and other receptacles used for distributing table and sachet water in Enugu metropolis. A total of 160 samples were collected from various receptacles, trucks and vans. They were analyzed using serial doubling dilution, morphological features on culture media and biochemical tests were used to identify the isolates. The bacteria load in CFU/ML and the antimicrobial susceptibility were determined using disc diffusion test. A high poly microbial contamination was recorded. Out of 160 samples collected 279 isolates were isolated. It was observed that wastewater had the highest contamination level, constituting over 27% of total isolates, followed by bowls at over 21%. Among the 279 bacterial isolates identified, *Escherichia coli* were the most prevalent (24.01%), while *Staphylococcus aureus* (22.94%) was also significant. *Klebsiella pneumoniae* (11.83%) and *Proteus mirabilis* (9.32%), were notable in wastewater and bowls. *Enterococcus faecalis* and *Shigella spp* were the least frequent. The viable number of bacteria load ranges between 7.26×10^6 – 19.27×10^9 CFU.ML. Antimicrobial susceptibility testing revealed that Levofloxacin and Gentamycin were effective against all Gram-positive isolates, while Gentamycin, Augmentin, and Ciprofloxacin were most effective against Gram-negative bacteria. The high prevalence of poly-microbial contamination some of which are multiple drug resistance is a health threat to consumers when consumed. There should be awareness of good sachet and table water handling hygiene by vendors and also periodic monitoring of water vending and distribution after production by the relevant authorities.

Keywords: Sachet water, Distribution, Microbial load, Coliform

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Solid Lipid Nanoparticles-loaded Artemether/Lumefantrine for Improved Oral Malaria Treatment

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ABSTRACT

Artemether/lumefantrine exhibits low aqueous solubility, resulting in low bioavailability. Therefore, new strategies are needed. This study was carried out to formulate and evaluate solid lipid nanoparticles (SLNs) for improved oral delivery of artemether/lumefantrine in the treatment of malaria. Artemether/lumefantrine-loaded SLNs were formulated using the ultrasonication technique. These SLNs were characterized for their encapsulation efficiencies, *in vitro* drug release, surface morphology, particle size, chemical interactions and thermal properties. *In vivo* antimalarial activities were also evaluated. The results showed that formulated SLNs exhibited high encapsulation efficiencies of $99.62 \pm 0.17 - 99.85 \pm 0.18$ % for artemether and $92.12 \pm 0.19 - 96.23 \pm 0.11$ % for lumefantrine when loaded separately. Co-loading of artemether and lumefantrine into the same lipid matrix also resulted in high encapsulation efficiencies of $99.16 \pm 0.15 - 99.86 \pm 0.17$ % for artemether and $92.52 \pm 0.10 - 96.82 \pm 0.13$ % for lumefantrine. *In vitro*, a percentage drug release of 58.75 - 25.74% was observed for artemether when loaded alone, whereas artemether co-loaded with lumefantrine exhibited approximately 86.20 - 40.78 % drug release after 6 h. For lumefantrine alone, *in vitro* percentage drug release ranged from 63.75 - 24.19%, while lumefantrine co-loaded with artemether showed *in vitro* drug release ranging from 74.75 - 29.75 % after 8 h. The formulated SLNs exhibited spherical particles with sizes ranging from 91.27 - 140.1 nm and a polydispersity index of 0.364 to 0.418. FTIR spectra indicated no drug-excipient interactions. Thermal analysis revealed that both artemether and lumefantrine were in a solubilized form within the formulated SLNs. *In vivo* antimalarial studies indicated a dose-dependent, significantly ($p < 0.05$) higher percentage reduction in parasitemia with drug-loaded SLNs compared to the market sample used as a reference. Therefore, SLNs could be used to improve the bioavailability and anti-malarial efficacy of artemether/lumefantrine.

Keywords: Artemether/lumefantrine ACT, Solid lipid nanoparticles, Parasitemia reduction, Sustained drug release, Oral delivery.

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Evaluation of Serum Kidney Injury Molecule 1 Levels of Diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria.

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ABSTRACT

Early detection and interventions are crucial for the management of diabetic kidney disease (DKD). Still, currently, its diagnosis relies mainly on albuminuria and declining glomerular filtration rate (GFR), which are late markers of kidney injury. Serum kidney injury molecule 1 (S.KIM-1) has shown promise as an early biomarker for detecting renal tubular injury in diabetic patients. Still, there is a dearth of data on this in the diabetic population in Nigeria. This study was therefore carried out to evaluate the level of S.KIM-1 in diabetics at the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State, Nigeria. Ninety (90) subjects comprising 50 diabetics (cases) and 40 apparently healthy non-diabetics (controls), aged 18 years and above participated in the study conducted between February and May 2023. Questionnaires were used to capture the bio-data and other vital information and anthropometric measurements were taken. Blood samples were collected and fasting blood glucose (FBG) and serum creatinine concentrations were analysed spectrophotometrically while S.KIM-1 levels were determined using enzyme-linked immunosorbent assay (ELISA). Data were analysed using student's t-test, one-way analysis of variance, (ANOVA) and Spearman's rho correlation. $P < 0.05$ was considered statistically significant. Results showed that the S.KIM-1 levels of the diabetics were higher ($p < 0.05$); (23.72 ± 6.55 ng/ml) when compared with that of the non-diabetics (9.50 ± 4.65 ng/ml) but there were no significant statistical differences ($p > 0.05$) in the S.KIM-1 levels based on the duration of the diabetes. Furthermore, there were strong positive correlations ($p < 0.05$) between S.KIM-1 and weight, body mass index (BMI), FBG, and serum creatinine in all the subjects ($p = 0.021$, $r = 0.243$; $p = 0.008$, $r = 0.279$; $p = 0.0001$, $r = 0.690$; and $p = 0.0001$, $r = 0.765$ ($p = 0.0001$, $r = 0.781$ and $p = 0.0001$, $r = 0.790$ respectively). Our findings revealed that S.KIM-1 levels are elevated in diabetics and should be further evaluated as a kidney function biomarker in our setting using a larger sample size.

Keywords: Serum kidney injury molecule-1. Diabetics. Diabetic kidney disease. Biomarker. University of Nigeria Teaching Hospital.

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Medical-Biotech Approach to Environmental Waste Recycling: A View Point from Antimicrobial Activities of Cocoyam (*Xanthosoma sagittifolium*) Peel

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ABSTRACT

Waste generated from staple crops through direct consumption and or Processing, such as Cocoyam, Cassava, Rice, Beans, etc., and several other fruits and Seeds, calls for environmental concerns, thus, appears gainful to deploy Medical Biotechnological tools/ approach to duly screen and investigate Phytochemical-\Constituents objectively, for advantageous benefit of human health and nutritional needs. Ethanol and distilled water extracts of the Cocoyam peel showed antibacterial activities against the following test organisms: *Escherichia coli*, *Padomonas aeruginosa*, *Staphylococcus aureus* and *Shigella spp*. Paper disc and punched plate agar diffusion bioassay were used. Cleared zones of inhibition observed around the disc indicate growth prevention of the test organism. Both ethanolic and water extracts showed appreciable activity against *Escherichia coli*, using the paper disc and punched plate methods, also, appreciable effect on *Pseudomonas aeruginosa*, using the ethanolic extract in the disc and little or weak activity with water extracts using the same method and activity increased with both extracts using the punched plate method. Activity of extract on *Shigella spp*. showed reasonable effect with both paper disc and punched plate methods. And an appreciable effect on *Staphylococcus aureus* using the ethanolic extracts in the disc and little or weak activity with water extract using the same method. Thus, extracts had better antibacterial activities as clearly observed at concentration of 1.5g and 2.0g, thereby showcasing good source of wide spectrum antibiotics. In conclusion, since extracts could be active against test organisms *in vivo*, it would tentatively be applicable in a living cell.

