International Conference on Discoveries in Applied Sciences & Advanced Technology 2025

6 – 7 FEBRUARY 2025

RESORT WORLD AWANA

Genting Highlands, Malaysia

PROGRAMME & ABSTRACT BOOK

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DASAT 2025

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INTRODUCTION

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025) is organized by the Universiti Teknologi MARA (UiTM) in collaboration with Universitas Hasanuddin (UNHAS), Universitas Sumatera Utara (USU), Universitas Majalengka, Advanced Materials Research Centre Universitas Indonesia (AMRC), and Universitas Pembangunan Nasional 'Veteren' Jawa Timur. DASAT 2025 provides a novel multidisciplinary platform for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, concerns, and practical challenges— The objective of this conference is to offer a dynamic platform for the exchange of innovative ideas, cutting-edge research, and technological advancements with the theme of **"Science Solutions for a Sustainable Future"**.

CONFERENCE TRACK:

Track 1: Fundamental Sciences
(Chemistry, Physics, Biology, Biodiversity).

Track 2: Advanced Technology
(Applied Chemistry & Environment, Industrial Physics, Astrophysics, Applied Biology, Industrial Technology, Materials Technology, Eco Technology, Food Technology, Textile Technology, Polymer Technology, AI Applications).

PUBLICATIONS:

- Baghdad Science Journal (Special issue) Indexed by SCOPUS, Q2, Impact Factor 1.
- International Journal on Advanced Science, Engineering and Information Technology, IJASEIT (regular issue) Indexed by SCOPUS, Q4.
- International Journal of Electroactive Materials (Indexed by MyCite)
- Journal of Polymer Materials, (Special Issue) (WoS, SCI indexed, Impact Factor 0.3)
- AUIQ Complementary Biological System
- Science Letters (Indexed by MyCite)

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Universitas Majalengka UNMA

WELCOMING MESSAGE
DEAN FACULTY OF APPLIED SCIENCES, UITM

On behalf of the Faculty of Applied Sciences, it is my distinct honour and privilege to welcome all distinguished guests, esteemed speakers, and valued participants to the **International Conference on Discoveries in Applied Sciences & Advanced Technology 2025 (DASAT2025)**.

Themed *"Science Solutions for a Sustainable Future,"* this conference serves as a premier platform for the dissemination of cutting-edge research, the exchange of innovative ideas, and the exploration of transformative technological advancements. It is through gatherings such as this that we collectively address the critical challenges of our time and chart new pathways toward a sustainable and prosperous future. DASAT2025 brings together an exceptional assembly of thought leaders, researchers, and practitioners from across the globe. The breadth of knowledge and expertise represented here will undoubtedly foster meaningful dialogue, inspire groundbreaking discoveries, and encourage interdisciplinary collaboration.

I take this opportunity to express my heartfelt appreciation to our keynote speaker and presenters for generously sharing their invaluable insights. I also applaud the organizing committee, partners, and sponsors for their unwavering dedication in ensuring the success of this conference. Your collective dedication are integral to realizing the vision and objectives of DASAT2025.

As you engage in the sessions, discussions, and networking opportunities, I encourage you to embrace the spirit of collaboration and innovation that defines this event. May DASAT2025 inspires new ideas, forge enduring partnerships, and contribute to the advancement of science and technology for the benefit of society and the environment.

Once again, I convey a warm welcome to all and wish you a fruitful and enriching experience at DASAT2025.

Thank you.

PROFESSOR Ts DR. MOHD ROZI AHMAD
DEAN
FACULTY OF APPLIED SCIENCES,
UiTM SHAH ALAM, SELANGOR, MALAYSIA

WELCOMING MESSAGE
CHAIRMAN DASAT 2025

Welcome to the DASAT2025, a premier gathering of researchers, industry experts, and thought leaders from around the globe. This conference is organised by The Faculty of Applied Sciences, Universiti Teknologi MARA. The objective of this conference is to offer a dynamic platform for the exchange of innovative ideas, cutting-edge research, and technological advancements with the theme of **"Science Solutions for a Sustainable Future"**.

In the rapidly evolving landscape of science and technology, this conference aims to foster collaboration and knowledge sharing among professionals from diverse fields. Attendees will have the opportunity to explore the latest breakthroughs applied sciences and advanced technology. Through speeches, and technical sessions, participants will gain insights into the transformative impact of these advancements on industries and societies.

The conference provides a unique opportunity for networking and establishing partnerships that can drive forward-thinking initiatives and collaborative projects. By bringing together academia, industry, and government representatives, we strive to bridge the gap between research and practical applications, ensuring that scientific discoveries translate into tangible benefits for society.

Hope everyone relishes the opportunity to forge meaningful connections with newfound friends, collaborators and individuals who inspire greatness in DASAT2025!

