AFE BABALOLA UNIVERSITY,
ADO EKITI (ABUAD)
Km 8.5, Afe Babalola Way, P.M.B. 5454,
Ado Ekiti, Ekiti State, Nigeria.

BOOK OF ABSTRACTS

COLLEGE OF SCIENCES RESEARCH DAY 2025 (COSRED)

THEME:

MULTI-INTERDISCIPLINARY RESEARCH FOR SUSTAINABLE FUTURE THROUGH SCIENCE AND INNOVATION

Date: March 25, 2025 | **Time:** 9:00am

Venue: College of Sciences Auditorium

ABUAD...a vision in action

Preamble

The College of Sciences Research Day (COSRED) at Afe Babalola University, Ado-Ekiti, is more than an annual event—it is a vibrant platform for innovation, collaboration, and intellectual engagement among faculty and postgraduate students. The COSRED unites scholars committed to advancing knowledge and addressing global challenges through groundbreaking research. This year's event, themed "**Multi-Interdisciplinary Research for Sustainable Futures through Science and Innovation**," focuses on exploring and promoting innovative research across diverse disciplines. Discussions will be structured around the following sub-themes: Advancements in Intelligence Computing, Modeling, and Technology Food Security, Policies, and Interventions, Natural Resources in Human Health and Nutrition, and Responsive Building and Cultural Dynamics (Nexus).

A total of 64 abstracts were submitted and reviewed, covering programs within the College of Sciences as well as contributions from sister colleges. However, from these, 19 were selected for oral presentations, while 26 will be presented as posters while others were returned to their various authors. A major highlight of this year's event is the strong participation of external researchers, underscoring COSRED's growing reputation as a platform for impactful collaboration.

The event is expected to foster new research partnerships, encourage interdisciplinary dialogue, and elevate the University's research profile on a global scale. Additionally, selected papers from this edition will be considered for publication in Scopus-indexed journals, extending the reach and influence of our research contributions. Overall, all papers presented in this year edition of COSRED are intended to be published on the University website as College of Sciences Research Day Book of Proceedings and abstracts indexed in ABUAD International Journal of Natural and Applied Sciences (AIJNAS) with digital identifier of an object (DOI).

Remarks by the Provost

I extend a warm welcome to you all as we embark on yet another edition of the College of Sciences Research Day (COSRED), an occasion that stands as a cornerstone in the history of our esteemed College and University. It stands as a beacon of international academic excellence, a tradition we have steadfastly upheld through our collective dedication and achievements over the past year. College of Sciences Research Day has catalyzed a research renaissance within ABUAD, a testament to the tireless efforts of our academic community who have committed themselves to showcasing our scholarly endeavours, performances, accomplishments, and innovative ideas across various scientific disciplines.

We proudly declare that research within the College of Sciences at ABUAD transcends mere knowledge acquisition; it also represents a paradigm shift toward knowledge elucidation. We are not merely progressing, we are also actively cultivating an environment that attracts and nurtures the brightest minds, particularly our aspiring postgraduate students and graduates. The overarching vision of the college is to build upon the resounding success of previous COSRED editions, fostering robust engagement and fostering meaningful collaborations that address pressing societal challenges. This year's event is tagged "Multi-interdisciplinary Research for Sustainable Futures through Science and Innovation." emphasizing our commitment to advancing interdisciplinary collaboration to foster sustainability for generations to come.

This year's event promises to feature over over 40 research projects, encompassing both oral presentations and poster displays, culminating in the acknowledgment of outstanding endeavors with awards in both categories. What sets this event apart is its inclusive nature, inviting contributions from both seasoned scholars and researchers outside the college and university, thereby laying a solid foundation for future explorations and signaling a significant step towards establishing COSRED as a truly global event. The anticipation surrounding the outcomes of this event is palpable, reflecting our collective eagerness to propel scientific inquiry forward.

Moreover, COSRED 2025 catalyzes exploring emerging research trends, enriching our academic community with a plethora of diverse projects ripe for further exploration. We invite researchers and students alike to partake in this veritable cornucopia of research endeavors, seizing the opportunity to glean insights and inspiration for their scholarly pursuits. In doing so, we perpetuate a culture of research excellence and foster a lifelong commitment to learning and discovery.

On today's occasion, as a college, we are extending our heartfelt gratitude to the University management, led by Prof. E. Smaranda Olarinde, for their invaluable support in ensuring COSRED 2025 held this day March 25th, 2025.

We would like to appreciate our Mother-general, Yeye Aare Modupe Babalola, who is always there to provide guidance for us. Our profound gratitude goes to the Founder, Chancellor and President of ABUAD, Baba Aare Afe Babalola, the Apostle of Innovative Research for national development, who has provided this great platform for us to manifest our potential.

Prof. Pius A. OKIKI
Provost, College of Sciences

Local Organising Committee (LOC) Members

- Arc. A. O. Ajenifujah-Abubakar, Ph.D – Chairman
  Department of Architecture, College of Sciences

- Dr. O. B. Afolabi
  Department of Chemical Sciences, College of Sciences

- Dr. O. C. Akinduyite
  Department of Computer Science, College of Sciences

- Dr. P. T. Olagbemide
  Department of Biological Sciences

- Dr. O. J. Iyanda
  Department of Agricultural Sciences, College of Sciences

- Dr. K. A. Musiliyu
  Department of Mathematical and Physical Sciences

- Mrs. R. A. Adeleye
  Department of Geology, College of Sciences

- Mr. S. Olaleye – Secretary
  Administrative Officer, Office of the Provost, College of Sciences

Presentation Assessment Panel

- Engr. Dr. A. Salau – Chairman
  College of Engineering

- Dr. J. Talabi
  College of Medicine and Health Science

- Dr. I. A. Olubiyi
  College of Law

- Dr. T. M. Obajuluwa
  College of Social and Management Sciences

- Dr. A. Obisesan
  College of Pharmacy

Programme Schedule

[08:00 – 09:00] Arrival and Registration of Participants

[09:00 – 09:10] Opening Prayer/National Anthem/ABUAD Anthem

[09:11 – 09:25] Provost's Welcome Address – Prof. P.A. Okiki

[09:26 – 09:40] The Vice Chancellor's Opening Remark – Prof. E. S. Olarinde [09:41 – 09:50] Goodwill Messages

Keynote Lecture I [9:51 – 10:16]

[09:51 – 09:55] Citation of the Keynote Speaker I – A. M. Tope-Oke

[09:56 – 10:15] Keynote Lecture I – Prof. Olumide O. Obe

FIRST SESSION [10:16 – 11:05]: "Advancement in Intelligence Computing, Modeling and Technology" Chair – Dr. J. Mebawondu

[10:16 – 10:25] Lead Presentation: "Enhancing Healthcare Communication: A Yoruba-to English NLP Model for Doctor-Patient Interactions Using Machine Translation and Speech-to Text" – T.O. Adefehinti.

[10:26 – 10:35] Presentation 2: "Enhancing Computer Networking Education through Virtual Simulators: Bridging infrastructure and cost gaps in academic Institutions in developing Countries" – O. A. Ojo

[10:36 – 10:45] Presentation 3: "Comparative Analysis of Multimodal Prediction Accuracy: Deep Learning Models verse Traditional Machine Learning Approaches" – M. O. Tenibiaje

[10:46 – 10:55] Presentation 4: "The Impact of the Use of Mobile Phones on the Academic Performance and Social Interaction of University Undergraduate Students" – S. Oluwakoya

[10:56 – 11:05] Presentation 5: "Enhancing the Vigenère Cypher for Unicode Compatibility: A Modern Approach to Polyalphabetic Encryption" – O. C. Ajogbeje

[11:06 – 11:15] Questions and Answers

[11:16 – 11:55] First Poster Session / Tea Break/ Varieties Rendezvous

SECOND SESSION [11:56 – 12:35]: "Food Security, Policies and Interventions" Chair – Prof. F. O. Bamigboye

[11:56 – 12:05] Lead Presentation: "Enhancing Water Supply and Food Security in Nigeria through Innovation, Policies and other Engineering Interventions" – O. J. Oyebode

[12:06 – 12:15] Presentation 2: "Determinants of National Cash Transfer Programme (NCTP) on Households' Food Security Status in Ekiti State, South West, Nigeria" – A. A. Afolabi

[12:16 – 12:25] Presentation 3: “Biofilms in Food Processing Environments: Formation, Implications and Control” – O. H. Ayeni

[12:26 – 12:35] Presentation 4: “Long Term Effect of Cassava Effluent Deposition on Soil Chemical Properties” – O. G. Dayo-Olagbende

[12:36 – 12:45] Questions and Answers

Keynote Lecture II [01:11 – 01:35]

[12:46 – 12:50] Citation of the Keynote Speaker II– Dr. O. G. Dayo-Olagbende [12:51 – 13:10] Keynote Lecture II – Dr. Shakirat O. Ajenifujah-Solebo

THIRD SESSION [13:11 – 14:00]: “Natural Resources in Human Health and Nutrition” Chair – Prof O. B. Akpor

[13:11 – 13:20] Lead Presentation: “Assessment of Heavy Metal Contamination in Fish, Fruits, and Vegetables in Southwest Nigeria: A Systematic Review”. – B. Laoye

[13:21–13:30] Presentation 2: “Antioxidant Activity, Climbing Performance and Neuromuscular Transmitter (ACHE) Activity of Aqueous Extract of *Phyllantus amarus* plant Using *Drosophila melanogaster* Model – A. O. Adejori

[13:31 – 13:40] Presentation 3: “Investigation of the effect of poly-herbal anti-malarial mixture in mice infected with *Plasmodium berghei*– O. O. Damilare

[13:41 – 13:50] Presentation 4: “Assessment of Potentially Neurotoxic Elements in PM_{10} and their Health Implicatons: A Case of Lagos Mainland, Southwestern Nigeria– O. O. Afolabi

[13:50 – 14:00] Presentation 5: “Protective Effects of *Sphenocentrum jollyanum* Fruit Furanoditerpenes and Semaglutide on Kidney Function via Modulation of Kidney Injury Molecule-1 and Erythropoietin in Streptozotocin-Induced Diabetes– J. O. Abiola [14:01 – 14:10] Questions and Answers

FOURTH SESSION [14:11 – 15:00]: “Responsive Building and Cultural Dynamics” Chair – Dr. A. K. Ogundana

[14:11 – 14:20] Lead Presentation: “Responsive Building Design and Passive Cooling Strategies: A Systematic Review of Climate-Adaptive Architecture in Lagos, Nigeria”– T. D. Ogundeji

[14:21 – 14:30] Presentation 2: “Responsive Design Strategies for Promoting Cultural Inclusivity in Public Buildings: A Scoping Review”– I. C. Uchenna

[14:31 – 14:40] Presentation 3: “Sustainable Smart Nightlife Venues in Abuja: Design and Urban Impact”– O. Maxwell

[14:41 – 14:50] Presentation 4: “Evaluation of Architectural Identity in Public Buildings in Southwestern Nigeria”– G. Adebowale

[14:51 – 15:00] Presentation 5: “Smart Vernacular Buildings: Embedding Cultural Wisdom into Responsive Building Systems”– T. O. Akomolede

[15:00 – 15:10] Questions and Answers

[15:11 – 15:40] Second Poster Session / Lunch Break

Award Presentation [15:41 – 15:50] – Chair, Presentation Assessment Panel

Best Oral Presentation / 1st Runner up / 2nd Runner up (Student)

Best Poster Presentation / 1st Runner up / 2nd Runner up (Student)

Closing [15:51 – 16:20]

[15: 51 – 16:00] Feedback/ Certificate Collection

[16:01 – 16: 10] Vote of Thanks – LOC Chair, Arc. A.O. Ajenifujah-Abubakar, Ph.D.