Keywords: Cocoyam (*Xanthosoma sagittifolium*), Medical-Biotech Approach, Phytochemical-\Constituents.

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Wheat bran as a Potential Agricultural Waste for Bioethanol and Lignocellulosic Enzymes Production using Cultures of *Pleurotus ostreatus* and *Saccharomyces cerevisiae*

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ABSTRACT

Production of bioethanol from agricultural waste using microbial culture is an attractive option for waste management and a substitute for fossil fuel. This study investigates wheat bran as a potential agricultural waste for the production of lignocellulosic enzymes and bioethanol using cultures of *Pleurotus ostreatus* and *Saccharomyces cerevisiae*. The isolates were identified and confirmed using phenotypic identification techniques. The wheat bran was ground and the proximate composition was evaluated. It was subjected to 24 days of biological pretreatment for an interval of two-day extraction, using *Pleurotus ostreatus*, in order to de-lignify and hydrolyses the holocellulose. The time course revealed that the optimal productivity of lignocellulolytic enzyme activities was laccase (day 8 - 2043.25 U/ml), manganese peroxidase (day 20 - 860.08 U/ml), cellulase (day 8 - 110.62 U/mL), xylanase (day 4 - 100.39 U/ml) and pectinase (day 4 - 4.01 U/ml). The highest cellulose and reduced sugar contents were on days - 4 (0.33 g/l) and 8 (4.72 g/l) respectively with an 84.9 % saccharification rate. Ethanol fermentation was done using *Saccharomyces cerevisiae* for 7 days and the ethanol yield, specific gravity, pH and total reducing sugar were also determined. From the results, the percentage ethanol yield of 4.82 was maximum at 72 hrs while the specific gravity, sugar content and pH decreased over time. These findings show/prove that wheat bran is a potential agricultural waste for lignocellulosic enzymes and ethanol. The process is recommended as a means of generating wealth from waste.

Keywords: Wheat bran, *Pleurotus ostreatus*, *Saccharomyces cerevisiae*, Lignocellulosic enzymes and Bioethanol

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**Soil Enzyme Activities in Farm Soils Cultivated with Yam (*Dioscorea spp*),
Cassava (*Manihot esculenta*) and Plantain (*Musa paradisiaca*): Soil Health
Investigation**

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ABSTRACT

Soil enzymes are simply group of enzymes found in soil from root exudates and microorganisms, which are necessary catalysts for decomposition of soil litter and soil organic matter, nutrient cycling and, strongly influence energy transformation, environmental quality, and agronomic productivity. This research aimed to investigate soil enzyme activity (Urease, Phosphatase and Dehydrogenase) of soil samples cultivated with Yam (*Dioscorea spp*), Cassava (*Manihot esculenta*) and Plantain (*Musa paradisiaca*). Soil samples were obtained using a soil sampler at 30cm depth from yam, cassava and plantain farms in Nsukka, Enugu State. Samples were collected from the centre, North, East, West and South of the farming site. The soil obtained was spread under the shade to air dry for three days and stored for analysis. Enzyme activities were determined using standard methods. The urease activity in soil samples cultivated with Cassava (*Manihot esculenta*), recorded the highest activity ($1.66 \mu\text{mol min}^{-1}$) when compared to Yam (*Dioscorea spp*), $1.45 \mu\text{mol min}^{-1}$ and Plantain (*Musa paradisiaca*), $0.76 \mu\text{mol min}^{-1}$. Phosphatase activity in samples cultivated with Cassava (*Manihot esculenta*), recorded the highest activity ($3.74 \mu\text{mol min}^{-1}$) compared to Yam (*Dioscorea spp*), $3.26 \mu\text{mol min}^{-1}$. Dehydrogenase activity in soil samples cultivated with Cassava (*Manihot esculenta*), recorded the highest activity with a value of $2.84 \mu\text{mol min}^{-1}$ compared to Yam (*Dioscorea spp*), $2.34 \mu\text{mol min}^{-1}$ and Plantain (*Musa paradisiaca*), $1.76 \mu\text{mol min}^{-1}$. It also showed that soil samples from plantain farms recorded the least of all enzyme assayed for. This variation can be accounted for by the various agricultural practices that may affect soil enzyme functions. From the findings soil obtained from Cassava (*Manihot esculenta*) farm showed better soil health and quality when compared to soil cultivated with Yam (*Dioscorea spp*) and Plantain *Musa paradisiaca* respectively.

Keywords: Soil Health, Dehydrogenase, Phosphatase, Urease and Activity

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Molecular Characterization of Bacteria from Crude Oil Tank Farms in Nigeria

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ABSTRACT

Nigeria, a major oil-producing nation, hosts numerous crude oil tank farms, which are pivotal for storage and distribution. These tank farms also serve as unique habitats for diverse microbial communities, including bacteria with potential applications in bioremediation and industrial maintenance. This study focuses on the molecular characterization of bacteria from crude oil tank farms in Nigeria. Samples were collected from sludge, water, and soil within the tank farms, with basic physio-chemical characteristics measured in situ. DNA extraction was performed using the ZR Fungal/Bacterial DNA Miniprep kit, followed by molecular analysis to identify bacterial species and assess their functional capabilities. Results revealed a rich diversity of bacterial communities capable of degrading hydrocarbons, highlighting their potential in bioremediation efforts to mitigate oil pollution. Additionally, understanding these microbial populations can inform strategies to combat industrial issues such as corrosion. The study underscores the significance of microbial monitoring in maintaining the environmental health of crude oil operations and optimizing industrial processes. Biotechnological approaches leveraging these bacteria offer eco-friendly solutions for managing oil sludge, promoting sustainability, and enhancing economic growth in the petroleum sector.