Thank you.

ASSOC. PROF. Ts. DR. SITI NORASMAH SURIP
CHAIRMAN DASAT 2025

LIST OF KEYNOTE & INVITED SPEAKERS

 **KEYNOTE SPEAKER** Assoc. Prof. Dr. Sanjay M R	Principal Research Scientist (Specialist 3), King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand. **Title: Natural Fibers and Green Composites for A Sustainable Future**
 **INVITED SPEAKER 1** Assoc. Prof. Dr Ali H. Jawad Al-Taei	World's Top 2% Scientists for 2022 & 2023, Elsevier BV. Top1 Q1/Q2 Author (Scopus/WoS) in Universiti Teknologi MARA (UiTM), Malaysia. **Title: Biomass Algae Biomass Modified Chitosan Biopolymer for Enhanced Toxic Dye Removal**
 **INVITED SPEAKER 2** Prof. Ir. Rahmawaty	Head of Master and Doctoral in Natural Resources & Environmental Management, Universitas Sumatera Utara, Indonesia **Title: Seasonal Plants Land Suitability: Land Limiting Factors and Management Recommendations in Supporting Sdgs Achievement**
 **INVITED SPEAKER 3** Assoc. Prof. Dr Ernie Suzana Ali	Associate Professor, Faculty of Science and Technology, Universiti Sains Islam Malaysia **Title: Antimicrobial Shape Memory Polyurethane from Waste Cooking Palm Oil**

ABSTRACT OF KEYNOTE & INVITED SPEAKERS

KEYNOTE SPEAKER 1

Assoc. Prof. Dr. Sanjay M R
(King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand)

Title: Natural Fibers and Green Composites for A Sustainable Future

Abstract:

The current global scenario has a huge impact on the development of new environmentally friendly materials because of their enormous advantages in replacing synthetic and hazardous materials. In the discipline of engineering, the use of environmentally friendly renewable materials would promote sustainability by reducing waste, landfills, and harmful emissions, resulting in a greener and cleaner environment. Natural fiber is an environmentally friendly renewable material that has gained researchers' interest due to its unique qualities such as low density, low cost, easy availability, biodegradability, and ease of processing. Natural fibers have become more popular as reinforcement materials in composites for a variety of applications, including aerospace, automotive, and household products. Other popular uses of natural fiber composites include furniture, railway coach interior panels, horticultural supplies, packaging goods, structures, and sports instruments. At last, natural fibers are unique qualities and availability as renewable and sustainable resources, natural fibers have numerous benefits over synthetic fibers. Plant cultivation minimizes greenhouse gas emissions and protects the environment from global warming. After being disposed of, natural fiber-based products are easily biodegradable. They do not damage the environment by filling landmasses and water bodies, causing serious health risks.

INVITED SPEAKER 1

Assoc. Prof. Dr Ali H. Jawad Al-Taei
(Universiti Teknologi MARA (UiTM), Malaysia)

Title: Biomass Algae Biomass Modified Chitosan Biopolymer for Enhanced Toxic Dye Removal

Abstract:

Herein, a natural material including chitosan (CTS) and algae (food-grade algae, FGA) was exploited to attain a bio-adsorbent (CTS/FGA) for enhanced methyl violet 2B dye removal. A study of the FGA loading into CTS matrix showed that the best mixing ratio between CTS and FGA to be used for the MV 2B removal was 50 %:50 % (CTS/FGA; 50:50 *w*/w). The present study employed the Box-Behnken design (RSM-BBD) to investigate the impact of three processing factors, namely CTS/FGA-(50:50) dose (0.02–0.1 g/100 mL), pH of solution (4–10), and contact time (5–15 min) on the decolorization rate of MV 2B dye. The results obtained from the equilibrium and kinetic experiments indicate that the adsorption of MV 2B dye on CTS/FGA-(50:50) follows the Langmuir and pseudo-second order models, respectively. The CTS/FGA exhibits an adsorption capacity of 179.8 mg/g. The characterization of CTS/FGA-(50:50) involves the proposed mechanism of MV 2B adsorption, which primarily encompasses various interactions such as electrostatic forces, n- π stacking, and H-bonding. The present study demonstrates that CTS/FGA-(50:50) synthesized material exhibits a distinctive structure and excellent adsorption properties, thereby providing a viable option for the elimination of toxic cationic dyes from polluted water.