[15:11 – 16:20] Closing Prayer /National Anthem/ABUAD Anthem

Poster Session Presentations

AICMT 01: Review of an Offline Signature Verification and Forgery Detection Using Deep Learning – P.O. Adedara

AICMT 02: The Impact of Social Media Technology on Human Life – T.P. Ayeni

AICMT 03: Synthesis and Characterization of Nitrogen-Doped Zinc Oxide Thin Films for P-Type Applications – K.A. Musiliu

AICMT 04: Advancing Maternal and Child Health in Nigeria through Support Vector Machines – T.O. Adefehinti

AICMT 05: Performance Evaluation of a Statistical Machine Translation Model for English-To-Yoruba (EYSMT) – T.G. Oluwatoki

FSPI 01: Advancing Sustainable Crop Productivity through Integrated Approaches: Lessons from Crop Physiology Research – O. Iyanda

FSPI 02: Enhancing Tomato Production in Nigeria: Challenges, Opportunities, and Sustainable Solutions– O. Iyanda

NRHN 01: A Comprehensive Review of Alzheimer’s Disease Pathogenesis, Treatment strategies, and Therapeutic Advances – O. Omowumi

NRHN 02: Seroprevalence of Chikungunya Virus IgG and IgM Antibodies among Patients with Fever in Ado-Ekiti– O.O. Idris

NRHN 03: Investigating The Effect of Polyphenolic-Rich Extract of Illicium verum Fruit on Sodium-Arsenite Induced Toxicity in *Drosophilia melanogaster*– I.L. Onifade

NRHN 04: Aqueous Extracts of *Syzygium aromaticum* Alleviate Potassium DichromateInduced Neurotoxicity in Wistar Rats by Inhibiting MAO-B and BACE1: An In Silico and In Vivo Study– M.A. Oluwasayo.

NRHN 05: Nutritional composition and sensory properties of biscuits as influenced by grasshopper (*Zonocerus Variegatus*) flour substitution– P.A. Falade

NRHN 06: Flavonoid-Rich Extract of *Detarium senegalense* Ameliorates Haematological and Lipid Abnormalities in Streptozotocin-Induced Type 2 Diabetes in Rats –J. N. Ejeje

NRHN 07: Health Benefits of *Aframomum melegueta* [Roscoe.] K. Schum –I. A. Adedoyin

NRHN 08: In Silico Evaluation of *Annona muricata* Phytochemicals as Potential Multi-Target Therapeutics for Polycystic Ovary Syndrome: A Molecular Docking Approach– O. E. Agboola

NRHN 09: Unveiling the Medicinal Values of *Xylopia aethiopica* (Dunal) A. Rich: A Review on Traditional and Scientific Perspectives– T.O. Akinwumi

NRHN 10: Seroepidemiological Survey of Human West Nile Virus IgG Antibody among Febrile Patients attending ABUAD Multisystem Hospital, Ado-Ekiti– O.O. Idris

NRHN 11: Investigating the Pattern of Antibiotic Resistance in Clinical Staphylococcus aureus Isolates from Ekiti State University Teaching Hospital, Ado-Ekiti– F.E. Folowosele

NRHN 12: Chemical Compositions of *Gossypium barbadense* Bark Ethanol Extract and its Antipyretic Effect on Brewers' Yeast induced fever in Wistar Rats– A. Abiola

RBCD 01: Performance of Urban Design Professionals in Achieving Sustainable Built Environment in Ado - Ekiti, Nigeria– A.T. Akinyemi

RBCD 02: Assessment of the Integration of Interior Design Colours on Users' Experience in Ado-Ekiti Hotels, Ekiti State, Nigeria– T.E. Adewumi

RBCD 03: Climate-Responsive Design for Sustainable Urban Resilience in Flood-Prone Areas of Port Harcourt Metropolis– B.A. Nwako

RBCD 04: Architectural Design Process and its Impact on Studio Class Performance among Architecture Students in Afe Babalola University, Ado-Ekiti, Nigeria– E. Opaluwa

RBCD 05: Sustainable cities and infrastructural development through civil engineering interventions and multidisciplinary research– O.J. Oyebode

RBCD 06: Nature and Elements of Urban Design as a Means of Promoting Sustainable City and Urban Environmental Aesthetics– R.A. Ibrahim

RBCD 07: Spatial Efficiency in Public Buildings: An Examination of Wasted Spaces in Benue State Secretariat, Makurdi, Nigeria– M. Gwaza

RBCD 08: Culturally responsive design: exploring the nexus between traditional building practices and modern sustainability in African cities– A.A Ala

RBCD 09: Enhancing Geotechnical Properties of Shale through the Utilization of Rice Husk Ash (RHA) from Anambra Basin, Nigeria– P.O Falae

Advancement in Intelligence Computing, Modeling and Technology

Enhancing Healthcare Communication: A Yoruba-to-English NLP Model for Doctor-Patient Interactions Using Machine Translation and Speech-to-Text

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Abstract

Language barriers pose critical challenges to healthcare access and delivery in multilingual regions like Nigeria. These challenges contribute to misdiagnoses, poor treatment adherence, and worsened patient outcomes, particularly in managing malaria. Advances in NLP offer promising opportunities to bridge communication gaps and ensure patients receive accurate information in their preferred language. This research creates an NLP model tailored to the Yoruba-speaking population, hence, solving the problem of language barriers between Yoruba and English healthcare stakeholders by integrating Yoruba Speech Recognition (YSR) which converts Yoruba audio into Yoruba text and Yoruba-English Machine Translation (YEMT**)** which translates the transcribed Yoruba text into fluent English using the Mel-frequency cepstral coefficients (MFCC) to enhance better diagnosis and treatment outcomes, providing a framework for addressing similar challenges in other healthcare contexts. Hugging Face tokenizers were employed to tokenize text thereby converting data to a numerical structured format. The data is split into a training set of 70% and a testing set of 30%. The Model has a Word Error Rate (WER) of 10% which indicates a robust ability of the Model to handle Yoruba's linguistic complexity, outperforming comparable systems for low-resource languages and a Sentence Accuracy of 77.1%, showcasing its practical applicability in enhancing doctor-patient interactions.

Keywords: Natural Language Processing (NLP), Yoruba-to-English Translation, Speech-to-Text, MFCC (Mel-Frequency Cepstral Coefficients), Healthcare Communication, Doctor-Patient Interaction

Enhancing Computer Networking Education through Virtual Simulators: Bridging infrastructure and cost gaps in academic Institutions in developing Countries

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Abstract
Enhancing computer networking education in resource-constrained environments remains a significant challenge, particularly in institutions in developing countries where the cost of setting up and maintaining physical networking labs is huge. Network simulators such as Packet Tracer, GNS3, and NS-3 have emerged as cost-effective and scalable alternatives, providing students with practical, hands-on experience in a virtual environment. This paper explores the role of network simulators in bridging the gap between theoretical knowledge and real-world application, with a focus on addressing infrastructure and cost limitations. It highlights the pedagogical benefits of simulation-based learning, including interactive problem-solving, real-time feedback, and the flexibility to model simple, intermediate, and complex networking scenarios. Furthermore, the study examines challenges such as the steep learning curve associated with some simulators and the discrepancies between simulated and real-world network performance. The paper concludes with strategic recommendations for the effective integration of network simulators into networking and IoT curricula, emphasizing best practices in instructional design, student engagement, and closing the gap between virtual simulations and real-world deployment to enhance student learning and skill development.

Keywords: Network Simulation, Teaching Tools, Computer Networking, Packet Tracer, GNS3, NS-3, IoT

Comparative Analysis of Multimodal Prediction Accuracy: Deep Learning Models verse Traditional Machine Learning Approaches

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Abstract

The advancement of predictive analytics has led to a shift from traditional machine learning (ML) techniques to deep learning (DL) models, particularly in multimodal prediction tasks. This study conducts a comparative analysis of the prediction accuracy of multimodal deep learning models and traditional machine learning approaches across various domains, including image recognition, natural language processing, and audio classification. By evaluating different architectures, fusion techniques, and key performance criteria such as complexity, scalability, feature engineering, interpretability, and computational requirement. This research provides insights into the strengths and limitations of each approach. Findings indicate that deep learning models outperform traditional machine learning in handling large, unstructured datasets due to their ability to learn hierarchical representations without manual feature engineering. However, ML models remain advantageous in scenarios requiring high interpretability, lower computational resources, and structured data processing. The study highlights the growing relevance of hybrid models that integrate both approaches, offering an optimal balance between accuracy and efficiency. These insights aim to guide researchers and practitioners in selecting the most suitable models for multimodal prediction tasks, fostering advancements in AI-driven analytics.

Keywords: Machine learning, deep learning, complexity, interpretability.

The Impact of the Use of Mobile Phones on the Academic Performance and Social Interaction of University Undergraduate Students

Samuel Oluwakoya, Olanike Christianah Akinduyite, Bukola Badeji Ajisafe, Tolani G. Oluwatoki
Department of Computer Science, Afe Babalola University, Ado-Ekiti, Nigeria

Abstract

The use of mobile phones has significantly transformed the academic experience of university students, providing both opportunities and challenges. This study examines the impact of mobile phone usage on the academic performance and social interaction of undergraduate students at Afe Babalola University, Ado-Ekiti (ABUAD). The research explores the extent to which mobile phones serve as academic tools for research, communication, and e-learning while also considering their potential distractions through social media, gaming, and nonacademic activities. The study adopted a quantitative research approach using a survey questionnaire administered digitally through google form questionnaire across undergraduates from various departments and colleges ensuring accessibility and anonymity to encourage honest response. The survey included a combination of Likert scale ratings, multiple-choice questions, and open-ended responses to ensure comprehensive insights. The findings indicate that while mobile phones enhance learning through access to online resources, excessive use for non-academic purposes negatively affects concentration and study efficiency. Furthermore, mobile phone dependency was found to influence social interactions, sometimes leading to reduced face-to-face communication. The study recommends strategies for promoting responsible mobile phone use, including digital literacy training and time management techniques, to maximize the academic benefits while minimizing distractions. This research contributes to the ongoing discourse on the role of technology in higher education and provides valuable insights for students, educators, and policymakers at ABUAD and similar institutions.

Keywords: Mobile phones, academic performance, social interactions, University students, technology.

Enhancing the Vigenère Cypher for Unicode Compatibility: A Modern Approach to Polyalphabetic Encryption

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Abstract

In today's digital age, the significance of strong encryption in communication has significantly increased. The Vigenère cypher, a classic polyalphabetic encryption substitution method, offers both effectiveness and simplicity; however, traditional methods only accommodate the uppercase alphabet of mode 26, which is insufficient for contemporary text encryption and security. This work advances the field of cryptography by introducing a robust and adaptable encryption technique suitable for modern computing environments. It suggests an updated version of the Vigenère cypher that supports Unicode, enabling a modern approach to polyalphabetic encryption through a system that can encrypt a wider range of characters beyond the ASCII (256) limit, including those from non-Latin scripts. This study also includes a flexible key generation system capable of dynamically managing different character sets while preserving the core principles of the cypher. Not only does the method reveal the enhanced Vigenère cypher, but it also considers capability and security implications. Finally, by integrating the modernize Vigenère cypher for Unicode compatibility, it creates a robust and versatile polyalphabetic encryption solution equipped to tackle the complexities of contemporary computing environments, securing text data across various applications such as messaging platforms, online storage services, and confidential document exchange.