Keywords: crude oil tank farms, bacteria, bioremediation, molecular characterization, Nigeria, Hydrocarbon degradation

BOOK OF ABSTRACTS

BBC-104

Sensory Evaluation, Physicochemical and Antioxidant Properties of Yoghurt Fortified with *Ocimum gratissimum*, *Phoenix dactylifera* and *Canarium schweinfurthii*

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ABSTRACT

Yoghurt is a fermented milk product with special sensory, nutritional, and dietetic benefits that comes in a wide range of varieties and flavors. Herbs and seed fruits are among the food items high in antioxidant compounds (such as vitamin C, carotenoids, tocopherols, and polyphenols), whose frequent consumption lowers the risk of a wide range of illnesses, such as cancer, heart disease, and diabetes. The shelf life, sensory quality, physicochemistry, and nutritional value of yoghurts with the addition of selected extract during 2-week refrigerated storage were evaluated in this study using yoghurt recipes made from a standard milk-based fermentation mix enhanced with Date, atili, lemongrass, and scent leaf extracts. Yoghurt was prepared from Standard milk-based fermentation mix fortified with extracts of *Ocimum gratissimum*, *Phoenix dactylifera* and *Canarium schweinfurthii*. Each fermentation mixture was pasteurized, and then infused with an industrial starter culture comprising a 1:1 ratio of *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp. bulgaricus*, and left to ferment for 12 to 15 hours at room temperature. Proximate analysis including determination of ash content, total solids, moisture contents, and shelf life was carried out and the organoleptic/sensory evaluation was carried out using the hedonic scale. Finally, the antioxidant properties were carried out using the β -carotene bleaching assay. The result showed that the yoghurt with *Ocimum gratissimum* extract showed both the highest percentage of total solid (TS) and shelf-life when compared with the plain standard samples. Yoghurt containing *Canarium schweinfurthii* extract had the shortest shelf-life but the highest moisture content, while the Yoghurt containing *Phoenix dactylifera* extract maintained a normal shelf-life when compared with the plain yoghurt and improved the sensory evaluation (taste and flavor). All samples showed high bleaching capacity when compared with the standard (Ascorbic acid) but the highest was the yoghurt sample with *Canarium schweinfurthii*. Yoghurt/dairy fortification is an ancient method of maintaining health and satiety. Yoghurt fortified with *Phoenix dactylifera* increased the sensory value of the yoghurt, and *Ocimum gratissimum* proved to be the most effective at extending shelf life. All yoghurt extracts showed high antioxidant potentials with *Canarium schweinfurthii* extract indicating the highest.

Keywords: Yoghurt, Fortification, Fermentation, Shelf-life, Extracts

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BBC-105

Nanocarriers: A Promising Tool for the Management of Inflammatory Diseases

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ABSTRACT

Nanocarriers are emerging tools in the field of nanotechnology, biotechnology, and biomedicine, which have gained attention as drug carriers, imaging and mediators for supporting chemicals that have the ability to stimulate immune response. Currently, nanocarriers are gaining interest in improving or modifying the immune system with combination of different materials and adjustment of their physical and chemical properties. Nanocarriers could be lipid-based, dendrimers, polymer and metal-based, which have diverse effects on the organism and could change the treatment paradigm of multiple diseases in the future. Applications of nanotechnology are prevalent in the diagnosis and treatment of infectious and inflammatory diseases. Nanocarriers basically are used to address, the limited solubility, extreme instability and cellular permeability of non-steroidal and steroidal anti-inflammatory drugs and various medicinal plant that also possess anti-inflammatory properties. Several researches have shown that nanocarriers can function as immunomodulators and some formulas have been approved for the treatment of inflammation-related diseases. This review seeks to explore recent advances in nanocarriers cutting across their interaction with different cellular and molecular components of the immune system and their application in the management of inflammatory diseases.

Keywords: Nanocarriers, nanotechnology, immune system and inflammatory diseases,

BOOK OF ABSTRACTS

BBC-106

Prevalence of Asymptotic Urogenital Candidiasis amongst Male Students at University of Nigeria, Nsukka

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ABSTRACT

Male urogenital Candidiasis can develop as a result of genital colonization by *Candida* spp such as *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis* and *Candida krusei*. Sexual activity, poor penis hygiene, antibiotic use, malnutrition, immunosuppressive diseases, and illicit drug use are factors that can increase the risk of urogenital Candidiasis in young male students. This infection can result in inflammation of the head of the penis, pain during sex and urination, burning and itching around the penis, and phimosis (a condition where the skin cannot be pulled back over the penis). A total of 50 early morning mid-stream urine samples were randomly collected from male students at the University of Nigeria, Nsukka, and inoculated on Sabouraud dextrose agar at 37°C for 24-72 hours. Wet film microscopy was carried out on the isolated *Candida* using 40x objective lenses for oval budding yeast presumed to be *Candida*. Germ tube test was also carried out on the isolate using the X40 objective lens. CHROMagar was used to identify the particular *Candida* sp. The *Candida* isolate appeared as oval budding yeast cells with short and irregularly branched pseudohyphae in wet film microscopy. The germ tube test indicates the absence of *Candida albicans* which form the germ tube. The CHROMagar confirmed the presence of *Candida krusei*. Out of 50 urine samples collected only 2% of *Candida krusei* was obtained. Male urogenital Candidiasis is a deadly infection and a serious health threat to young male students in the University. The male students should be educated on the causes and health risks of urogenital Candidiasis. This study determined the prevalence of *Candida krusei* from a urine sample of male students at the University of Nigeria, Nsukka.

Keywords: Prevalence, asymptotic, urogenital Candidiasis, genital colonization, *Candida* spp,

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BBC-107

Intermittent Fasting: An Approach for Preventing Chronic Diseases

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ABSTRACT

Fasting entails overall and voluntary abstinence from food. Fasting helps the vital energy to remove the toxic matter from the blood and purify the system. A significant amount of people in the modern world live a sedentary, and extremely unhealthy lifestyles that don't involve any kind of physical activity. Intermittent fasting (IF) is a state of consuming food and drinks within a defined period followed by fasting or extreme energy restriction. Contemporarily, there are several types of plans recognized for intermittent fasting: The 16:8 plan allows for a 16-hour fast and an 8-hour window for eating, is the most popular form of intermittent fasting, the 20:4 plan, the 24:24 plan also known as (alternate day fasting), 23:1 plan also known as (one meal a day). Although other approaches to IF are practised. The practice of IF has shown growing advantages including reducing insulin resistance, enhancing metabolic health, and promoting weight loss. Fasting periodically allows the body's cells to regenerate via autophagy. Studies on both humans and animals have demonstrated that intermittent fasting not only promotes weight loss and lowers the production of free radicals, but it also reduces the risk of diseases, such as cancer, cardiovascular disease, and diabetes, by integrating and improving cellular responses. Also, it has been proven that intermittent fasting affects body metabolism including the production of ketone bodies which serves as a major source of fuel for the brain and heart. There is a tremendous need for medical professionals to be educated about the importance of nutrition and IF. The objective of this review is to summarize and bring out the benefits of Intermittent Fasting.