Keywords: Adsorption; Algae; Box-Behnken design; Chitosan; Optimization

INVITED SPEAKER 2

Prof. Ir. Rahmawaty
(Universitas Sumatera Utara, Indonesia)

Title: Seasonal Plants Land Suitability: Land Limiting Factors and Management Recommendations in Supporting Sdgs Achievement

Abstract:

A land evaluation study for Muara Batang Toru Sub-district's seasonal plants is essential to determine its development prospects. This study evaluates land suitability for six seasonal plants, namely: red chili, cucumber, shallot, tomato, eggplant, and bitter melon, in Muara Batangtoru Sub-district, South Tapanuli Regency. This study uses a survey method and matches the criteria of survey results and laboratory analysis with predetermined criteria. Geographic information systems map the actual and potential land suitability classes for vegetable crops. The study results indicate that most of the actual land suitability classes are classified as marginally suitable (S3) and not currently suitable (N1), with the main limiting factors being water availability, low nutrient retention, less than optimal rooting media, and high rainfall. With proper management, such as making drainage and beds, providing organic fertilizer of 15-25 tons/ha/year, and applying lime/dolomite, the land suitability class can be increased to moderately suitable (S2) or highly suitable (S1). Commodities such as red chili, tomatoes, and bitter melon have the potential for significant productivity increases with simple interventions. Intercropping and crop rotation systems are recommended to optimize production results while maintaining environmental sustainability, supporting increased agricultural output, and encouraging the socio-economic stability of the community in Muara Batangtoru Sub-district. This research also contributes to the Sustainable Development Goals (SDGs).

Keywords: Limiting factors, nutrient retention, land management, highly suitable, SDGs

INVITED SPEAKER 3

Assoc. Prof. Dr Ernie Suzana Ali
(Universiti Sains Islam Malaysia)

Title: Antimicrobial Shape Memory Polyurethane from Waste Cooking Palm Oil

Abstract:

This study addresses the environmental issues associated with the improper disposal of waste cooking oil by modifying shape memory polyurethane (SMPU) using residual palm cooking oil. The primary objectives were to synthesize SMPU via an esterification process and to evaluate its shape memory and antimicrobial properties. Characterization was performed using Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), and shape memory property tests. The FTIR spectrum confirmed the successful synthesis of the polymer with urethane formation at 1686 cm^{1}. The shape memory tests showed that the SMPU had a shape fixity of 96.67% and a shape recovery of 95.56%. Although the SMPU did not exhibit clear inhibition zones in antibacterial tests, it demonstrated intrinsic antimicrobial activity against *Staphylococcus aureus* (*S. aureus*) and *Escherichia coli* (*E. coli*). The SMPU inhibited bacterial growth directly on its surface but did not exhibit antimicrobial properties in its surroundings. The successful synthesis of SMPU from waste palm cooking oil provides a sustainable raw material for polyurethane production and helps mitigate environmental issues related to waste disposal. The findings highlight the potential applications of SMPU, particularly where shape memory and antimicrobial properties are desirable, contributing to the development of environmentally friendly materials and addressing waste management challenges.

Keywords: Polyurethane, waste cooking oil, shape memory, antimicrobial

CONFERENCE PROGRAMME

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025) 5 February 2025 (Wednesday) Time: 20.00 – 21.30 Venue: KENARI MR 7 (SECRETARIAT ROOM) Resort World Awana	
TIME	**AGENDA**
20.00 – 21.30	Registration

DAY 1

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025) Day 1: 6 February 2025 (Thursday) Time: 07.30 – 10.30 Venue: WAWASAN HALL	
TIME	**AGENDA**
07.30 – 08.30	Registration
08.30 – 09.45	Opening Ceremony
09.45 – 10.15	Keynote Speech
10.15 – 10.40	Coffee Break & Poster Session
Time: 10.40 – 17.00 **Venue: WAWASAN HALL, SERINDIT ROOM, JELATEK ROOM**	
10.30 – 13.00	Invited Speeches & Oral session 1
13.00 – 14.30	Lunch Break & Poster Session
14.30 – 15.30	Oral Session 2
15.30 - 16.00	Coffee Break & Poster Session
16.00 - 17.00	Oral Session 3
Time: 19.45 – 22.30 **Venue: LANAI HALL**	
19.45 – 22.30	Networking Dinner

CONFERENCE PROGRAMME

DAY 2

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025) **Day 2: 7 February 2025 (Friday)** **Time: 08.30 – 10.30** **Venue: WAWASAN HALL, SERINDIT ROOM, JELATEK ROOM**	
TIME	**AGENDA**
08.30 – 10.30	Oral Session 4
	Light Refreshments & End of Conference

ORAL PRESENTATION SCHEDULE DAY 1

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025)
Day 1: 6 February 2025 (Thursday)
Time: 1040 – 1700