Keywords: Vigenère cypher, unicode compatibility, polyalphabetic encryption, modern cryptography, text encryption

Synthesis and Characterization of Nitrogen-Doped Zinc Oxide Thin Films for P-Type Applications

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Abstract

Zinc oxide (ZnO) is a wide-bandgap transparent conducting material that plays a vital role in advancing contemporary technologies. In this work, the impact of nitrogen doping within ZnO thin films (ZnO-TFs) on Indium Tin Oxide (ITO) coated glass substrates was investigated using an experimental approach. Nitrogen sourced from Hexamethylenetetramine urotropine ($C_9H_{12}N_4$), was introduced into the ZnO-TFs, which were then deposited onto ITO glass substrates via electrodeposition. The nitrogen-doped (N-ZnO-TFs) ZnO thin films were characterized using various techniques, including X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-visible spectroscopy, four-point probe (FPP) measurements, Fouriertransform infrared (FTIR) spectroscopy, and energy-dispersive X-ray fluorescence (EDXRF). XRD analysis showed that every deposited film revealed a crystalline structure with a hexagonal wurtzite configuration, with orientation along the (002) plane. It was noticed that as the nitrogen content increased, both the crystallite size and the intensity of the (002) diffraction peak diminished, suggesting that higher nitrogen levels led to reduced crystallinity. The SEM images revealed distinct hexagonal structures in both undoped and nitrogen-doped ZnO thin films, with each structure averaging about 100 nm in diameter. Additionally, fourpoint probe analysis indicated that conductivity improved due to more efficient electron injection into the conduction band of N-ZnO, which in turn enhanced the photoelectrochemical performance of the Zinc oxide films.

Keywords: ZnO-TFs, Electrodeposition, Band gap, Crystallinity, Methenamine, Spectroscopy

Advancing Maternal and Child Health in Nigeria through Support Vector Machines

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Abstract

The alarming rate of maternal and neonates' morbidity and mortality rates in the country prompted a genuine commitment to enhance the health and well-being of mothers and children. This research aims to address the critical health challenges that causes maternal and neonates mortality using support vector machines (SVM) to improve health outcomes, optimize healthcare efficiency and address existing disparity. SVM, a supervised machine learning algorithm, is employed to predict risks during pregnancy and childbirth by analyzing health indicators such as blood pressure, age, and heart rate so as to develop a predictive model to identify high-risk cases early and support healthcare professionals in implementing timely interventions. The dataset was split into training (80%) and testing (20%) subsets using train_test_split from scikit-learn. The training data was then balanced using SMOTE to ensure equal representation of each class. The Model has an Accuracy of 76% and an F1 score of 71 %, making it suitable for enhancing maternal and neonatal outcomes.

Keywords: Maternal and Child Health, Machine Learning, Support Vector Machines, Predictive Analytics, Healthcare Optimization, Nigeria

Performance Evaluation of a Statistical Machine Translation Model for English-To-Yoruba (EYSMT)

Tolani G. Oluwatoki[1], Adebayo O. Adetunmbi[2], Josephine Olatanmi Mebawondu[3], Olanike Christianah Akinduyite[4], Stephen Eyitayo Obamiyi[5]
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Abstract

Lingua franca is a language adopted as a common language among the general population of a country with diverse native languages. In Nigeria, many school children are unable to fluently express themselves in their own mother tongue due to the language of instruction in the various educational institutions. This has suppressed the indigenous languages making the identity of the people and the cultural heritage gradually go into extinction. This makes it imperative to harness the use of technology to develop tools for local and indigenous language that can be made available for the general population. This study discusses our experiment on translation system using Statistical machine translation model. The system was trained on a bilingual corpus using text from both Yoruba and English dictionary and religion domain in the course of the research. With 7.83% BLEU (Bilingual Evaluation Understudy) score evaluation metric, the EYSMT shows a better performance than that of the sampled Google translate.

Keyword: Language, Indigenous, Statistical Machine, Translation, BLEU.

Review of an Offline Signature Verification and Forgery Detection Using Deep Learning

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Abstract

Signatures can be traced to the early ages as far back as 3000BC. It is a unique way of validating a person's identity, it has played a significant role in history from clay tablets to wax stamps to e-signatures used in today's world. Despite the fact that it offers uniqueness and a means of identification and validation of identity, signature forgery and theft has been an issue causing significant damages mostly in finance, education, business, law, real estate to mention but a few. This system aims to strengthen fraud detection and secure authentication process. Authentication in modern security systems is increasingly crucial due to the rapid growth of technology and automation. Traditional authentication methods often face limitations, leading to the rise in biometric systems. Among these, signature verification remains a widely adopted method for individual verification, and it plays a crucial role in identity authentication for various sectors; banking, legal documentation, and academic institutions. The present research focused on the various challenges caused by signature forgery, such as difference in genuine signatures, little to no training data. This study introduces an offline signature verification and forgery detection system using deep learning techniques, specifically Convolutional Neural Networks (CNN). The research utilized the CEDAR and ABUAD signature datasets to train, test, and evaluate models like MobileNetV2, DenseNet-121, ResNet-18, and Xception. The sequential implementation process includes preprocessed methods, feature/trait extraction, and model training to achieve improved accuracy. The findings demonstrated that DenseNet and Xception delivered superior accuracy, offering practical implications for real-world applications such as fraud prevention in financial and educational sectors.

Keywords: Signature verification, CNN-based verification, forgery detection, deep learning, biometric authentication.

The Impact of Social Media Technology on Human Life

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Abstract

Social media (SM) are websites and applications that allow users to share content for the purpose of interaction and social networking. Nowadays, people use social media for content sharing, interaction, networking, and a faster way of disseminating information. SM has taken center stage in official communications, marketing, and service promotion by organizations. SM is leading in creating new and independent businesses called microblogonomics, which allows individuals to earn money from their online interactions. Despite the benefits of SM, it also poses challenges like cyberbullying, social anxiety disorders, depression, addiction, fear of missing out (FOMO), superficial connections, reduced face-to-face interaction, and exposure to inappropriate content. This study examines the impacts of SM technology on human life, focusing on its benefits, challenges, and proposing strategies for ethical and responsible usage. By observing social media guidelines and avoiding its pitfalls, it can be one of the most potent tools for the advancement of society and individual potential.

Keywords: Social media, networking, technology, microblogonomics, addiction

Food Security, Policies and Interventions

Enhancing Water Supply and Food Security in Nigeria through Innovation, Policies and other Engineering Interventions

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Abstract

Engineering solutions are central to improving water supply, agricultural sustainability and productivity. There are incessant challenges of inadequate food supply and issues linked with water supply in Nigeria. This study examined various ways of enhancing water supply and food security in Nigeria. In-depth information about engineering processes, innovations, and policies was gathered through qualitative and qualitative research methods. Nigeria is at a turning point in its history when both areas can be greatly enhanced by creative thinking, well-thought-out legislation, and engineering breakthroughs. To solve these issues, this study investigates the possibilities of integrated innovation in agricultural techniques and water management. It addresses the function of legislative frameworks that can facilitate the development of water harvesting technologies, desalination, and effective irrigation systems, among other aspects of sustainable water resource management. Innovation in water management plays a pivotal role in addressing water scarcity. Technologies such as rainwater harvesting, advanced irrigation systems, and water recycling can significantly improve water availability. It was discovered that long-term food and water security in Nigeria depend on the implementation of a comprehensive, multidimensional strategy that incorporates engineering, policy, and technology advancements. There is a need to introduce crop types that are climate-robust, precision farming, storage and delivery systems to reduce food waste and other technical interventions in agricultural output. Climate change, inadequate infrastructure, ineffective resource management, and fast population increase have all contributed to food insecurity and water scarcity. It was concluded that water supply and food security in Nigeria can be enhanced through innovation, viable policies and other engineering interventions. Public-private partnerships and community involvement can be utilized in the implementation of these solutions. This will ultimately support the socioeconomic growth and climate change resilience of the country.

Keywords: Engineering solutions, Water scarcity, Agricultural sustainability, Policies, Food insecurity.

Determinants of National Cash Transfer Programme (NCTP) on Households' Food Security Status in Ekiti State, South West, Nigeria

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Abstract

Food security in rural households has been constrained by household's poverty and social interventions such as National Cash Transfer Programme (NCTP) aimed at breaking the intergenerational transfer of poverty and reducing the vulnerability of the extremely poor rural farming households to food insecurity in the country. The study examined the socioeconomic characteristics and determinants of NCTP on households' food security status in Ekiti State, Nigeria. Multistage-randomized sampling technique was used to select 240 households for the study. Frequency counts and percentages were used to describe the socioeconomic characteristics while Logit regression model was used to analyse the determinants of NCTP. The socioeconomic analysis showed that 82.5% of NCTP beneficiaries were male, about 59.2% of the beneficiaries were married and 77.5% of non-beneficiaries were also married. The average age of beneficiaries was 44% and 45% of them aged between 41-50 years and 98.3% belonged to a cooperative society. The annual income of beneficiaries were between ₦160,000.00 to ₦325,500.00, while that of non-beneficiaries ranged from ₦96,000.00 to ₦190,000.00.The daily per capita calorie consumption for NCTP beneficiaries was 2856.24 Kcal. The study also revealed that NTCP beneficiaries were more food secure than non-beneficiaries. Age ($p<0.01$), gender ($p<0.01$), household income ($p<0.01$), cooperative society membership ($p<0.01$), NCTP participation ($p<0.01$), access to credit ($p<0.01$), and years of farming experience ($p<0.01$) all had a positive and significant impact on household food security, according to the results of a logit regression analysis.
The study therefore recommends that NCTP should be continuous and more households should be covered in the Programme.

Keywords: National cash transfer programme, food security, households and logit regression.

Biofilms in Food Processing Environments: Formation, Implications and Control

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Abstract

The aim of this review is to advance the body of knowledge on biofilms in food processing environments, with emphasis on their formation, implications and control. Food processing environments are associated with high nutrient and moisture concentrations, as well as conditions that favor the growth of surface-associated microorganisms, known as biofilms. Biofilms are complex communities of microorganisms that adhere to surfaces and secrete protective extracellular polymeric substances (EPS). They wield substantial influence across diverse sectors such as medicine, health, food industry, and environmental science amongst others. Although biofilms can be beneficial particularly in agriculture, their negative effects outweigh the known beneficial aspect. In food processing environments, the presence of biofilms could lead to food spoilage, corrosion in processing plants, food-borne diseases and resistance of pathogens to antimicrobial treatments. In addition to being implicated in numerous infections, corrosion and contamination of medical devices, about 60% of foodborne outbreaks globally can be linked to biofilms. However, understanding the mechanisms of biofilm formation (both the reversible and irreversible attachment) as well as development of innovative strategies to combat them, can enhance food safety/security, reduction in spoilage and protection of public health. In food industries, physical, biological and chemical methods (such as mechanical cleaning, use of antimicrobial agents, surfactants etc.) have been explored in the prevention or elimination of biofilm formation along factory pipes and surfaces. However, controlling biofilms remain a challenge, particularly with the protection the EPS proffer. Therefore, addressing the issue of biofilms in food processing environments necessitates a holistic approach that encompasses prevention, novel control measures, research, as well as knowledge advancement among others.

Keywords: Biofilm, food processing environment, food safety, food safety, microbes.