Keywords: Intermittent, fasting, ketone bodies, and diseases

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BBC-108

Studies on Remedial Effect of *Jatropha tanjorensis* Leaf Extract on the Haematology of Mice Infected with *Plasmodium berghei* and Treated with Artemisinin-Based Combination Therapies

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ABSTRACT

This study investigated the remedial effect of *Jatropha tanjorensis* on the haematology of mice infected with *Plasmodium berghei* and treated with Artemisinin-based combination therapies (ACT). Fifty mice were grouped into five; A, B, C, D and E. Groups A, B, C, and D were infected with *Plasmodium berghei*. Group A was treated with Artemether and Lumefantrine, B was treated with Artesunate and Amodiaquine, C was treated with Dihydroartemisinin and Piperaquine Phosphate, and D was untreated while group E was neither infected nor treated. The initial and final percentage parasitaemia were determined by microscopy. Haematological parameters were determined using a haematocrit reader after three days of treatment. The three groups which were treated with the different ACT were administered *Jatropha tanjorensis* leaf extract. The haematological parameters were determined again using the haematocrit reader. Data was analyzed in R (R Core Team, 2023). The level of significance was set at 95% probability ($P \leq 0.05$). The result showed that the percentage of parasitaemia in groups A – C decreased but was only significant in group C ($P < 0.05$). However, parasitaemia increased in the untreated but infected group D. Evaluation of the haematological parameters revealed a significant decrease in PCV, RBC and Hb concentration from *P. berghei* infection while the total WBC count and the lymphocyte count increased in groups A-C, whereas neutrophil and eosinophil counts increased in the controls; D and E. However, after administration of *J. tanjorensis*, there was a significant increase in lymphocyte, neutrophil and eosinophil counts, particularly in group B. There was an insignificant increase in PCV, RBC, Hb and TWBC among the groups ($P > 0.05$). These findings suggest that Dihydroartemisinin and Piperaquine Phosphate were most effective in reducing the *Plasmodium berghei* parasite load in the infected mice. It also revealed that *J. tanjorensis* can be used to improve the haematological parameters after malaria treatment.

Keywords: Artemisinin-based, *Jatropha tanjorensis*, haematology, *Plasmodium berghei*, mice.

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BBC-109

**High-Performance Liquid Chromatographic Analysis of High-Fructose Corn Syrup
Produced from Different Varieties of Corn**

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ABSTRACT

High-fructose corn syrup produced from different corn varieties was assayed for their properties. The properties of the enzymes (alpha-amylase and glucose isomerase) involved in this production were determined to compare with existing studies. Fructose concentrations of the syrups produced in this study were higher than previously reported, this may be due to the crude nature of the enzymes used. The enzymes used were optimized for improved production of the syrup. The maximum activities of α -amylase and glucose isomerase after 72 h of fermentation time were 1680.2 and 884.78×10^7 ($\mu\text{mol}/\text{min}$) respectively. The optimum pH for the production of alpha-amylase and glucose isomerase was at a pH of 9.0. The activity of α -amylase on gelatinized corn starch was higher than that of un-gelatinized corn starch. The maximum fructose syrup produced occurred after adding alpha-amylase to the gelatinized corn starch and incubating at 50°C for 24 hours before introducing glucose isomerase for 2 hours at a temperature of 65°C. The fructose concentrations in the syrup produced from white dent corn, yellow sweet corn and popcorn were 236.14mg/g, 148.32mg/g and 84.64 mg/g respectively. Although there is an already existing method for producing high-fructose corn syrup, this study was borne out of the need to reduce the high production cost of existing fructose syrup and provide a cheaper alternative to sucrose.

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BBC-110

Mechanism of Antibiotic Resistance by Protein Moonlighting

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ABSTRACT

Antibiotic resistance has become a major global health crisis, posing significant challenges in the treatment of bacterial infections. Some studies on bacterial resistance have shown that there is a huge diversity of resistance mechanisms, in which the distribution and interaction is mostly complex and unknown. However, there are varieties of biochemical and physiological mechanisms that are responsible for the development of antibiotic resistance. Most of the antibiotic resistance has emerged as a result of mutation or through transfer of genetic material between microorganisms. However, emerging evidence suggests that protein moonlighting, a phenomenon where a single protein can perform multiple functions in the cell, beyond its originally described role plays a crucial role in antibiotic resistance. Some proteins that are involved in the normal functioning of bacterial cells may have the ability to interact with antibiotics in a way that allows the bacteria to resist their effects. For example, pyruvate dehydrogenase (PDH); a key enzyme in energy metabolism can bind to and detoxify fluoroquinolone antibiotics like ciprofloxacin. In *Pseudomonas aeruginosa*, PDH sequesters the antibiotic within its active site, rendering it inactive. Some proteins involved in the transport of nutrients into the bacterial cell may also be able to transport antibiotics out of the cell, preventing them from accumulating to levels that are toxic to the bacteria. For example, ToIC an outer membrane protein found in *Escherichia coli* act as a channel for various molecules, including antibiotics. However, specific mutations in ToIC can alter its conformation, reducing the passage of certain antibiotics like cephalosporins, thereby offering resistance. Other proteins may be able to modify or degrade antibiotics within the cell, rendering them ineffective. For example the protein enolase involved in glycolysis, has been shown to have β -lactamase activity which can inactivate β lactam antibiotics. Overall, protein moonlighting is a complex phenomenon that can contribute to antibiotic resistance in a variety of ways. Understanding how these protein functions in bacterial cells and how they interact with antibiotics is an important area of research that could ultimately lead to the development of new strategies for combating antibiotic-resistant bacteria.

Keywords: Protein moonlighting, antibiotics, antibiotic resistance, glycolysis, mutation, pyruvate dehydrogenase

BOOK OF ABSTRACTS

BBC-111

Antisense RNA Technology

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ABSTRACT

Diseases are often connected to the expression of some disease-causing gene which is important to produce that “Protein.” If the expression of this gene can be prevented then the disease can be cured. Antisense RNA technology is a powerful approach used to inhibit or downregulate genes. It involves the design and utilization of oligonucleotides, typically 19-23 nucleotides in length that are complementary to specific messenger RNA (mRNA) sequences. By binding to the target mRNA via Watson-Crick hybridization, antisense RNA molecules can effectively regulate gene expression at various levels. This technology has shown promise in the development of RNA-targeted drugs, particularly single-stranded antisense drugs (ASOs). It may be used to design some therapeutics for diseases in whose pathology in the production of protein plays a major role. The principle behind antisense technology is that the antisense nucleic acid sequence base pairs with its complementary sense RNA strand, inserted and prevents the mRNA from being translated into protein. Gene function relies on expression, which follows the central dogma of molecular biology. Manipulating and regulating protein expression during its translation can either knock out or knock down the expression of a gene of interest. Therefore, functional genomics can benefit from this technology since it allows for the regulation of protein expression. In cancer, ncRNAs (non-coding RNA) serve as potential biomarkers. For cancer treatment, effective and clinical relevant biomarkers are essential, and several studies indicated that the abnormal expression of antisense RNA can be used as an indicator in cancer diagnosis. In plants, antisense RNAs are mainly used in the inhibition of fruit maturation, virus resistance, flower coloration, starch synthesis, male sterility, and fertility. This review summarizes the current understanding of antisense RNAs and their mechanism of action. In addition, we detail the applications of antisense RNAs in anticancer treatments and in regulating the expression of related genes in plants.

Keywords: antisense RNA, Proteins, Gene expression, Translation, antisense oligonucleotides (ASOs), Diseases.

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BBC-112

Proteomic and Mass Spectrometric Analysis for Biomarker Discovery in Early-Stage Heart Failure.