TIME	VENUE: Wawasan Hall Fundamental Sciences	VENUE: Serindit Room Advanced Technology	VENUE: Jelatek Room Fundamental Sciences/ Advanced Technology
	SESSION 1		
Chairperson	Assoc. Prof. Dr Mohd Muzamir Mahat	Assoc. Prof. Dr. Nofrijon Sofyan	Assoc. Prof Dr Zety Sharizat Hamidi
1040-1100	**Invited Speaker I** Assoc. Prof. Dr. Ali H. Jawad AL-Taei (Universiti Teknologi MARA) **Title; Biomass Algae Biomass Modified Chitosan Biopolymer for Enhanced Toxic Dye Removal**	**Invited Speaker II** Prof. Ir Rahmawaty (Universitas Sumatera Utara Indonesia) **Title; Seasonal Plants Land Suitability: Land Limiting Factors and Management Recommendations in Supporting SDGS Achievement**	**Invited Speaker III** Assoc. Prof Dr. Ernie Suzana Ali (Uni. Sains Islam Malaysia) **Title; Antimicrobial Shape Memory Polyurethane From Waste Cooking Oil**
1100-1110	P223A -Siti Nuramirah Rabbani binti Muhammad Zaki **Title; A Comparative Study of Demineralization and Physical Activation in Enhancing the Porosity and Adsorption Properties of Recovered Carbon Black Pyrolyzed from Waste Tire**	M328B -Mohd Nazip Suratman **Title; Floristic Composition and Conservation Assessment of Lowland Dipterocarp Forests in UiTM Puncak Alam, Selangor, Malaysia**	M314A -Fiona Angellinnov **Title; Oil Palm (Elaeis guineensis) Leaves Extract Mediated Green Synthesis of TiO2 Nanoparticles and Their Optical Characteristics**
1110-1120	P127A -Iswara Gautama **Title; Waste Potential and Logging Times In People's Teak Forests**	M212B -Andi Detti Yunianti **Title; Secang Wood as a Dye for Gmelina Wood and Lento-Lento Wood at Different Times**	M314B -Mohammed Falalu Hamza **Title; The Impacts of Different Adsorbents on the Treatment of Produced Water Generated from Oil Industries**
1120-1130	M112A -Surya Al Fatah **Title; Integrated Geographic Information System (GIS) and Analytical Hierarchy Process (AHP) In Public Green Open Space Management in Medan City**	M317B -Astuti Arif **Title; Termite Diversity on Palm Oil Plantation in Pinrang Regency, South Sulawesi, Indonesia**	M315B - Nur Iwani Nor Izaham **Title; Low Temperature AC Photoelectrochemical Etching of Si-doped n-type GaN: Nanostructure Fabrication for Enhanced MSM Photodetector Performance**

1130-1140	P226A -Sikiru Surajudeen Olalekan **Title; Innovative Utilisation of Ferrite Magnetic Nanoparticles with Electromagnetic Field Propagation for Enhanced Oil Recovery Using 3-D Finite Element Methods**	M322B -Agus Purwoko **Title; Characteristics of Kepah (M. meretrix) and Mangroves as its Habitat in the Main Clam-producing Area of Bagan Asahan, North Sumatra, Indonesia**	M312B -Wahyuni **Title; Land Use Suitability Based on Spatial Pattern in Biang Loe Watershed**
1140-1150	M117A - Ardi Mardiana **Title; Cross-Platform Speaker Diarization: Evaluating the Scalability and Flexibility of Maleo**	P140B -Haidar Fari Aditya **Title; Phytoremeidation Potential of Four Plants in Contaminated with PB and CD Near the Pulp and Paper Industrial Area, Indonesia**	M313B -Risfah Yulianty **Title; Discrimination of Kleinhovia hospita in South Sulawesi using FTIR, Chemometric Approach**
1150-1200	M118A - Fahri Budiman **Title; Scenario Modelling for Tapanuli Orangutan Habitat Preservation in Central Tapanuli**	P144B -Seca Gandaseca **Title; Tree and Medicinal Plant Diversities in UCS Forest, Puncak Alam, Selangor Malaysia**	M317A -Erni Farisha Binti Muhammad Fadzulli **Title; Impact of Social Marketing into Purchasing Behavior of Apparel Products in Malaysia**
1200-1210	P230A -Syed Taufiq Akmal **Title; A Comparative Study of Different Thresholding Techniques in Segmenting Porous Gallium Nitride in Field Emission Scanning Electron Microscopy Images**	M136B -Nurfarah Ain Binti Limin **Title; Behavioural Patterns and Faecal Glucocorticoid Metabolites (FGM) Concentrations in Captive Malayan Tigers at National Wildlife Rescue Centre (Nwrc), Perak, Malaysia**	M315A -Fiona Angellinnov **Title;Exploring The Characteristics of TiO2 Nanoparticles Green Synthesized Using Gambir (Uncaria gambir) Leaves Extracts**
1210-1220	P131A -Engkos Koswara **Title; Numerical Study of Nozzle Tilt Variation on Pelton Turbine Performance**	M322A - Wanti Mindari / Haidar Fari **Title; Phytoremediation Potential of Four Plants Contaminated With Pb And Cd Near the Pulp and Paper Industrial Area in Indonesia**	P229B -Herlina Rante **Title; Isolation and Characterization of Antibacterial – Producing Actinomycetes from Soil in Luwu Timur Regency, South Sulawesi, Indonesia**
1220-1230	P228B -Andang Suryana Soma **Title; Landslide Hazard Modeling using the Artificial Neural Network (ANN) Approach in the Biang Loe River Watershed**	M133B - Nurul Fathiah Binti Khairudin **Title; Exploring Epiphytes Dynamics Across Diverse Landscapes in Oil Palm Plantation: Ecological Insights**	P142B -Sazlinda Kamaruzaman **Title; Effervescence Tablet-Assisted Dispersive Solid Phase- Microextraction Based on Multi-Templates Molecularly Imprinted Polymer/Graphene Oxide for Preconcentration and Determination of OAC Drugs in Aqueous Samples**