Long Term Effect of Cassava Effluent Deposition on Soil Chemical Properties

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Abstract

Cassava processing generates wastewater with both potential benefits and risks for soil health. The present study evaluated the long-term effects of cassava effluent on soil chemical properties in Akure, Nigeria, a major cassava-producing region. The research examined five locations: a forest as a control and four cassava processing sites (A, B, C, and D). The selection of the cassava processing sites was based on the duration of the processing activities on the sites (Site A: 15 years, Site B: 10 years, Site C: 5 years, and Site D: 3 years) and a forest (control). Topsoil samples (0–15 cm) were collected using a soil auger, and samples were analyzed for organic matter, pH, total nitrogen, available phosphorus, potassium, calcium, magnesium, sodium, cation exchange capacity, and base saturation. Results showed the most acidic soil to be Site A (pH 6.243) and most neutral as Site C (pH 6.747). Organic matter content was highest in the Forest (2.974%) and lowest in Site A (2.148%). The Forest also had the highest total nitrogen (0.320%) and available phosphorus (18.499 mg/kg). Effluent deposition increased the level of potassium in Site B (36.433 ppm) and calcium in Site C (28.767 ppm). Magnesium (12.256 ppm) and sodium (16.500 ppm) were highest in Site D, while cyanide peaked at Site C (3.71 mg/kg). The findings highlighted both nutrient enrichment and negative impacts such as soil acidification, sodium buildup, and elevated cyanide levels, thereby emphasizing the need for sustainable effluent management practices.

Keywords: Cassava, effluent, soil chemical properties, organic matter, cyanide.

Advancing Sustainable Crop Productivity through Integrated Approaches: Lessons from Crop Physiology Research

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Abstract

Sustainable crop production is essential for global food security and promoting environmental stewardship. The investigation focuses on inventive methods to enhance the productivity and resilience of crucial crops in Nigeria's derived savannah agro-ecology. The research merges traditional farming methods with contemporary technological advancements, such as precision agriculture, integrated nutrient management, and bio-pesticides. Advanced crop phenotyping methods were integrated with case studies on lowland rice, and other staple crops, for the assessment of the impacts of such interventions on yield, nutrient use efficiency, and ecological sustainability. Data collection was done through field trials and laboratory analyses to assess efficiency and scalability in diverse agro-ecological settings. The results showed a significant enhancement of crop yield and improvement in nutrient use efficiency with ecological balance. These findings show that approaches that are interdisciplinary and responsive to agricultural policies and food security and natural resource management challenges are very key. The research findings emphasize the potential for scalable solutions that meet the global goals for sustainability and localized needs. This study has shown that traditional agricultural practices with modern technologies hold great promise for improving sustainable crop production in the derived savannah of Nigeria. Techniques such as precision agriculture, integrated nutrient management, and bio-pesticides significantly improved yields, nutrient efficiency, and ecological sustainability. The interdisciplinary aspects included soil fertility, climate variability, and optimization of resources. Case studies of staple crops, mostly lowland rice, illustrated scalable solutions to enhance food security and the management of vital resources. Findings underline cross-disciplinary collaborations that spur sustained agricultural innovation in support of resilient ecosystems. For sustainable crop production in Nigeria's derived savannah, our findings emphasize the vital necessity of fusing contemporary technology with traditional agricultural expertise. The multidisciplinary strategy emphasizes the necessity of laws supporting eco-friendly pest control, integrated nutrient management, and precision agriculture. Putting these scalable ideas into practice can optimize resource utilization, promote resilient ecosystems, and greatly improve food security.

Keywords: Sustainable agriculture; precision agriculture; integrated nutrient management; crop yield optimization.

Enhancing Tomato Production in Nigeria: Challenges, Opportunities, and Sustainable Solutions

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Abstract

The production of tomatoes is an essential part of Nigeria's agricultural economy, making a substantial contribution to employment, economic growth, and food security. Nigeria, which produces a lot of tomatoes, has a lot of opportunity to improve its agricultural value chain. Nevertheless, enduring obstacles impede maximum output, such as inadequate storage facilities, poor infrastructure, insect and disease infestations, and restricted access to contemporary farming methods. Climate variability makes these issues worse by influencing yields and raising losses after harvest. In order to produce tomatoes in a sustainable manner, smallholder farmers must embrace climate-resilient techniques including integrated pest management, effective water management, and the use of better seed types. Increasing access to climatic data, creative farming methods, and robust infrastructure can reduce environmental impact and increase output. Policies that provide smallholder farmers with access to loans and training in sustainable farming methods are examples of government and private sector interventions that can increase resilience and productivity. In addition to the financial gains, tomato production improves human nutrition and health. Vitamins, minerals, and antioxidants that are vital for a healthy diet are abundant in tomatoes. A comprehensive strategy that incorporates infrastructure development, research investment, legislative reforms, and technology-driven solutions would address production and storage issues and improve Nigeria's tomato value chain. Nigeria can promote nutritional health, increase food security, and advance agricultural sustainability by utilizing advantageous agro climatic conditions and encouraging climate-smart agriculture..

Keywords: Tomato production, food security, agricultural policies, climate resilience, postharvest losses.

Natural Resources in Human Health and Nutrition

Assessment of Heavy Metal Contamination in Fish, Fruits, and Vegetables in Southwest Nigeria: A Systematic Review

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Abstract

The aim of this systematic review was to investigate the prevalence of heavy metal contamination in fish, fruits, and vegetables in Southwest Nigeria. The review focused on studies published over a ten-year period, between 2014 and 2024. Articles used for the study were obtained by conducting a comprehensive literature search using several databases, including ResearchGate, Scopus, Google Scholar, ScienceDirect, and PubMed using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).To identify relevant studies, a plethora of keywords were utilized to search for articles in the selected databases, including. Articles reporting heavy metal contamination in specified food products within the last decade were included. Of the 10,212 initially identified articles, 64 met the inclusion criteria after thorough screening. The selected studies were predominantly conducted in Lagos (30), Ondo (8), and Ogun (7) states, with few studies in Oyo, Ekiti, and Osun states. The majority of the research focused on fish (40 studies), followed by vegetables (20) and fruits (4). The commonly studied fish species were observed to be *Tilapia zilli, Chrysichthys nigrodigitatus, Clarias gariepinus,* and *Oreochromis niloticus*, with heavy metal concentrations frequently exceeded WHO limits. Therefore, this review highlights the significant risks posed by the presence of heavy metals in food products and underscores the importance of stringent environmental monitoring and the adoption of appropriate regulatory mechanisms for health and environmental risk mitigation. This could help in the formulation of appropriate policy implementation strategies geared towards mitigating heavy metal contamination in the region's food supply

Keywords: Heavy metal, contamination fish, fruits, vegetables, prisma, health, environmental monitoring, policy implementation.

Antioxidant Activity, Climbing Performance and Neuromuscular Transmitter (ACHE) Activity of Aqueous Extract of *Phyllantus amarus* Plant using *Drosophila melanogaster* Model

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Abstract

The therapeutic power of plant components is predominantly because of the blend of components called secondary metabolites of plants. *Phyllanthus amarus*, a plant with great importance in traditional medicine, claimed to be an excellent remedy for some diseases. In this study, the antioxidant properties and phytochemicals quantification of the *P. amarus* aqueous whole plant extract (PAAQE) was carried out. Subsequently, A 21-day survival and longevity analysis were carried out to determine the safe dose of PAAQE, fruit flies were expose to PAAQE in five groupings with group 1 as control (normal diet) and groups 2, 3,4 and 5 fed with 0.025, 0.500, 0.100 and 0.200 mg PAAQE/g diet respectively for 21 days Flies were thereafter homogenized, and parameters such as climbing ability, acetylcholinesterase (AChE), nitric oxide (nitrite), glutathione-s-transferase (GST), reduced glutathione, catalase and glucose assays were carried out. Antioxidant properties of PAAQE by 1,1-Diphenyl-2picryl-hydrazyl (DPPH) radical scavenging activity, Ferric reducing ability of plasma (FRAP) and 2,2' aminio-bis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) was 83.14 ± 0.02 (*% Ellagic acid*), 28.65 ± 0.02 (*mg/100g*) and 59.52 ± 0.03 (*µg/g*) respectively. The phytochemical results indicated that PAAQE has high phenols, (74.52 mg/100g), saponins (55.72mg/100g), alkaloids (37.20 mg/100g) and flavonoids (25.56 mg/100g) among others. PAAQE at different doses show no significant ($p < 0.05$) difference on the survival rate, nitric oxide (NO), glucose level, AChE activity and climbing ability. However, there is a significant ($p < 0.05$) increase in the total protein level at 1.000 mg/5g diet, while a significant decrease ($p < 0.05$) was observed for 0.100 and 0.200 mg/ g diet in reduced glutathione activity, also catalase activity was significantly reduced ($p < 0.05$) at lower doses (0.250, 0.500 and 0.100 mg/ g diet). This study showed that PAAQE is not toxic and hence possess therapeutic potentials as a result of the phytochemicals present which are useful in managing diseases that are associated with oxidative stress.

Keywords: Antioxidant, metabolites, phytochemicals, therapeutic.

Investigation of the effect of poly-herbal anti-malarial mixture in mice infected with *Plasmodium berghei*

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Abstract

Malaria, a major public health threat affecting over 3.3 billion people in sub-Saharan Africa. It remains a great challenge in the 21st century despite advancements in medical discoveries and innovations. This study investigated the effect of poly-herbal anti-malaria mixture on mice infected with *Plasmodium berghei* (NK65). Fifty (50) albino mice purchased and acclimatized for two weeks. Water and methanol extracts of air-dried and powered mixture of the bark of Neem tree, African peach leaf, and Brim leaf in ratio 1:1:1 were used. Thirty-six albino mice injected intraperitoneally with 0.2 mL of diluted parasitized red blood cells on day 0, were divided into six groups each for chemosuppressive and curative tests. Experimental mice were monitored daily by blood smear, and their percentage of parasitaemia was evaluated at the end of each test. Acute toxicity of plant extract was conducted on three groups. Chemosuppressive test revealed that animals administered water/methanol extract 200 mg/kg and 500 mg/kg exhibited suppressive efficacy with mean of 2.39±0.95, 2.01±0.91, 2.49±0.98, 2.07±0.79, respectively, which are significantly ($p<0.05$) different from the control. Curative test revealed that groups administered the extract exhibited curative action with mean 0.99±0.05, 1.17±0.15, 0.37±0.29, 1.24±0.34 and statistical significance of $p\leq0.05$ compared to the control. A significant ($p<0.05$) difference in haematological parameters between control and treated groups, indicates the synergistic effect of polyherbal formulation in preventing parasite proliferation. Polyherbal formulation significantly altered liver function parameters in suppressive and curative tests at $p\leq0.05$. In the curative test, ALP and ALT values were normal, but AST values were significantly different ($p<0.05$) from the control. Histopathological examination revealed that untreated group experienced necrotizing hepatocytes, while treated groups experienced moderate inflammatory response, and kidneys of the treated appeared to have unchange glomerulus. and renal tubules while the kidney of the untreated in curative test appeared to have congested interstitium The study indicated that the poly-herbal mixture could be a good candidate as antiplasmodial agent against malaria infection as it exhibited a good suppressive and curative action greater than 50%.

Keywords: *Plasmodium berghei,* curative test, chemosuppressive test, antiplasmodial, inoculum, parasitaemia.