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ABSTRACT

Heart failure is a clinical syndrome resulting from abnormalities in cardiac structure or mechanical function, leading to the heart's inability to deliver oxygen at a rate commensurate with the body's metabolic needs which is regarded as the terminal stage of all cardiovascular disorders. Despite advances in primary prevention and therapy, heart failure continues to have a poor prognosis and a high mortality rate. Proteomics offers a valuable tool for discovering and applying novel biomarkers in diagnosing and managing cardiovascular diseases, potentially improving prevention and therapy. In this study, the shotgun proteomic approach was utilized to identify and compare proteins in tissue samples from a 3-month-old glucokinase knockout mouse in early-stage heart failure and a normal control mouse. Bioinformatics analysis using MASCOT MS/MS ions search was also employed to further identify, characterize, and quantify the proteins from established databases. The result therefore identified 156 cardiac proteins in the normal control mouse tissue sample, while 163 cardiac proteins were identified in the diseased mouse tissue sample. Among these, 104 cardiac proteins were common to both samples, 35 were differentially expressed in the diseased tissue and 49 were unique to the diseased tissue. Eight cardiac proteins (ATP Synthase mitochondrial OS, Cytochrome C somatic OS, Myoglobin OS, Myosin-6 OS, Hemoglobin Subunit alpha OS, Histone H4 OS, Histone H2A type 2-A OS, and Cytochrome C oxidase subunit 7A1 mitochondrial OS) with high exponentially modified protein abundance index (emPAI) values were selected as potential biomarkers. This study shows that the identified proteins play vital roles in cellular stress response, mitochondrial dysfunction, and myocardial cell death and can be used as biomarkers for the prevention of early-stage heart failure and therapeutic strategies.

Keywords: Cardiovascular, Proteins, Biomarkers, Proteomics

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BBC-113

Investigation of Fish Aquacultures in Nsukka Metropolis as Potential Sources/Reservoirs of Antibiotic-Resistant Bacteria

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ABSTRACT

Fish farms have been identified as reservoirs for antibiotic-resistant bacteria in the environment. Aquatic microbiota can acquire resistance to antibiotics as a result of the aquaculture practice adopted in the fish farms. This study was conducted to assess the predominantly occurring bacteria in aquaculture and their antibiotic susceptibility profile. Water samples were collected from four different fish ponds for microbiological analysis. Isolation of bacteria species was done using the conventional culture method. An aliquot of 100µL from 10⁻⁴ and 10⁻⁵ dilutions of each sample in a physiological saline (0.85% NaCl), was pipetted and spread on nutrient agar plates (28g/1L, TM media, India), followed by incubation at 37°C for 24 hrs. The resulting bacterial colonies were characterized based on Bergey's manual of systematic bacteriology, while colonies with the same morphological features were identified as the predominant colonizers of that environment. The predominant isolates (n = 24), were identified from the total number of 73 bacterial colonies occurring in the four fish ponds. The antibiotic sensitivity profile was evaluated by the Kirby-Bauer Disc diffusion method. The order of bacterial prevalence in the fish ponds is UG (29.17%) = NJ (29.17%) > BJ (25%) > OL (16.7%). Gram positive bacteria were predominantly higher (n =22; 91.67%), than the Gram-negatives 2(8.33%). The probable bacterial isolates are members of *Bacillus species*, *Staphylococcus aureus*, *Streptococcus species*, *Enterococcus species*, *Klebsiella species*, and *E. coli*. All the isolates were susceptible to ofloxacin and gentamicin. Except for ofloxacin, *S. aureus* was resistant to all the antibiotics (87.5%), while the occurrence of resistance was lowest among the *Streptococcus* spp. Bacteria harbouring resistance genes are abundant in the fish ponds investigated, and there is a need to minimize the public health risks thereof, through regulated antibiotics use, and the adoption of good husbandry practices as alternatives to antibiotics for improved fish farming.

Keywords: Fish farms, aquaculture system, antibiotic sensitivity, horizontal gene transfer, resistance

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BBC-114

Microbiological Contamination of Microphones used in the Delivery of Lectures and other Social Functions in Different Faculties at the University of Nigeria, Nsukka.

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ABSTRACT

Microbial contamination of hard surfaces plays a significant role in disease outbreaks. One of such hard surfaces includes microphones used as the public address sound system. Microphones represent high-touch surfaces (HTS) that are routinely used in every social events. This work was aimed at isolating contaminating microorganisms from microphones used in Faculties of Arts and Social Sciences within the University of Nigeria, Nsukka. A total of 30 swab samples were collected from the microphone mouthpiece and handles, using sterile swab sticks moistened with sterile distilled water. The samples were delivered to the Microbiology laboratory, for processing, at the elapse of about 3 hrs pre-incubation. The swab samples pre-enriched in peptone water (15 g/ L), were inoculated into different culture media including Nutrient agar (28 g/L), Macconkey (57 g/L), and CLED (36 g/L), and SDA (65 g/L) supplemented with 0.05 g/L chloramphenicol, was prepared, autoclaved and dispensed into sterile Petri dishes. The samples were swabbed on the agar plates and incubated at 37°C and room temperature for bacteria and fungi respectively. The plates were observed for bacterial growth after 24 hrs, while fungal growth was monitored for a period of 48 h to 1 week. A total of 84 contaminants were isolated. Distribution of these isolates showed that comprising of 10 unique genera were isolated from the samples. These organisms include *Staphylococcus aureus*, *Staphylococcus* sp., *Streptococcus* sp, *Micrococcus* sp, *Bacillus* sp, *Proteus* sp, *Escherichia coli* and *Pseudomonas aeruginosa*, *Candida* sp and *Aspergillus* sp. The percentage of the isolates showed that *Staphylococcus aureus* was (5.95%), *Staphylococcus* sp. was (5.95 %), *Streptococcus* sp (9.5 %), *Micrococcus* sp (1.19 %), *Bacillus* sp (36.47 %) and *Pseudomonas aeruginosa* (11.90 %), *Candida* sp (8.33 %) and *Aspergillus contaminations flavus* (4.76 %). The potential roles of microphones in the transmission of pathogenic strains from the environment could be predicted, based on this study. Achieving a sterile surface for microphones may be practically difficult, but strict adherence to the basic rules of hand washing with hand sanitizers and disinfectants will reduce the burden of contaminants on microphone surfaces. It is also recommended that after these, the microphone itself should be cleaned with isopropyl alcohol and stored where possible in a box fitted with UV light. Each user of a microphone should be provided with a new mouthpiece cover and possibly use a nose mask when using a microphone in public places.

Keywords: Microphones, Microbial contamination, lectures, disinfectants, University of Nigeria, Nsukka

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BBC-115

Evaluation of Microbiological Contamination of Air Conditioners Installed in Offices in Different Faculties at the University of Nigeria, Nsukka.