1230-1240	M119A - Dony Susandi **Title; Enhancing Material Quality Control in Construction: A Data-Driven Approach Using PDCA and DMAIC**	P143B -Zulfan Arico **Title; Land Use Impact on Seedbank Diversity in Montane Bogs Forests: A Study on Tree Restoration Efforts**	M323B -Nuraina Hanum Binti Abdulruhim **Title; Effect of Ba2+ Substitution at A-site on Structural, Electrical and Magnetic Properties of Sm0.5Ca0.5MnO3 Manganite**
1300-1430	**LUNCH BREAK & POSTER SESSION**		
SESSION 2			
Chairperson	Prof. Ts. Dr. Mohd Nazip Suratman	Prof. Agus Purwoko	Assoc. Prof. Dr Adi Md Sikin
1430-1440	M210A -Muhammad Rakha Alfarabi **Title; Machine Learning Assisted Scanning of Pyrimidine-Pyrazole Derivative Compounds as Steel Corrosion Inhibitors in Hydrochloric Solution**	P145B -Masrizal Saraan **Title; Species Composition and Vegetation Structure in Conservation Partnership Areas of the Gunung Leuser National Park**	M111A -Marina Zulkifli **Title; Oxidative Stability of Cookies Formulated with Kiwi (Actinidia Deliciosa) as Active Ingredient**
1440-1450	P123A -Rio Sudwitama Persadanta Kaban **Title; Prediction of Tensile Strength, Hardness, and Melting Point of Nickel and Iron-nickel Superalloys Based on Composition Using Machine Learning**	M217B -Siti Khairiyah binti Mohd Hatta **Title; Unraveling Mutualistic Dynamics: Host Specificity of Blastophaga sp. Fig Wasps from Ficus deltoidea var. deltoidea**	P220B - Opeyemi Saheed Kolawole **Comparative effectiveness of different animal manure and the phytotoxicity evaluation on the growth and yield of Abelmoschus esculentus L. (Okra) vegetable**
1450-1500	M313A -Nofrijon Sofyan **Title; Characteristics of Graphene Oxide-Doped and Basella rubra Leaves Extract Mediated Green Synthesis of TiO2 Nanoparticles**	P147B -Dwi Astiani **Title; Tree-species Selection and Richness of the Tembawang Forest, Local Wisdom in Supporting Food Security and Improving the Environment in a Sustainable Manner**	P225A -Nabilatulkhilwa binti Khairi Ajmain **Title; Comparative Effects of Long-term vs. Short-term Coffee Consumption on Metabolic Health: A Systematic Review**
1500-1510	P124A -Julius Paolo Siregar **Title; Land Cover Change Analysis in the Potential Area of the Tapanuli Orangutan Ecological Corridor between the West and East Blocks of the Batangtoru Hutaimbaru Ecosystem, South Tapanuli**	M211B -Andi Sadapotto **Title; Soil Surface Insect Diversity in Sugar Palm (Arenga pinnata) And Pine (Pinus merkusii) Stands At The Hasanuddin University Educational Forest, Maros Regency, South Sulawesi, Indonesia**	M219A -Rumaisya Yasmin Binti Mohd Nazri **Title; Critical Cultivation Parameters for Optimized Astaxanthin Biosynthesis in Haematococcus pluvialis: A Systematic Review**