Assessment of Potentially Neurotoxic Elements in Pm_{10} and their Health Implications: A Case of Lagos Mainland, Southwestern Nigeria

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Abstract

Particulate matter (PM) most especially the smaller fractions such as PM_{10}, $PM_{2.5}$ and ultrafine particles (UFP) has attracted increased attention since it contains a variety of organic and inorganic elements with varying compositions at local and regional levels. This study intends to assess the quality of PM_{10} in the study area and its impact on health. Thirty PM_{10} samples were obtained from fifteen selected stations in Lagos mainland based on the activities. Two samples were obtained from each station between the hours of 6 -10am (morning) and 3 - 6pm (afternoon) for eight weeks during dry season using a High Volume Air Sampler. After sampling, the filter was carefully removed and placed in a desiccator for several hours to remove moisture content; when the filter paper had been desiccated it was then re-weighed to determine the net gain. The filter papers were cut longitudinally into strips of 2.54 x 20.3cm in order to prepare the samples using Microwave Assisted Extraction (MAE) method. The derived extracts were subsequently analyzed using Ultra - trace Inductively Coupled Plasma Mass Spectrometry. The results were evaluated and compared with the WHO standards. The results revealed that samples collected during the hours of 3 – 6pm has the highest PM_{10} loads compared to the ones collected during the hours of 6 – 10am. The highest PM_{10} load (758.9 ± 334.1) µg/m was observed in the samples collected along Ojota-Ketu Road while samples from Surulere had the lowest PM_{10} load (258.6 ± 56.2) µg/m. The results of the potentially neurotoxic elements (PNEs) revealed elevated concentrations in all the samples. The concentrations of Zn in mg/kg ranged from 9.7-240.0; Cd(0.01-0.25); Pb(12.4-50.9); V(12.078.0); Cr(13.3-69.7); Co(1.5-32.2); Ni(2.7-26.6); Cu(3.5-34.5); Hg(18.0-78.0) and As(0.01-1.4). The concentration of PNEs, in all the samples collected in the hours of 3-6 pm were higher than their corresponding samples in the hours of 6-10 am. Similarly, over 80% of the samples both 6-10am and 3-6pm were significantly higher than their corresponding WHO limits.

Keywords: Potentially-neurotoxic-elements, particulate-matter (PM_{10}), PM_{10} load, health implication, Lagos.

Protective Effects of *Sphenocentrum jollyanum* Fruit Furanoditerpenes and Semaglutide on Kidney Function via Modulation of Kidney Injury Molecule-1 and Erythropoietin in Streptozotocin-Induced Diabetes

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Abstract

Diabetes mellitus is a global health crisis with associated complications, including diabetic kidney disease, a leading cause of end-stage renal disease. The present study evaluated the protective effects of *Sphenocentrum jollyanum* fruit furanoditerpenes (SJF) in combination with semaglutide (SEM) on kidney function in streptozotocin-induced diabetic rats. Kidney injury was assessed through histological examination, haematological and biochemical analyses, and gene expression profiling. The administration of SJF (30 mg/kg) and SEM (1 µg/kg to 100 µg/kg) independently and in combinations (Dosage for the combinations) led to a significant reduction in fasting blood glucose levels and improvements in kidney morphology. SJF alone and in combination with SEM reduced lipid peroxidation and oxidative stress due to enhanced antioxidant activities. Notably, gene expression analysis revealed significant modulation of kidney injury molecule-1 and erythropoietin, which are critical biomarkers for kidney injury and erythropoiesis. The combined treatments showed synergistic effects of protecting the kidney against damage and reversing diabetes-induced changes in haematological parameters. Our findings suggest that *Sphenocentrum jollyanum* fruit furanoditerpenes may provide a promising adjunct to conventional therapies like semaglutide, offering kidney protection and potentially reducing the dose required for effective diabetes management.

Keywords: Diabetic kidney disease, *Sphenocentrum jollyanum*, semaglutide, kidney injury molecule-1, erythropoietin.

Investigating The Effect of Polyphenolic-Rich Extract of *Illicium verum* Fruit on Sodium-Arsenite Induced Toxicity in *Drosophilia melanogaster*

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Abstract

Interactions of toxic compounds with the biological system could lead to toxicity of several organs, oxidative stress and its several complications such as cancer, diabetes, and neurodegenerative diseases. Polyphenols have been reported to exhibit protective effects against various organ toxicities. Therefore, the aim of this study was to determine the effect of polyphenolic-rich extract of *Illicium verum* (PEIV) fruits on $NaASO_2$-induced toxicity in *Drosophila melanogaster* (fruit flies). Fruit flies (Harwich strain) were grouped into five. Group 1 flies were fed with only basal diet, while groups 2, 3, and 4 were exposed to basal diets containing $NaASO_2$ (0.02 mg/g diet). In addition, groups 3 and 4 were supplemented with PEIV (0.5 and 1.0 mg/g of diet) while group 5 flies were exposed to basal diet containing 0.5 mg PEIV. Thereafter, survival studies were carried out on flies exposed to both $NaASO_2$ and extract for 7 and 12 days, respectively. Geotaxis test was carried out on the locomotor function in flies. The effect of PEIV on $NaASO_2$-induced toxicity in flies was carried out on exposure of flies to treatment for 7 days after which Biochemical parameters such as levels of nitric oxide (NO), total protein (TP), and reduced glutathione (GSH), as well as activities of acetylcholinesterase (AChE), glutathione-s-transferase (GST) and catalase were analyzed. The Results showed that $NaASO_2$ caused a significant ($p < 0.05$) decrease in cognitive functions (activities) and an increase in mortality rate after 12 days, similarly, $NaASO_2$ treated flies exhibited a significant ($p < 0.05$) decrease in biochemical parameters such as NO, TP and GSH, as well as the activity of GST and Catalase with a significant ($p<0.05$) increase as evident in AChE compared to the control (normal flies). However, treatment with PEIV based diet at doses of 0.5mg/g and 1mg/g caused a significant ($p<0.05$) increase in NO, TP and GSH levels as well as the activities of GST and Catalase with a reduction significantly ($p<0.05$) in the activity of AChE, compared to $NaASO_2$ treated flies and control. According to the findings of this study, doses of PEIV indicated protective effect against $NaASO_2$ induced oxidative stress. It could therefore be suggested that PEIV might be safe at these doses and serve as a promising therapeutic candidate in combatting $NaASO_2$ induced toxicity.

Keywords: *Illicium verum*, polyphenols, sodium arsenite, toxicity, *Drosophila melanogaster.*

A Comprehensive Review of Alzheimer's Disease Pathogenesis, Treatment strategies, and Therapeutic Advances

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Abstract

Alzheimer's disease (AD) is a prevalent neurodegenerative disorder and the leading cause of dementia characterized by progressive cognitive impairment. As the global prevalence of AD continues to rise, it has emerged as a significant healthcare challenge in twenty first century. It typically affects older adults and it's marked by two pathological hallmarks: beta-amyloid (Aβ) plaques and neurofibrillary tangles, which progressively spread throughout the brain. While the exact mechanism involved in the development of AD is still unknown, targeting oxidative stress is known to play a central role in the pathogenesis, making it a primary target for therapeutic strategies. Current treatment focus on symptom management options to reduce its symptoms and help improve quality of life in patients to some extent without halting disease progression. Some natural antioxidants including vitamin E and selenium have been found to provide protection with marked neuroprotective effect in mitigating oxidative damage. Additionally, certain pharmacological interventions and medicinal plants have proven promising in AD management. Therefore, a deeper understanding of the interplay between the formation of Aβ plaques and neurofibrillary tangles accumulation could provide valuable insights into the disease mechanisms and facilitate the development of more effective therapeutic interventions.

Keywords: Alzheimer disease, oxidative stress, amyloid β plaque, neurofibrillary.

Aqueous Extracts of *Syzygium aromaticum* Alleviate Potassium Dichromate-Induced Neurotoxicity in Wistar Rats by Inhibiting MAO-B and BACE1: An *In Silico and In Vivo* Study

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Abstract

Potassium dichromate (PDC), a hexavalent chromium compound, is a known environmental neurotoxin that induces oxidative stress and inflammation, leading to neurotoxicity. This study investigates the neuroprotective effects of aqueous extracts from *Syzygium aromaticum* (AESA) against PDC-induced neurotoxicity in Wistar rats. Rats were exposed to PDC (17 mg/kg) to induce neurotoxicity, groups 3 and 4 were pre-treated with AESA (100 and 200 mg/kg) for 7 days prior to the commencement of the experiment, and groups 5 and 6 received AESA posttreatment. Biochemical analyses were performed to assess serum brain markers, oxidative stress, antioxidant status, and anti-inflammatory activities. Additionally, *in silico* docking of phytochemicals from AESA was carried out to explore their interaction with key neuroprotective receptors. Results indicated that PDC exposure significantly reduced glutathione (GSH) levels and enzymatic antioxidants (SOD, CAT, GPx, GR, GST) while increasing malondialdehyde (MDA) levels and elevating pro-inflammatory cytokines (TNF-α, IL-1β). Enzymatic activities of acetylcholinesterase (AchE) and butyrylcholinesterase (BChE) were also elevated, along with over-expression of MAO-B and BACE1 genes. Pre-treatment and cotreatment with AESA significantly reversed these effects, enhancing antioxidant levels, reducing oxidative stress, and lowering pro-inflammatory cytokines and cholinergic enzyme activities. Molecular docking revealed that diagalloylglucose, a prominent phytochemical in AESA, exhibited strong binding affinities to key receptors involved in neuroprotection. This study concludes that AESA has significant neuroprotective potential, mitigating PDC-induced neurotoxicity through antioxidant, anti-inflammatory, and gene regulatory mechanisms.

Keywords: *Syzygium aromaticum*, neurotoxicity, potassium dichromate, antioxidants, molecular docking.

Nutritional Composition and Sensory Properties of Biscuits as Influenced by Grasshopper (*Zonocerus Variegatus*) Flour Substitution

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Abstract

Edible insects are significant protein sources and their consumption plays a vital role in food security. This study evaluated the nutritional composition and sensory evaluation of biscuits fortified with wheat flour and grasshopper flour blend. Four biscuits samples were formulated by substituting wheat flour with grasshopper flour at 0, 5, 10 and 15% and were subjected to standard analytical techniques to evaluate proximate, amino acid, mineral, vitamin, and antinutrient contents as well as sensory attributes. The results showed that fortification significantly ($p < 0.05$) improved some nutrient contents of biscuits. A 100 g of each biscuit sample contained moisture (6.30-9.60%), crude protein (9.01-15.10%), ash (2.76-3.60%), crude fat (19.98-22.40%) crude fibre (22.24-5.22%) and carbohydrate content (35.44-44.92%) carbohydrate respectively which were significantly higher ($p < 0.05$) compared to control (100% wheat flour) except for moisture, ash and carbohydrate. The amino acid profile of the samples showed good balance of essential amino acids especially histidine, isoleucine, methionine, leucine and lysine. Minerals like sodium, calcium, magnesium, phosphorus, potassium and iron increased with increase in substitution with grasshopper flour except for manganese and zinc. The result of vitamin composition showed that the samples contained vitamin A (340.00-520.00 µg/100g β-carotene equivalent), vitamin B9 (0.99-3.76 mg/100g), vitamin D (0.89-1.60 mg/100g) and vitamin E (0.47-0.62 mg/100g).The samples were very low in the antinutritional factors. The mean scores of all the fortified biscuits from 9-point hedonic scale were greater than 5.0 apart from control in terms of all the attributes evaluated. Therefore, incorporating grasshopper flour into biscuit production up to 15% can be a feasible choice to improve food security, improve nutritional value of food products and promote the increased in consumption of grasshopper and other edible insects.

Keywords: Edible insects, biscuits, grasshopper, vitamin composition.