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ABSTRACT

Air conditioners are deployed in human dwellings to eradicate heat conditions but may serve as potential reservoirs of infection if not appropriately used and maintained. This study aimed to evaluate microbial contamination of air conditioners in three different faculties at the University of Nigeria, Nsukka. Fifty samples were collected from different staff offices fitted with air conditioners: filtered air directly from the air conditioners, open air and air conditioner filters. Filtered air samples were taken (close to the air conditioner) by exposing nutrient agar (NA), MacConkey agar, Cystine Lactose-Electrolyte-Deficient Agar (CLED) and Sabouraud Dextrose Agar (SDA) plates against the air stream from the air conditioner for 15 minutes. The indoor/open-air samples were also taken by exposing the media plates for 15 minutes while sterile swab sticks moistened with sterile distilled/peptone water were used to take samples from the air conditioner filters and later used to inoculate the three media aforementioned. The NA and MacConkey culture plates were incubated at 37 °C for 24-48 h while SDA plates were incubated at room temperature for 3-5 days for fungal. Identification of the isolates were done using culture and microscopic morphology and biochemical characteristics. In all, 10 bacterial and 5 fungal genera were isolated. Filter swab samples harboured the highest diversity and abundance of bacteria than fungi. The bacterial isolates included: *Bacillus* spp., *Pseudomonas* spp., *Escherichia coli*, *Staphylococcus* spp, *Klebsiella* sp, *Enterobacter* spp., *Micrococcus* spp, *Streptococcus* spp., *Klebsiella* spp and *Corynebacterium* spp. The fungal species included: *Aspergillus* spp, *Alternaria* spp, *Cladosporium* spp and *Penicillium* spp. *Fusarium* spp. From the results it was observed that air conditioner filters are reservoirs for microorganisms and therefore requires regular cleaning and maintenance to avoid infiltration of microbes which could pose health risks in supposedly air conditioned rooms.

Keywords: Air conditioners, air conditioner filters, indoor air, Microbial contamination, University of Nigeria, Nsukka

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BBC-116

Chemoinformatic Screening of *Moringa oleifera* Phytochemicals for FGFR3 Inhibitors: Promising Candidates for Breast Cancer Treatment

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ABSTRACT

This study aimed to evaluate the in silico and ADMET properties of phytochemicals from the methanol extract of *Moringa oleifera* seeds, focusing on their potential to inhibit fibroblast growth factor receptor 3 (FGFR3) in breast cancer therapy. *Moringa oleifera*, known as the "drumstick tree" and widespread across India, Africa, and other tropical and arid regions, is commonly used for food and medicinal purposes. Various parts of the plant exhibit cytotoxic effects and can mitigate neoplastic conditions. Using gas chromatography-mass spectrometry (GC-MS) and gas chromatography-flame ionization detection (GC-FID), bioactive compounds were identified. Phytochemicals from *Moringa oleifera* were retrieved from the IMPPAT database and docked against FGFR3 (PDB-ID: 6PNX) to screen the GC-MS/GC-FID library. Top-scoring compounds underwent further evaluation with glide XP-docking and prime MM-GBSA calculations using the Schrödinger suite v20.03. The ADMET properties of the best-fit compounds were predicted using SwissADME web servers. GC-FID analysis revealed the presence of compounds such as catechin, naringenin, dihydrocytisine, tannin, ribalindine, flavonone, cardiac glycoside, flavone, ephedrine, oxalate, and saponin in varying concentrations. Quantitative analysis using UV spectrophotometry indicated the presence of phenol (1309.33±7.02 µg/mL), glycosides (100.80±1.11 µg/mL), flavonoids (243.33±1.514 µg/mL), terpenoids (1357.67±8.02 µg/mL), and saponins (221.47±2.52 µg/mL). In silico analysis showed that phytoconstituents like tannin, chlorogenic acids, and 4-(α-1-rhamnosyloxy)-benzylglucosinolate (glucormoringin) had better docking scores compared to nintedanib, a standard drug, and exhibited favorable ADMET properties, indicating their potential as anticancer agents.

Keywords: *Moringa oleifera*; Phytochemicals; FGFR3 inhibitors; Breast cancer therapy; *In silico* analysis

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BBC-117

Assessment of the Hydrolytic Enzymes Production Potential of Fungi Collected from Crude Oil-Polluted Sites in Nigeria

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ABSTRACT

Filamentous fungi are known to secrete extracellular degradative enzymes that enable them to tolerate high concentrations of toxic chemicals including hydrocarbons. Thus, the need to assess fungal isolates from crude oil-polluted sites for their hydrolytic enzyme production potential and implications for soil remediation. The Study aimed at assessing the bioremediation potential of Fungi species isolates from oil-polluted sites. The specific objective was to assess the extracellular enzymes production potential of Isolates that had the best hydrolytic activity. Soil samples collected from crude oil-polluted sites were profiled for Fungal Isolates. Most abundant and frequently occurring Isolates were cultured on PDA for 72 hours. Antibiotics were used to suppress the bacterial growth in the fungal growth. Pure fungi were inoculated on starch, skim milk, carboxymethylcellulose and groundnut oil media for assessment of amylase, protease, cellulase and lipase production respectively. The surfaces were flooded with specific recommended dyes for the different enzymes. After the 4-day incubation period, the hydrolytic enzyme production potential of the Fungi species was assessed following standard methods. Isolates with the best hydrolytic activity were assessed for the production of extracellular enzymes using the enzyme spectrophotometric assay technique. A total of 19 fungal species were isolated from the soil samples. *Aspergillus* species had the highest hydrolytic potential followed by *Curvularia lunata*. *A. fumigatus* strain 2 had the highest amylolytic activity while *A. clavatus* recorded the least amylolytic activity. *Penicillium sp.* had the strongest cellulolytic activity, followed by *A. fumigatus*; *A. niger* and *A. parasiticus* were strongly proteolytic. All Test species were lipolytic and *A. fumigatus* and *C. lunata* produced the highest lipases. Of all the fungal isolates studied, *Aspergillus* species exhibited maximum hydrolytic and lipolytic potentials signifying the genus's capability of producing extracellular degradative enzymes that could be exploited in the remediation of crude oil-polluted sites.

Keywords: Fungi, Enzymes, Oil Pollution, Bioremediation

BOOK OF ABSTRACTS

BBC-118

Effect of the ZnO Nanoparticles Obtained from Cashew (*Anacardium occidentale*) Leaves on the Haematological Parameters of Rats with Alloxan-Induced Diabetes.

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ABSTRACT

This study aimed to investigate the effect of zinc oxide nanoparticles (ZnO-NPs) synthesized from cashew (*Anacardium occidentale*) leaves on haematological parameters – red blood cell count (RBC), white blood cell count (WBC), differential white blood cell count (dWBC), haemoglobin (Hb) concentration, packed cell volume (PCV), glycated haemoglobin (HbA1c) concentration, and platelet (PT) levels - of rats with alloxan-induced diabetes. Examination of the pancreatic histopathology of the diabetic rats was also conducted. To achieve this, a total of thirty-five (35) male Wistar rats were divided into five groups with seven (7) rats in each group as follows: group 1 (normal control), group 2 (diabetic untreated), group 3, 4 and five (diabetic and treated with standard drug (glibenclamide), 200 and 400 mg/kg b.wt of ZnO nanoparticles of *A. occidentale* respectively). Diabetes was induced intraperitoneally by injecting 130mg/kg body weight of alloxan dissolved in 0.9% normal saline into 12 hours-fasted rats. The body weight and blood glucose level of the rats were taken before the treatment commenced, and on the 7th, 14th and 21st day of treatment, corresponding to the baseline, 1st, 2nd and 3rd day respectively. On the 21st day of the treatment, blood samples were collected from the rats to analyze haematological parameters using standard biochemical assays. The rats were subsequently sacrificed and the pancreas was harvested for histopathological examination. Results revealed that ZnO-NPs significantly ($p < 0.05$) improved the haematological parameters of the diabetic rats treated with different doses of ZnO-NPs of *A. occidentale* leaves, as well as improved the pancreatic histopathology of the rats compared to the untreated group, while also exhibiting a therapeutic efficacy comparable to that of the standard antidiabetic drug. There was an increase ($p < 0.05$) in the RBC, PCV and Hb levels as well as a decrease in the WBC, PT and HbA1c levels of rats in groups 4 and 5 respectively, compared to the untreated group, with the 200 mg/kg b.wt ZnO nanoparticle appearing to be more effective. Also, there was a decrease ($p < 0.05$) in the lymphocyte, monocyte, neutrophil and eosinophil counts of group 4 and 5 rats respectively. This highlights the potential of phyto-synthesized ZnO-NPs of *A. occidentale* as a novel approach to managing haematological complications associated with diabetes.