1510-1520	P125A -Budiaman **Title; Sustainable Agroforestry System Supporting Sulawesi's Endemic Bee Feeding Wallacetrigona incisa**	P149B -Syamsu Rijal **Title; Land Cover Dynamics of Social Forestry Using Google Earth Engine at Latimojong Forest Management Unit, South Sulawesi, Indonesia**	M311A -Hafizuddin Ja'afar **Title; Coffee as a Functional Food: Does Brewing Method Matters?**
1520-1530	P126A -Fitra Syawal Harahap **Title; Study of Soil Erodibility in its Relationship with Coffee Plant Productivity Based on Agroforestry in Silaen District Toba Regency**	P150B -Ramadhani Mahendra Kusuma **Title; Comparative Study of Nocturnal Insect Diversity in Integrated Pest Management (IPM) Rice Fields in Indonesia and Malaysia**	M213A -Nuratikah Binti Abdulllah **Title; Exploring the Impact of Brewing Techniques and Roasting Levels on the Metabolomics and Antioxidant Profile of Coffea liberica, Coffea arabica, and Coffea canephora**
1530-1600	**TEA BREAK & POSTER SESSION**		
SESSION 3			
Chairperson	Assoc. Prof. Dr. Shariff Ibrahim	Prof Ir. Rahmawaty	Dr. Amaliawati Ahmad Latiffi
1600-1610	P121A -Lo Po Kim **Title; Assessment of Microplastic Pollution in Malaysia's Freshwater Ecosystems: A Case Study of Sungai Keranji, Kampar, Perak**	P151B Wiwik Ekyastuti **Title; Potential of Peatland After Burning as A Source of Arbuscular Mycorrhizal Fungi Inoculum**	P229A -Nur Aqilah Binti Zailani **Title; Molecular Insights into Kombucha Tea: A Functional Food Perspective**
1610-1620	P128A -Irwandi **Title; Analysis of Sumatran Orangutan Occupancy Patterns in Forest Management Unit (KPH) 6 Aceh Province Using SMART Data**	M318B -Rizki Amaliah **Title; Analysis of Infiltration Rates in the Agroforestry System of Arenga pinnata (Sugar Palm) in Bonelemo Barat Village, Luwu Regency, Suso Watershed**	P141B -Tri Ferga Prasetyo **Title; Research and Development of a Roselle Petal Maturity Detection System Utilizing HSV Image Segmentation Method, Based on Raspberry Pi and Internet of Things Technology**
1620-1630	P129A -Aline Sisi Handini **Title; Enhancing Tomato Production with Liquid Organic Fertilizer and Growing Media Combinations**	P224A -Nazrizawati Binti Ahmad Tajuddin **Title; Structural Design of Macroporous Layered Double Hydroxide Catalysts: Alleviating Mass Transport Constraints In Bulkier Triglycerides**	M310B - Rina Maharany **Title; Effect of Sugar Cane Blotong Application Time on Improvement of Soil Biological Properties in Plants Producing Palm Oil (Elaeis Guineensis Jacq)**
1630-1640	P130A - Dimas Prabowo Harliando **Title; Dynamic Simulation of Land Management for Corn Cultivation on Critical Land in Pasuruan District**	P222B - Mohamed Ibrahimshah bin Kasim **Title; Accuracy Comparison Between Easy Qibla and Total Station**	M216B -Aida Firdaus Muhammad Nurul Azmi **Title; A Review: Innovative Plant Based Meal Replacement as an Alternative Solution for Weight Control Management through A Very Low-Calorie Diet Concept**

1640-1650	M212A -Syahidah **Title; Biological Activity of Mahogany Bark (Swietenia Mahagoni (L.) Jacq) Growing at Different Altitudes in Barru Regency, South Sulawesi**	P146B -Muhamad Helmi Husaini Bin Rusmidi **Title; Astatoco vitalis: A Cost-effective Therapeutic Approach Utilizing Astaxanthin And Tocotrienols for Anti - Inflammatory Treatment**	M321B -Muhammad Rizwan **Title; Effect of Palm Oil Shell Biochar and P and K Fertilizer on the Growth and Production of Soybean Plant (Glycine max)**
1650-1700	M319A -Siti Raihan Binti Zakaria **Title; Chromatographic and Chemometric Approaches for Pyrazine Analysis in the Discrimination of Coffee Bean Varieties and Geographic Origins**	M326B -Samsuri **Title; Aboveground biomass model of mangrove forest using Sentinel 2A imagery in east Sumatera coastal, Indonesia**	P120A - Ade Bastian **Title; Enhancing Indonesian Food Safety: Deep Neuro-fuzzy Rice Quality Classification**
1945 - 2245	**NETWORKING DINNER (LANAI HALL)**		

ORAL PRESENTATION SCHEDULE DAY 2

International Conference on Discoveries in Applied Sciences and Advanced Technology (DASAT 2025)
Day 2: 7 February 2025 (Friday)
Time: 0830 – 1100