Flavonoid-Rich Extract of *Detarium senegalense* Ameliorates Haematological and Lipid Abnormalities in Streptozotocin-Induced Type 2 Diabetes in Rats

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Abstract

Diabetes mellitus (DM), a prevalent metabolic disorder, often leads to dyslipidaemia and haematological abnormalities, exacerbating complications such as cardiovascular disease and anaemia. This study investigates the therapeutic potential of a flavonoid-rich extract from *Detarium senegalense* (FREDS) in correcting lipid and haematological imbalances associated with type 2 diabetes induced by streptozotocin (STZ) in Wistar rats. After the induction of diabetes, animals were treated with FREDS at varying doses (50, 75, and 100 mg/kg body weight) for 28 days. Haematological parameters, including red blood cell count, haemoglobin concentration, white blood cell count, platelet indices, and lipid profiles (total cholesterol, triglycerides, LDL, HDL, and VLDL), were assessed. Results showed that FREDS significantly ($P < 0.05$) improved red blood cell count, haemoglobin, and haematocrit levels while reducing white blood cell counts and platelet aggregation, suggesting its anti-inflammatory and haematological benefits. In terms of lipid metabolism, FREDS administration resulted in significant reductions in total cholesterol, triglycerides, LDL, and VLDL cholesterol while increasing HDL levels, thus ameliorating diabetic dyslipidaemia. The extract's flavonoids appear to exert antioxidant, anti-inflammatory, and lipid-regulatory effects, supporting its potential as a supplementary treatment for managing diabetes-related complications. These findings highlight the promising therapeutic effects of FREDS in enhancing both haematological and lipid abnormalities in diabetic conditions, thus justifying further studies to confirm its long-term therapeutic efficacy and safety.

Keywords: *Detarium senegalense*, flavonoids, diabetes mellitus, haematological abnormalities, dyslipidaemia.

Health Benefits of *Aframomum melegueta* [Roscoe.] K. Schum

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Abstract

This review examined the botanical features, traditional uses, culinary applications, and medicinal properties of *Aframomum melegueta*. It shed light on *A*. *melegueta*'s remarkable efficacy and therapeutic potential as a novel source of natural antibiotics for treating infections. *Aframomum melegueta* commonly referred to as grains of paradise or alligator pepper, belonging to the ginger family, Zingiberaceae; is a herbaceous perennial plant found widely in the swampy regions of Western and Central Africa. The plant's unique aroma and medicinal values come from its essential oil and other phytochemical constituents such as flavonoids, phenolic compounds, alkaloids, tannins, terpenoids, saponins, cardiac glycosides, steroids, carotenoids, phenols, vitamins and minerals which possess healing and therapeutic properties. In traditional African medicine, *Aframomum* species are employed to relieve stomach pain, diarrhoea, hypertension and are believed to serve as aphrodisiacs; also, for conditions like measles and leprosy. In Nigeria, it is called Oseoji (Igbo), Ataare (Yoruba), and Cittáá (Hausa). It holds both medicinal and nutritional benefits, with its seed extracts traditionally used as remedies for dysentery and diarrhoea, an effective treatment for snake bites. This herbaceous plant is consumed as a spice and has been used in Nigeria to address various common ailments, including body aches, diarrhoea, sore throat, catarrh and rheumatism. They are also used to manage excessive lactation and postpartum hemorrhage. It acts as a purgative, galactogogue, anthelmintic, anti-inflammatory, antioxidant and haemostatic agent. Its polyphenolic and flavonoid contents is notably higher than that of other African spices. *Aframomum melegueta* is known to reduce body fat percentage and waist-hip ratio without adverse effects. Leaf extracts from *Aframomum melegueta* contain phytochemicals with significant potential as bio-control agents against pathogens acting as an antimicrobial agent. It is a potential treatment for cancer, diabetes and inflammation. Further pharmacognostic and pharmacological investigations are therefore encouraged to prove these ethnobotanical claims.

Keywords: *Aframomum melegueta*, antioxidant, ethnobotanical claims, natural antibiotics, pharmacological investigations, phytochemical constituents.

In Silico Evaluation of *Annona muricata* Phytochemicals as Potential Multi-Target Therapeutics for Polycystic Ovary Syndrome: A Molecular Docking Approach

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Abstract

Polycystic ovarian syndrome (PCOS) is a prevalent endocrine disorder with multifaceted manifestations, including menstrual irregularities, infertility, hirsutism, obesity, and metabolic disturbances. Its pathogenesis involves complex hormonal, genetic, and environmental factors, disrupting key pathways like steroidogenesis and insulin signaling. Current treatments often target isolated aspects of PCOS pathology, highlighting the need for more integrated approaches. Plant-based polypharmacology, utilizing compounds from traditional herbal medicine, offers a promising strategy for addressing the multifactorial nature of PCOS. *Annona muricata*, a plant known for its diverse array of bioactive phytochemicals, holds potential as a multi-target therapeutic source. This study leverages molecular docking to evaluate the interactions of *A. muricata* compounds with key hormonal receptors implicated in PCOS, namely the progesterone receptor (1A28), androgen receptor (2AM9), and CYP17A1 bound to abiraterone (3RUK). Eighty-three (83) phytochemicals from *A. muricata* were screened to reveal promising candidate(s) with favourable binding affinities across all three receptors. Notably, compounds such as emodin and coclaurine exhibited a strong potential to modulate hormone-signaling pathways involved in PCOS. These findings provide early computational evidence of the polypharmacological potential of *A. muricata* in PCOS treatment, suggesting a new avenue for therapeutic development targeting the underlying hormonal dysregulation. Further *in vitro* and *in vivo* studies are essential to validate these findings and explore the clinical applicability of these compounds in the treatment and management of PCOS.

Keywords: *Annona muricata*, hormonal dysregulation, molecular docking, phytochemicals, polycystic ovarian syndrome

Unveiling the Medicinal Values of *Xylopia aethiopica* (Dunal) A. Rich: A Review on Traditional and Scientific Perspectives

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Abstract

A review of literature on *Xylopia aethiopica* (Family *Annonaceae*), commonly called Negro pepper, African pepper, Guinea pepper and spice tree which is an ever-green aromatic tree growing up to 15-30 m high. It is native to the low land rain forests and moist fringe forests in the savanna zones and coastal regions of Africa. The phytochemical profile of *Xylopia aethiopica* which consists of alkaloids, flavonoids, tannins and saponins gives it considerable medicinal potential. Common throughout West and Central Africa, this aromatic herb is often used in traditional medicine to treat conditions like inflammation, rheumatism, stomach issues and diarrhoea. These applications are supported by recent research, which highlights the plant's medicinal qualities, such as its analgesic, antibacterial, anti-inflammatory, and antioxidant benefits. With processes similar to those of traditional analgesics, xylopic acid, a primary bioactive molecule, exhibits analgesic effects that alleviate pain and decrease inflammation. The plant's essential oils and secondary metabolites are primarily responsible for its antibacterial activity, which suggests potential in treating bacterial infections, especially against pathogens like *Staphylococcus aureus* and *Escherichia coli*. Furthermore, by neutralizing reactive oxygen species, *Xylopia aethiopica* demonstrates antioxidant activity, shielding cells from oxidative stress, which is connected to long-term illnesses like cancer. Its potential to manage lifestyle-related disorders, such as diabetes, is highlighted by its antioxidant qualities and function in modifying metabolic pathways. The plant's antipyretic and antidiarrhoeal properties broaden its uses in both conventional and alternative medicine, establishing it as a natural treatment for a variety of ailments. The therapeutic adaptability of *Xylopia aethiopica* highlights its potential for drug development, and mounting research supports its incorporation into clinical procedures. This multipurpose plant provides a sustainable route to comprehensive healthcare solutions and is a prime example of the fusion of ancient knowledge with modern health applications.

Keywords: Antibacterial, anti-inflammatory, antioxidant, phytochemical, *Xylopia aethiopica.*

Seroepidemiological Survey of Human West Nile Virus IgG Antibody among Febrile Patients attending ABUAD Multisystem Hospital, Ado-Ekiti

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Abstract

West Nile Virus (WNV) is an arbovirus belonging to the family *Flaviviridae* with single stranded RNA. WNV is widespread and transmitted to birds, mammals and humans through mosquito bites mainly by the *Culex* spp. The study aimed to determine the seroprevalence and risk factors associated with the human WNV IgG antibody among febrile patients attending ABUAD Multisystem Hospital, Ado-Ekiti. The presence of IgG antibody to human WNV was determined in the blood samples collected from ninety-one (91) febrile patients using Enzyme-Linked Immunosorbent Assay (ELISA) kit. The socio-demographic data, general patient and risk factors including proximity of residence to bushes, nonusage of mosquito nets, proximity to stagnant water, and travel history information were obtained via a structured questionnaire. The study population ranged from 10 to 85 years, with a mean age of 28.0 ± 15.3 years. The total seroprevalence rate of WNV IgG antibody was 62.6% (57/91). The highest seropositivity was observed in 56-70 years age group (80%) with females constituting 61.4% of seropositivity. Among the seropositive cases, fever 70.7 % (29/41) and abdominal pain 52.6 % (10/19) were the most reported symptoms. There was no statistical association between the WNV IgG antibody and symptoms ($p>0.05$). Among the patients living around bushes, 64.9% (37/57) were seropositive. However, there was no statistical association between the WNV IgG antibody and the selected risk factors ($p>0.05$). The high seroprevalence rate of 62.6 % highlights the significant circulation of WNV in the study population and underscores the need for further investigation and public health interventions to prevent and control WNV transmission in this region and other parts of the country.

Keywords: West Nile virus, IgG antibody, fever, febrile patients.

Seroprevalence of Chikungunya Virus IgG and IgM Antibodies among Patients with Fever in Ado-Ekiti

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Abstract

Chikungunya virus (CHIKV) is an arthropod-borne virus that has emerged as a significant global public health concern. This study investigated the seroprevalence and predisposing factors associated with Chikungunya virus infection in Ado-Ekiti, Nigeria. Blood samples were collected from 91 patients who presented with fever at the outpatients department of Afe Babalola University Multisystem Hospital, Ado-Ekiti. Serological analyses were performed using IgG and IgM Enzyme-Linked Immunosorbent Assay (ELISA) kits to detect CHIKV antibodies in the serum of febrile patients. A structured questionnaire was used to obtain socio-demographic data, general patient and risk factors information. This study revealed an 8.8 % and 5.5 % CHIKV IgG and IgM seropositivity rate respectively. Females constituted 75 % of seropositive cases, with the 41-55 years age group showing the highest IgG antibody prevalence (12.5 %) while the highest IgM antibody prevalence (14.3 %) was recorded amongst 26-40 years age group. Fever was present in all patients with positive cases. There was no significant association between socio-demographic data and CHIKV seropositivity ($p>0.05$). However, residential area showed significant association with CHIKV seropositivity ($p<0.05$). The risk factors including non-usage of mosquito nets and proximity to stagnant water were not significantly associated with CHIKV seropositivity ($p>0.05$). Further research is needed to explore additional environmental and behavioral determinants of CHIKV infection.

Keywords: Chikungunya virus, IgG antibody, IgM antibody, fever.

Investigating the Pattern of Antibiotic Resistance in Clinical *Staphylococcus aureus* Isolates from Ekiti State University Teaching Hospital, Ado-Ekiti

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Abstract

Antibiotic resistance in *Staphylococcus aureus* (*S. aureus*) presents a major challenge in healthcare, complicating infection management and elevating comorbidity and mortality rates. This study investigated resistant patterns in clinical isolates of *S. aureus* from Ekiti State University Teaching Hospital, Ado-Ekiti. A Hundred (100) clinical isolate es of *S. aureus* were obtained from specimens including blood, urine, wound, sputum, high vaginal swabs, endocervical swabs, semen, and urethral swabs. Phenotypic characterization of the isolates was carried out using biochemical tests. The antibiotic susceptibility pattern was investigated using the Kirby-Bauer disk diffusion method. Also, DNA was extracted from the isolates and the detection of *nuc, mecA, blaZ, and aac-aph* genes was carried out using PCR methods. The antibiotic susceptibility pattern showed the highest resistance to cefotaxime and ampicillin with 85%, respectively, followed by vancomycin (58%), cefuroxime (56%), ciprofloxacin 42%, clindamycin (32%), nitrofurantoin (25%), azithromycin (24%), gentamicin (17%), and meropenem (25%). Among the resistant *S.aureus* isolates, 27.7% (15/54) had *nuc* gene. Though, *mecA* 86.7% (13/15), *blaZ* 6.7% (1/15), and *aac-aphD* genes 93.3% (14/15), respectively, were detected among the methicillin resistant *S. aureus* (MRSA) isolates. The identification of multiple antibiotic resistance could be used in clinical diagnosis as well as for the surveillance of the spread of antibiotic resistance determinants in epidemiological studies.