Keywords: Zinc oxide nanoparticles, diabetes, *Anacardium occidentale*, haematological parameters, alloxan-induced.

BOOK OF ABSTRACTS

BBC-119

Histopathological Changes Associated with Exposure to Some Toxic Heavy Metals in Kidneys of Albino Wistar Rats

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ABSTRACT

Heavy metals are the most toxic substances of global concern. Since they are not biodegradable they tend to bioaccumulate in the environment producing toxic effects to both plants and animals even in low concentrations resulting in genomic instability. This study was therefore aimed at assessing the histopathological changes associated with exposure of some toxic heavy metals in kidneys of albino wistar rats. Thirty albino wistar rats were used for this study and divided into 6 groups of 5 rats each and were administered $\frac{1}{10}$ of the determined LD₅₀ of the respective heavy metal salts of Lead acetate, Chromium sulphide, Cadmium chloride, Arsenic trioxide and Mercury chloride for groups 2,3,4,5 and 6 respectively daily. Group 1 served as the control was given commercial rat chow and water *ad libitum*. At the end of 45 days animals were sacrificed and kidneys collected for histological assessment using H & E staining technique. All the groups exposed to heavy metals showed histological alterations to include: degenerating tubules with vacuolated ductal and tubular shrinking nuclei, there were also hemorrhagic blood vessels within the renal cortical matrix. In conclusion heavy metal intoxication has been shown to cause histopathological changes in the kidney of experimental rat models.

Key words: Kidneys, Heavy metals, Histopathological changes, Degenerating tubules.

BOOK OF ABSTRACTS

BBC-120

Impact of roasting on vitamins, minerals, and proximate compositions of *Terminalia catappa* (Tropical almond)

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ABSTRACT

Terminalia catappa, commonly known as the tropical almond, is an underutilized food source with potential nutritional and health benefits. This study aimed to comprehensively evaluate the impact of roasting on the vitamins, minerals, and proximate compositions of *Terminalia catappa* (Tropical almond). The red almond fruits collected were first subjected to sun-drying for 14 days at a temperature range of 34–40°C. The nuts were divided into raw and roasted samples. Roasting was done in an electric rotary oven at 125°C for 15 minutes. Both samples were finely pulverized and used for each analysis. The results obtained showed that vitamin A (0.23 ± 0.20) was significantly ($p < 0.05$) lower in raw seeds than roasted (0.28 ± 0.01), while vitamins B1 (0.32 ± 0.03), B2 (1.14 ± 0.02), and B3 (3.52 ± 0.10) increased significantly in raw seeds. Vitamin E (24.77 ± 2.25) decreased non-significantly in raw seeds. Furthermore, there were no significant ($p > 0.05$) differences in selenium (0.45 ± 0.03 ; 0.42 ± 0.03) and iron (1.22 ± 0.04 ; 1.22 ± 0.60) in raw and roasted samples, but calcium (56.67 ± 1.00), manganese (0.03 ± 0.01), and zinc (0.26 ± 0.03) were significantly lower ($p < 0.05$) in roasted seeds. The raw seeds also exhibited significantly ($p < 0.05$) higher levels of protein (31.24 ± 0.75), ash (7.25 ± 0.14), moisture (10.01 ± 0.32), and crude fiber (5.00 ± 0.24) compared to roasted seeds with 27.56 ± 1.96 , 6.76 ± 0.23 , $5.38 \pm 0.04\%$, and 2.23 ± 0.06 , respectively. However, carbohydrate and energy levels were significantly higher in roasted seeds. Copper (0.03 ± 0.00) was only detected in raw seeds. This study reveals that roasting significantly impacts the nutritional profile of *T. catappa* seeds. While roasting reduces certain beneficial nutrients, it also enhances other components. These findings underscore the importance of optimizing roasting conditions to balance the seed's nutritional quality and safety for potential food and nutraceutical applications.

Keywords: *Terminalia catappa*, vitamins, minerals and proximate composition.

BOOK OF ABSTRACTS

BBC-121

Volatile Organic Compounds (Vocs) FUME (PM_{2.5}&10) from Automobile Spray Paints Induced Inflammation and Oxidative Damage: From Stock Parents to F1 Generation

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ABSTRACT

Volatile organic compounds (VOCs), a byproduct of natural processes and human activities are one of the biggest occupational silent threats to human health. This study was conducted to evaluate the effects of volatile organic compounds (VOCs) in a branded automobile spray paint on the oxidative stress indices of exposed workers, using albino rats as human model. A total number of 60 albino rats comprising of both male and female were used for this study. This work was divided into two phases. The first phase of the experimental rats (stock parent) was randomly divided into 5 groups (n = 6: 3 male and 3 female for each group) and exposed to different inhalation concentration of 0 (for the control), 25, 50, 75 and 100 ppm of paint solution (paint dissolved in turpentine) respectively. They were exposed to these inhalants (10 ml each of the different formulated paint-solution) for 8 weeks and 15 minutes short time exposure limit (STEL) daily using an inhalation exposure chamber. The second phase; offspring (first filial generation) of the stock parents and unexposed was also divided into 5 groups (n = 6: 3 male and 3 female randomly selected). The effect of exposure was tested on the stock parent (exposed group) and the offspring (unexposed group) of the experimental rats. An automated digital air quality detector machine was used to determine the actual dose (concentration/liter) of the VOCs in each exposure chamber, while gas chromatography was used to analyses the composition of VOCs content in the exposed paint solution. There was a significant (p < 0.05) increase in lipid peroxidation biomarker (MDA) and antioxidant enzymes SOD, CAT, GPx and GSH in stock parent and F1 respectively. This work has demonstrated that exposure to VOCs fume detected as PM 2.5 and 10 can adversely reengineer oxidative and inflammatory damage in the filial generations.