TIME/ROOM	VENUE: Wawasan Hall Fundamental Sciences	VENUE: Serindit Room Advanced Technology	VENUE: Jelatek Room Fundamental Sciences/ Advanced Technology
SESSION 4			
Chairperson	Dr. Sikiru Surajudeen	Assoc. Prof. Dr. Seca Gandaseca	Assoc. Prof. ChM. Dr. Sazlinda Kamaruzaman
0830-0840	P122A -Masitah Binti Abu Kassim **Title; Performance Characteristics Assessment of Sustainable Materials using Life Cycle Assessment (LCA)**	M217A -Intan Nurfarzana Binti Mohd Safini **Title; Patterns of Antibiotic Resistance in Staphylococci Associated with Bovine Subclinical Mastitis**	M320B-Noor Hidayah Binti Pungot **Title; Toward Novel Therapeutics: A Synthetic Approach to Pachydermin from Chamonixia pachydermis as a Promising Pharmacological Agent**
0840-0850	M211A -Rovina Kobun **Title; Integrating Food Technology and Polymer for Sustainable Agricultural Practices: Enhancing Tomato Shelf Life with Natural Coatings**	M210B -Yenny Wuryandari **Title; Antagonistic Ability of Bacillus spp. Against the Pathogen Fusarium sp. Causes of Chili Plant Wilting (Capsicum annum L.) and Mechanism of Action**	P223B -Ade Fitria **Title; Estimation of Carbon Sequestration in Rubber Vegetation Using Remote Sensing**
0850-0900	M130B -Zety Sharizat binti Hamidi **Title; Impacts of Angular Width on the Physical Properties, Evolution, and Propagation of CMEs During the Transition Phase from Solar Cycle 24 To Solar Cycle 25**	P148B -Emi Roslinda **Title; Management of Tembawang, a Traditional Community Forest in West Kalimantan, for Biodiversity Conservation**	M110A - Wan Saidatul Syida Bt Wan Kamarudin **Title; Fuctional Improvement of Kefir's Physicochemical and Sensory Attributes with Mango Peel Puree**
0900-0910	M215A- Anita Zaitunah **Title; Mapping Vegetation Dynamics and Coastline Change Using Remote Sensing Techniques in Pantai Cermin, Serdang Bedagai, North Sumatra**	M213B -Abdul Rauf **Title; Percut Watershed Monitoring and Evaluation Supports Sustainable Watershed Management in North Sumatra**	P224B -Khairil Anuar Jantan **Title; Phosphine-Free Approach for the Suzuki-Miyaura Reaction, Antifungal Efficacy, In Silico Analysis, and Molecular Docking Studies of Dimeric Iodide-Bridged Palladium(II) Complexes**

0910-0920	M318A -Norzihan Rahimi **Title; Buckling Analysis and Laminate Optimisation of Composite Laminates**	M214B -Lai Zhi Qin **Title; Effect of Mycovirus Infection on the Hydrolytic Enzymes Activity on Fusarium oxysporum f. sp. cubense Tropical Race 4, the Causal Agent Banana Fusarium Wilt**	P225B -Mohd Khairulniza Mansor **Title; Influence of Solvent Type on the Morphology and Mechanical Properties of Electrospun PMMA Nanofibers**
0920-0930	P221A - Nur Diyana Nadirah binti Fuadi **Title; Pitch Study of Bifacial Photovoltaic System Design Using Pvsyst: A Case Study in Puncak Alam, Malaysia**	M215B -Norinsafrina Binti Mustaffa Kamal **Title; Three-factor Response Surface Optimization for Manganese Adsorption by Ferromanganese Ore and Humus Mixture**	P227B -Hanisah Binti Zainal Abidin **Title; Porosity and Structural Integrity of Tin-Polydimethylsiloxane (PDMS) Composites for Radiation Shielding Applications.**
0930-0940	M218A -Mr. Oluwatosin Obaseki **Title; Photoelectrode Materials for Green Hydrogen Production: A Concise Overview**	M134B -Nur Amin Ibrahim **Title; Biodiversity of Understory Vegetation in Oil Palm Plantation: Insights from Banting, Malaysia**	M320A -Adi Md Sikin **Title; Optimization of Roasting Condition of Salak Seed (Salacca zalacca) as Coffee Substitute and its Physicochemical Properties**
0940-0950	M312A -Azra Umairah Binti Anuar **Title; Tailoring Oxidation Degrees of Graphene Oxide (GO) Based Recovered Carbon Black (rCB) of Waste Tire Through Varying Potassium Permanganate Concentration**	M321A - Indra Gunawan **Title; Soybean Plant Growth and Production Response (Glycine max L) Regarding the Use of Organic Fertilizers and Inorganic P and K**	P220A - Nurul Zaizuliana binti Rois Anwar **Title; Proximate Composition, Thermal and Rheological Properties of Ice Cream Substituted with Different Proportions of Palm Sugar as Natural Sweetener**
0950-1000	M115A -Nafisah Binti Musa **Title; The Use of Empty Fruit Bunches (Efb) for Biodegradable Plastic Utensil Alternatives**	M324B -Mohammed Abdullahi **Title; Potentials and Limitations of Cold adapted Hydrogen Producing Bacteria; A Mini Review**	P230B -Yazmin Bustami **Title; Evaluation of anti-quorum sensing of bioAgNPs against Pseudomonas aeruginosa sp. using in vitro and in silico approaches**
1030-1040	P231B -Nurul Husna Mohammad Bokhari **Title; Statistical Analysis of Isolated Metric Type III Solar Radio Bursts (Subtype VI) During the Ascending Phase of Solar Cycle 25**	M325B -Muhammad Isah Legbo **Title; Antibacterial Activity of piliostigma thonningii Extracts against Bacterial Species Isolated from Open Wound**	M216A -Muhammad Iqbal Hafiz Bin Saad **Title; Prevalence and Antibiotic Resistance of Enterococcus faecium and Enterococcus faecalis in Municipal Wastewater Integrated with Hospital Effluent in Northern Malaysia**