Keywords: *Staphylococcus aureus*, antibiotic resistance, clinical isolates, methicillin resistant.

Chemical Compositions of Gossypium barbadense Bark Ethanol Extract and its Antipyretic Effect on Brewers' Yeast induced fever in Wistar Rats

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Abstract

Gossypium barbadense plant has been used traditionally for the treatment of diseases. This study investigated the chemical compositions of *Gossypium barbadense* bark ethanol extract and its effect on temperatures and weights of Wistar rats. Aqueous suspension of brewers' yeast (20%) was prepared in normal saline to induce fever in wistar rats (10 mg/kg). Extraction was carried out by macerating a 100 g *Gossypium barbadense* bark in 500ml, 95% ethanol followed by GC-MS analysis of the extract to identify chemical compounds present. Animals were grouped into three, group one treated with extract, group two treated with standard drug (Paracetamol B.P. 120mg/5ml) and group three as control. 400mg/kg daily dose of treatment was administered for three days. In the GC-MS analysis, major compounds identified were Pentatriacontane (4.23×10^{-2}mg/g), 9-Octadecenoic acid (3.45×10^{-2}mg/g), n-Hexadecanoic acid (3.34×10^{-2}mg/g), Hexacosane (2.03×10^{-2}mg/g), Tricyclo[20.8.0.0(7,16)]triacontane, 1(22),7(16)-diepoxy (9.91×10^{-3}mg/g), 1.1-Dichloroethene(9.54×10^{-3}mg/g), while minor compounds were 1,3-Diethoxy-2-propanol (4.88×10^{-3}mg/g), Octatriacontyl pentafluoropropionate (3.24×10^{-3}mg/g) Cyclohexane, 1R-acetamido-4cis-acetoxy-5 (9.35×10^{-4} mg/g). Rectal temperatures (^{o}C) and body weight of rat's control, induced and treated with extract were 36.3 ± 0.09, 37.6 ± 0.36, 35.9 ± 1.56 and 130.5 ± 1.43, 125.5 ± 5.26, 131.5 ± 5.97 respectively. Temperatures and weights of animal treated with standard drug were 37.1± 0.12, 38.5 ± 0.30, 36.9 ± 0.23 (^{o}C) and 125.5 ± 4.04, 134.0 ± 2.70, 140.8 ± 0.95 (g) respectively. Temperatures of Wistar rats increased after induction of fever with brewers' yeast, which is known to cause increase of prostaglandin in the hypothalamus. On treatment with extract, the temperatures were reduced. There was reduction in the weight of animals after induction of fever due to weakness and loss of appetite and this was normalized after treatments with the extract, which stabilized the prostaglandin level of the animals. *Gossypium barbadense* bark extract was found to provide ameliorative effect to the animals upon induction with Brewer yeast, confirming its antipyretic property.

Keywords- *Gossypium barbadense* bark, ethanol extract, brewers' yeast, antipyretic effect.

Responsive Building and Cultural Dynamics

Responsive Building Design and Passive Cooling Strategies: A scoping Review of Climate Adaptive Architecture in Lagos, Nigeria

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Abstract

This study investigated the integration of responsive technologies within passive cooling strategies to advance climate-adaptive architecture. Through a comprehensive scoping review, the research examined peer-reviewed articles and technical reports to map current knowledge, identify key strategies and highlight gaps in the field. The findings reveal that incorporating responsiveness into passive cooling systems can enhance environmental performance by dynamically adapting to shifting climatic conditions and occupant needs, thereby improving sustainability, energy efficiency and comfort. However, significant challenges persist, including the high costs of responsive technologies, the absence of standardized practices and the difficulty in predicting long-term performance. A critical disconnect was identified between theoretical advancements in responsive design and their practical implementation within passive systems, compounded by limited interdisciplinary collaboration among architects, engineers, and material scientists. The study underscores the importance of a holistic design approach that integrates technological innovation with the core principles of passive cooling. It calls for future research to prioritize cost-effective solutions, establish industrial guidelines and foster cross-disciplinary partnerships to fully leverage responsive systems in achieving sustainable and climate-adaptive architecture.

Keywords: Responsive building design, passive cooling strategies, climate-adaptive architecture, sustainability.

Smart Vernacular Buildings: Embedding Cultural Wisdom into Responsive Building Systems

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Abstract

The integration of local traditions into smart building technologies presents a transformative approach to achieving culturally and technologically sustainable architecture. In an increasingly globalized design landscape, preserving cultural identity in architecture while leveraging advanced technologies has become both a challenge and an opportunity. This study investigates the convergence of vernacular architectural practices and smart technologies, focusing on how local materials, traditional construction techniques, and indigenous design principles can be harmonized with modern technological advancements to create buildings that are both adaptive and culturally relevant. By analyzing case studies from diverse cultural and climatic contexts, the research will identify innovative strategies for embedding cultural narratives and traditional wisdom into the framework of responsive building systems. Key areas explored include the use of regionally sourced materials in smart construction, the adaptation of traditional passive design strategies into automated systems, and the development of culturally sensitive smart interfaces that align with local lifestyles and values. The research further examines challenges such as the loss of traditional knowledge, cultural homogenization, technological accessibility, and potential resistance to adopting smart systems within traditional societies. The findings highlight the potential for a symbiotic relationship between tradition and innovation, demonstrating how local architectural heritage can inform the development of resilient, efficient, and culturally rooted buildings. By embracing both the past and the future, architects and urban planners can create environments that respond dynamically to climatic, social, and cultural needs while ensuring the continuity of local identity. This paper ultimately contributes to the discourse on sustainable and inclusive architectural practices, offering actionable insights and frameworks for integrating local traditions into the design and implementation of smart building technologies. It aims to inspire a paradigm shift where technology and culture coexist harmoniously, fostering environments that respect heritage while embracing innovation.

Keywords: Local traditions, smart building technologies, vernacular architecture, cultural identity.

Sustainable Smart Nightlife Venues in Abuja: Design and Urban Impact

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Abstract

Designing smart nightlife venues for emerging urban areas presents a multifaceted opportunity to blend sustainability, technological innovation, and cultural enrichment. These venues cater to the increasing demand for vibrant social spaces while addressing urban challenges such as resource consumption, noise pollution, and environmental impact. However, integrating nightlife activities sustainably into urban planning requires a comprehensive understanding of their effects on local ecosystems, infrastructure, and communities. This study investigates the sustainable design of smart nightlife venues in Abuja, Nigeria, through the integration of advanced technologies, inclusive spatial planning, and efficient resource management. Utilizing a mixed-methods approach—including case studies, structured surveys, and environmental impact assessments—the research evaluates specific innovations such as photovoltaic solar panels for renewable energy, LED lighting systems for reduced electricity consumption, and AI-driven acoustic management to minimize noise pollution. Key sustainability metrics assessed include carbon emission reduction, energy efficiency ratings, and accessibility measures for inclusive use. The findings suggest that these smart technologies not only mitigate environmental impacts but also foster social inclusivity and stimulate local economic activity. The implications of this research extend to urban planners, architects, and policymakers, providing actionable insights into creating nightlife spaces that are environmentally sustainable, socially inclusive, and economically viable. The study recommends a holistic approach that integrates local community needs, renewable energy solutions, and adaptive urban policies to design nightlife venues that contribute positively to Abuja's urban fabric.

Keywords: Sustainable design, smart nightlife, urban planning, energy efficiency, cultural inclusivity, Abuja, adaptive technologies.

Evaluation of Architectural Identity in Public Buildings in Southwestern Nigeria

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Abstract

The architectural identity of public buildings in Southwestern Nigeria often falls short of contributing meaningfully to the urban fabric and city branding. For public buildings to serve as symbols of urban significance and foster civic pride, their spatial configurations, facade treatments, and overall aesthetics must align with cultural, social, and economic needs. While developed nations have successfully addressed these architectural challenges to enhance urban identity, similar efforts remain largely undocumented and underexplored in Southwestern Nigeria. This study aims to evaluate the architectural deficiencies of selected public buildings in Southwestern Nigeria by analyzing critical design elements such as spatial arrangements, facade aesthetics, accessibility, connectivity, and urban integration. The research will assess the alignment of these buildings with branding objectives and their capacity to reinforce city identity. It will also investigate user challenges, including navigation, functionality, and the buildings' limited impact on urban visibility and cultural symbolism.

Keywords: Architectural, buildings, identity, public, Southwestern Nigeria.

Responsive Design Strategies for Promoting Cultural Inclusivity in Public Buildings: A Scoping Review

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Abstract

In the context of increasing cultural diversity, public buildings play a vital role in fostering inclusivity by accommodating diverse communities' varied needs and preferences. Responsive design strategies, which emphasize adaptability and flexibility in architecture, have emerged as potential solutions to create inclusive spaces that reflect and respect cultural differences. This scoping review investigates how responsive design elements can be applied in public buildings to promote cultural inclusivity. The review explores the literature on responsive architecture, public space design, and cultural diversity to identify key design strategies implemented globally. It addresses critical questions such as: How do responsive design features adapt to the cultural practices and social dynamics of diverse users? What role do responsive technologies, such as smart systems and adaptive materials, play in enhancing cultural inclusivity? How can public buildings become more accommodating to minority cultural groups through design? This scoping review systematically gathered, mapped, and analyzed researches from various disciplines, such as architecture, urban planning, and sociology, to answer these questions. The scoping review of methodology followed a structured process, including identifying relevant studies, extracting key findings, and synthesizing design principles that can be applied to public buildings. This approach allowed for a comprehensive understanding of the current state of knowledge while identifying gaps that future research can address. The findings highlighted that responsive design strategies, such as adaptable spatial configurations, cultural symbolism in design elements, and environmentally responsive materials, played a critical role in promoting inclusivity. Furthermore, the review revealed that integrating culturally sensitive design practices in public buildings was essential for creating spaces that are not only functional but also reflective of the diverse identities within communities. This review provided a foundation for architects and planners to develop culturally inclusive public spaces through responsive design.

Keywords: Responsive design strategies, cultural inclusivity, public buildings, adaptive architecture

Performance of Urban Design Professionals in Achieving Sustainable Built Environment in Ado - Ekiti, Nigeria

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Abstract

This research looks at how well urban design experts do in creating a sustainable constructed environment in Ado Ekiti, Nigeria. Even though sustainability is becoming more important in the world, many Nigeria cities especially smaller ones like Ado-Ekiti still have challenges implementing sustainable urban design principles. This research examined sustainability's economic, social and environmental facets and evaluated how urban design professionals handle these elements in their designs. This research found important obstacles, such as insufficient training on international best practices, restricted access to sustainable materials, and inadequate enforcement of policies, through surveys and interviews with urban planning experts, public authorities, and members of the local community. The results also revealed that an important factor impeding sustainability efforts is a lack of public knowledge and engagement. Based on these results, this research suggested a framework for raising the level of expertise among urban planners and promotes more stakeholder collaboration, improved governmental regulations, and greater use of sustainable technology. This study has added to the currents conversation about urban sustainability by providing useful recommendations adapted to the smaller cities in Nigeria.