Keywords: VOCs, Oxidative stress, Albino rats, Stock parents, F1 and Automobile paint

BOOK OF ABSTRACTS

BBC-122

Anti-Convulsant, Proinflammatory and Discrimination Index Responses to PTZ Kindling Model Following Pretreatment with Plant Tannin in Rodents

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ABSTRACT

Tannin, also called tannic acid, any of a group of phenolic compounds in woody flowering plants that are important deterrents to herbivores. There are secondary metabolites sequestered in vacuoles within the plant cell that occur normally in the roots, wood, bark, leaves, and fruit of many plants. Pentylentetrazole (PTZ) is a convulsant agent used clinically and has been studied in several systems with the aim of determining its mechanism of epileptogenesis. This study focused on the anti-convulsant activity of tannin as well as accessing cellular adaptations to glial cell and inflammatory cellular responses. Forty-nine adult male wistar rats in seven groups were used for this study. Group 1, the normal control group was given growers feed and appropriate volume of water, group 2 was given 33mg/kg of PTZ only, group 3 was given 100mg/kg of tannin and 33mg/kg of PTZ, group 4 was given 200mg/kg of tannin and 33mg/kg of PTZ, group 5 was given 400mg/kg of tannin and 33mg/kg of PTZ, group 6 was given 400mg/kg of tannin only while group 7 (positive control group) was given 6.4mg/kg of tegretol (a control drug for convulsion) and 41.2mg/kg of PTZ. Tannin was administered orally to animals in groups 3, 4, 5 (treatment groups) and 6 for 20 days. On the 17th day of administration, PTZ administration commenced to the 19th day. Result showed that animals in group two showed high microglial and astrocyte response compared to groups pretreated with tannin; Tannin also reduced mean convulsion duration and IL-1 and TNF- α levels; there was no observable deficit in neuronal microstructure. Behavioural tests showed tannin has helped improve memory and discrimination index. Hence, this study shows tannin has anticonvulsant properties and inhibit glial cell activation, enhance cognitive behaviour and inhibit inflammatory cellular responses.

Keywords: Tannin, Pentylentetrazol, Interleukin-1, TNF- α , microglia.

BOOK OF ABSTRACTS

BBC-123

Determination of Lethal Dose (LD_{50}) and Mutagenic Effects of Sodium Azide on Germination Percentage in Two Varieties of Tomato (*Solanum Lycopersicum*)

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ABSTRACT

Sodium azide is a chemical mutagen that has been used to produce resistance in various susceptible crops to improve their yield and quality traits against harmful pathogens. The lethal dose and mutagenic effects of sodium azide on germination percentage of two varieties of tomatoes (Beatstreak and San Marzano) were investigated with the aim of optimizing a suitable mutagen concentration with a variability that could be exploited in the improvement of a quality traits in Tomato plants. This study was carried out in the Green House at the Department of Biotechnology, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State (AE-FUNAI). The two varieties of tomatoes seeds were collected locally as a fresh seed from the taxonomic department and was treated with sodium azide at different concentrations of 0.0%, 0.2%, 0.4% and 0.6% v/v. The seed were sown and monitored for 30days with everyday documentation of germination percentage, survival percentage and lethal dose. Statistical analysis using significant difference (LSD) at 95% probability level was employed to analyze the effects. The results obtained from this study shows that there is a steady decrease in germination and survival percentage with increased concentration of sodium azide in both varieties of tomatoes when compared with the control. The lethal dose (LD_{50}) was determined upon germination and survival of the tomato varieties. The highest LD_{50} was calculated by linear regression to be 0.950 for beafstreak variety which was significantly higher than 0.794 for san marzano variety at 50% germination was recorded under treatment 0.6% NaN_3 . These concentrations are therefore considered as the LD_{50} values. Sodium azide via mutation at low concentration improves some important quality traits of tomato.

Keywords: Sodium Azide, Beatstreak, San Marzano, Lethal Dosage, Mutagenic.

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BBC-124

Interplay between Gut Microbiota and Probiotic Diet and its impact on Human Health

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ABSTRACT

Recently, the human gut microbiota has received special attention as there is a direct correlation between the composition of the gut microbiota and human health. The shaping and multiplication of gut microbiome starts at birth, while the modification of their composition depends mainly on various genetic, nutritional and environmental factors and this can change intestinal permeability, digestion and metabolism as well as immune responses. Over the past several decades, Dietary patterns have changed significantly with increased consumption of calorically dense ultraprocessed foods low in fibre and high in saturated fats, salts, and refined carbohydrates. This has led to numerous negative health consequences such as obesity, metabolic syndrome and cardiovascular disease. The unprecedented surge in diseases coupled with harmful side effects as well as high resistance to existing drugs has necessitated the search for a more precise diagnostic and treatment options for diseases among scientists globally. Probiotics which are living microorganisms that have beneficial effects on the host have taken a central stage in research owing to their numerous therapeutic potentials in a number of diseases through metabolic regulation, preventing opportunistic pathogens from colonizing the intestine, maintaining a healthy gut flora balance. This study explored the relationship between gut microbiota, probiotic diet and human health.

Keywords: Gut Microbiota, Probiotic diet, Human health, Dysbiosis, Eubiosis.

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BBC-125

Properties and application of *Pichia kudriavzevii* HBUAS72401 cellulase in hydrolysis of organic acid pretreated rice husk

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ABSTRACT

Efforts toward converting waste to wealth have currently become a global concern owing to the growing population that have resulted in increased waste generation. This study is aimed at production, characterization and application of cellulase from *Pichia kudriavzevii* HBUAS72401 the saccharification of organic acid pretreated rice husks. *Pichia kudriavzevii* strain HBUAS72401 isolated from rice husk was optimized for cellulase production using submerged fermentation process. The enzyme underwent a two-fold purification steps using ammonium sulphate precipitation and gel chromatography with specific activities of 10.52 U/mg and 22.05 U/mg respectively. The partially purified cellulase had a molecular weight of 63 kDa, and optimum pH of 5.5 and temperature of 60°C. It's Michellis Menten constant (K_m) was 0.067 mg/ml and V_{max} of 3,333.3U. Potassium (K^+) and zinc ion (Zn^{2+}) displayed maximum activating and inhibitory effects, respectively on *Pichia kudriavzevii* HBUAS72401 cellulase when compared to the rest of the metal ions (Co^{2+} , Mn^{2+} , Na^+ , Mg^{2+} , Fe^{2+} , Cu^{2+}) investigated. The crude cellulase was used to hydrolyze rice husk pre-treated with organic acids (succinic, tartaric, and citric acid) for 30, 60, 90, and 120 minutes over three days. After 24 hrof enzyme hydrolysis, succinic acid pre-treated rice husk for 90 minutes yielded the highest concentration of reducing sugar (27 mg/dL) and tartaric acid pre-treatment for 30 minutes had the least yield (13mg/dL). The partially purified cellulase was also used for hydrolysis under the same conditions, with citric acid pre-treated rice husk for 90 minutes showing the highest concentration of reducing sugar (18 mg/dL) after 3 days of hydrolysis whereas rice husk pretreated with citric acid for 30minutes gave the least yield (3 mg/dL) after 24 hr of enzyme hydrolysis. The results of this study have shown that cellulase obtained from *Pichia kudriavzevii* HBUAS72401 has the potentials for industrial application in bioethanol production from lignocellulosic biomass.

Keywords: *Pichia kudriavzevii*, Cellulase, Rice husk, Acid Pretreatment, Bioethanol.