Keywords: Urban design, sustainability, Ado-Ekiti, sustainable built environment, urban design professionals, Nigeria.

Assessment of the Integration of Interior Design Colours on Users' Experience in Ado-Ekiti Hotels, Ekiti State, Nigeria

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Abstract

Colours serve as a universal visual language that influences our lives and it plays a vital role in interior design, serving as a powerful tool to create visually appealing and harmonious living spaces .This study assesses the effects of interior design colours of hotels on their users. Conducted among guests and staff of hotels, in Ado-Ekiti, and to have a good and quality results for the research, a mixed-methods approach combining surveys, interviews, case studies and observational studies was employed to collect data from hotel guests(users) and staff in selected hotels in Ado-Ekiti, Ekiti State .The study aimed to assess the relationship between integration of colours and emotions in interior spaces, assess the role (function) of colours in interior design ,and assess colour beauty ,compare contrast. Statistical package for social sciences (SPSS) was used to analyse data collected from hotel users and staff. The findings showed that hotel guests, particularly those with psychological concerns or well–being issues, felt more comfortable in certain coloured spaces, while others were less comfortable in different colours . It also highlighted the importance of incorporating thoughtful interior design colours in hotels to ensure both guest and staff comfort , as well as to create a commercially successful hospitality environment. The study concludes that the proper use of colours in interior design of hotels creates immersive, memorable, enjoyable ,serene environments which elevate users' experiences .It therefore recommends that interior design architects emphasize colours in interior design of spaces in hotels to influence lives and world at large.

Keywords: Colours, Hotels, Hospitality, Interior design.

Climate-Responsive Design for Sustainable Urban Resilience in Flood-Prone Areas of Port Harcourt Metropolis

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Abstract

Flooding is a global challenge, worsened by climate change and poor urban planning. Port Harcourt, Nigeria, faces severe flooding due to rapid urbanization, inadequate drainage, and weak regulations. This study explores climate-responsive design for urban resilience. Using a qualitative research approach, it conducts a Narrative literature review and analyzes meteorological data to propose architectural and planning solutions. Findings reveal both natural and human-induced flood causes, including waste disposal, urban expansion, and impermeable materials. The study recommends climate-responsive policies, sustainable building regulations, and nature-based solutions. Buildings should incorporate elevated foundations, flood-resistant materials, efficient drainage, and passive cooling. Public awareness and government enforcement are crucial for compliance. Adopting these strategies will enhance Port Harcourt's resilience and foster a sustainable urban environment. Furthermore, integrating these principles into urban development frameworks can ensure long-term adaptability to climate change.

Keywords: Climate-responsive design, flooding, nature-based solutions, sustainable urban resilience, urban planning strategies, flood-resistant buildings.

Architectural Design Process and its Impact on Studio Class Performance among Architecture Students in Afe Babalola University, Ado-Ekiti, Nigeria

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Abstract

Architecture, a field that addresses the organization of space and the resolution of spatial, aesthetic, and social challenges, involves a complex design process that bridges conceptual ideas and tangible realities. This study investigates the effects of understanding the architectural design process on architecture students' performance in design studio classes. Conducted among students at the Department of Architecture, Afe Babalola University, AdoEkiti, the research utilized a historical research design to evaluate performance across three academic sessions. The study aimed to describe the architectural design process, assess students' comprehension of the process, and examine how this understanding impacted their design studio performance. The methodology incorporates data collection from the students' performance in architectural design studio over a period of three consecutive sessions across three levels (200L, 300L and 400L) and analyzed using Microsoft Excel 2010 for trend analysis. Results indicate a positive correlation between students' comprehension of the design process and their academic performance. Specifically, students who demonstrated greater participation in design studio activities showed incremental improvement in both their understanding of the architectural design process and their grades. The iterative nature of the design studio, where students repeatedly engage with the design process, fosters deeper understanding and enhanced performance through deliberate practice. The study concludes that reinforcing students' understanding of the architectural design process throughout their education is essential for producing architects capable of solving real-world design challenges. It recommends that architecture programs emphasize the benefits of mastering the design process to equip future architects with the skills necessary for sustainable environmental planning and design.

Keywords: Architectural education, architectural design process, design pedagogy, design studio class, student learning outcome.

Sustainable cities and Infrastructural Development through Civil Engineering Interventions and Multidisciplinary Research

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Abstract

Sustainable cities, responsive buildings, cultural dynamics, sustainable futures, and infrastructural development cannot be achieved without the nexus of civil engineering interventions and multidisciplinary research. This paper examines the input of civil engineers, architects, and other allied disciplines in realizing sustainable cities and infrastructural development. The methodical approach for this research is literature reviews and expert opinions from professionals in the building industry. Findings revealed that our cities and society had been severely impacted by issues like urbanization, energy poverty, the entry of quacks into the construction industry, and negligence of duty by some labour force. Corruption and inefficiency in the implementation of infrastructure projects continue to be major challenges. Progress in vital industries like energy and transportation has been impeded by financial mismanagement and project implementation delays. On-site design and construction activity must be properly monitored. More than 50% of Nigerians live in urban areas, and the country's urban population is expanding at a rate of 4.3% annually. To address the environmental, economic, and social issues brought on by the world's growing urbanization, climate change, and economic expansion, it has been concluded that sustainable infrastructure and transportation are essential. Civil Engineering interventions, multidisciplinary research, Intelligent Computing, modeling software, technological innovation methods, strong policies, public-private partnerships, and strategic investments are necessary to realize sustainable cities and infrastructural development in Nigeria.

Keywords: Sustainable cities, infrastructural development, sustainable transportation, multidisciplinary research, building industries.

Nature and Elements of Urban Design as a Means of Promoting Sustainable City and Urban Environmental Aesthetics

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Abstract

Urban design is the practice of shaping the built environment of city and neighborhood. It expresses the ideals of the people who build and occupy the cities. Many studies traced the origin and the development of design and agree that urban design did not just take place from a single point, rather, it developed from different parts of the world, having their designs and history of urban development. This study is set to explore the nature and element of urban design as means of promoting sustainable city and the urban environmental aesthetics. This research presents an approach on the cities, with a view to highlight the benefit of green spaces in urban areas and their contribution for the sustainability of the cities. The method of study is through the analysis of records, e-library and literature on nature and elements of urban design and city sustainability. Design elements aim to curtail obsolete, dysfunctional, and chaotic development. This element specifically addresses outdoor space and building form and measures to improve the physical setting in which community life takes place. The study concludes that the mounting concern toward improving and promoting sustainable cities and urban environmental aesthetics for the benefits of urban populations as cities expand at an unprecedented rate globally and in Nigeria particularly is not overemphasized. It recommends that urban elements provide settings for a remarkable range of environmental, social and economic benefits and should be incorporated in building sustainable cities.

Keywords: Built environment, environmental aesthetics, green spaces, sustainable cities, urban design.

Spatial Efficiency in Public Buildings: An Examination of Wasted Spaces in Benue State Secretariat, Makurdi, Nigeria

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Abstract

Public buildings in Nigeria, particularly in urban centers, frequently exhibit spatial inefficiencies that constrain their functionality, operational effectiveness, and user satisfaction. This study critically examines wasted spaces at the Benue State Secretariat in Makurdi. The study employs the Environmental Behavior Theory (EBT) as a guiding framework. EBT allows for an in-depth analysis of the interaction between spatial configurations and user behavior and provides an understanding of how design decisions impact space utilization. The methodology integrates qualitative approaches such as on-site observations, interviews with users, and analysis of architectural floor plans. A participatory mapping exercise involving building users is conducted to understand perceived and actual space usage patterns and determine how the Secretariat's design either facilitates or impedes productivity and interaction. Additionally, Observational audits were conducted to evaluate circulation pathways, access routes, and the frequency of use across various functional zones of the Secretariat. Preliminary findings indicate that significant spatial wastage occurs in corridors, communal areas, and storage facilities due to a lack of alignment between the Secretariat's design and its current usage patterns. Overly compartmentalized office layouts and inadequate communal spaces were also identified as key contributors to inefficiencies. The study proposes actionable recommendations, including the integration of flexible design principles to accommodate evolving usage demands, improved spatial zoning for multifunctional purposes, and the reconfiguration of circulation pathways to enhance accessibility and flow. The findings draw attention to the potential for optimizing public building designs to align with contemporary demands for functionality and user satisfaction. The study will conclude that the design standards applied in the design of the secretariat building do not support the current demand of the users and the need for a re-adaptation of the buildings.

Keywords: Environmental behavior theory, participatory mapping, public buildings, spatial efficiency, wasted spaces.

Culturally responsive design: exploring the nexus between traditional building practices and modern sustainability in African cities

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Abstract

This study explores the intersection of traditional African building practices and modern sustainability principles in urban design. African cities are rich in cultural heritage, yet modern urban development often overlooks traditional construction techniques, resulting in designs that are both environmentally unsustainable and culturally disconnected. This research seeks to examine how traditional African building practices can be integrated into contemporary sustainable design to enhance cultural responsiveness, environmental performance, and social inclusivity. A comprehensive literature review is undertaken to assess the current state of knowledge on traditional African architecture, sustainability principles, and culturally responsive urban design. The review synthesizes existing research to identify key themes, such as the use of locally sourced materials, passive cooling techniques, and community-oriented spatial planning. It also highlights the challenges associated with integrating indigenous knowledge into contemporary architectural frameworks, including regulatory constraints, modernization pressures, and the undervaluation of traditional methods. The study's findings underscore the potential of traditional building practices to improve sustainability through climate adaptability, resource efficiency, and reduced carbon footprints. Additionally, these practices foster a stronger sense of identity and community within urban spaces. This research contributes to the development of design frameworks that harmonize traditional methods with modern sustainability standards, offering valuable insights for architects, designers, policymakers, and urban planners. By bridging the gap between heritage and innovation, this study advocates for a more sustainable, culturally sensitive, and inclusive approach to urban development in African cities.

Keywords: African cities, culturally responsive design, modern sustainability, traditional building practices, urban design.

Enhancing Geotechnical Properties of Shale through the Utilization of Rice Husk Ash (RHA) from Anambra Basin, Nigeria

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Abstract

This study investigates the enhancement of geotechnical properties of shale through the addition of rice husk ash (RHA). Shale, commonly used in engineering applications, was analyzed for its grain size distribution, consistency limits, compaction characteristics, California Bearing Ratio (CBR), and unconfined compressive strength (UCS) both before and after stabilization with RHA. The grain size analysis revealed high fine content (89% to 94%) and substantial clay content (24% to 32%), indicating suitability for use as landfill liners due to low permeability and high plasticity. The consistency limits showed that the shale samples predominantly exhibit medium plasticity, making them suitable for sub-grade applications. Compaction tests, conducted at both the West African and Modified AASHTO levels, demonstrated that higher compaction energy results in higher maximum dry density (MDD) and lower optimum moisture content (OMC), meeting the requirements for filling and embankment materials. The CBR tests revealed that while the unsoaked CBR values were adequate for sub-base materials, the soaked CBR values indicated potential moisture susceptibility. The UCS results categorized the shale samples as very soft to medium soft, necessitating stabilization for use as base materials. The addition of RHA at varying percentages (5%, 10%, and 20%) significantly improved the geotechnical properties of the shale. The consistency limits showed enhanced plasticity characteristics, with increased liquid and plastic limits and decreased plasticity index. The compaction results indicated optimal RHA content for maximum MDD and improved soil density. The CBR and UCS values substantially increased with RHA addition, indicating enhanced strength and stability. The study concludes that RHA is an effective stabilizing agent for shale, improving its suitability for various construction applications such as road sub-bases and foundations.

Keywords: Rice husk, shale, sub-base, agricultural waste.