1040-1050	P227A -Nurul Syafiqah Binti Roslan **Title; Porosity and Structural Morphology of Double Layers Tin-polydimethylsiloxane (PDMS) as Radiation Shielding Material**	M329B -Sadia Sultan **Title; Modulating the metabolism of soil fungi: Use of toxic volatiles as a tool for selective isolation**	M139B -Nur Farah Syuhada Binti Mohd Zaki **Title; Isolation and Identification of Tannin-degrading Bacteria From Goat Feces, Ruminal Fluid, and Rumen Gut**
1050-1100	P231A -Fatin Nur Azmina Binti Mohd Fauzi **Title; Evaluating The Efficiancy of Petroleum Based Polyurethane versus Green Polyurethane: A Comparative Study on The Physical, Mechanical and Morphological Properties for Enhancing Grouting Application**		
LIGHT REFRESHMENTS & END OF CONFERENCE			

LIST OF POSTERS

POSTER ID	Advanced Technology	POSTER ID	Fundamental Science
T310A	Chemically Modified Banana Stem Bioadsorbents for Effective Adsorption of a Reactive Dye in Aqueous Solution.	T318B	Evaluation of Physical and Chemical Properties of Bamboo Leaves and Their Potential for Tea Production: Impact of Particle Size on Total Phenolic Content.
T311A	Mechanical Properties of Hybrid Woven Glass Cloth and Recycled Polypropylene Sheet of Polyester Laminate Composite	T319B	Thermal Conductivity of Al 2 O 3 Nanofluid Utilizing Cross-linked Polyacrylic Acid (PAA) as the Base Fluid: An Experimental Study
T313A	Antimicrobial Shape Memory Polyurethane from Waste Cooking Palm Oil	T322B	An Investigation of Chia Seed Emulsifiers in Oil-In-Water Emulsion Mixtures.
T314A	Development and Characterization of Mechanical, Physical and Biodegradability Properties of Banana Peel-based Bioplastic	T327B	Hyrtiosulawesine: An Efficient Synthesis and Molecular Docking Studies
T315A	Comparative Study of PLA/Kenaf Core and PLA/Kenaf Bast Flexural Properties	T333B	Deflection Performance of Composite Panels Comparing Particleboard, Blockboard and Sandwich Board
T316A	Advancing Wood Coating Efficiency through Nanotechnology Applications	T334B	Performance of Kitchen Cabinet as Built-in Furniture
T317A	Fe 3 O 4 /NiO/Graphene Composites: Enhancing Humidity Energy Harvesting Through Temperature Variations	T336B	Application of Asparaginase Enzyme In Reducing Acrylamide Formation In Roasted Coffee Beans
T320A	Anti-odour and Colour Properties of Cotton Fabric Dyed with Spent Ground Coffee	T337B	Structural Properties of Barium (Ba) Substitution at A-Site on SrBaMnRuO 6 Double- Perovskite Material
T324A	Design and Development of Conductive Hydrogels for Enhanced Neural Regeneration in Spinal Cord Injuries	T338B	Green Synthesis, Characterization and Anticancer Activity of Poly acetal/Chitosan doped with Gold Nanoparticles
T325A	High-Sensitivity Sensors for Dual Detection of Hydrogen and CO_2 Gases: Advances in Materials and Design	T339B	Mentha piperita Ethanolic Extract Attenuates the Growth of Oral Pathogenic Bacteria
T326A	Advancements in Graphene Nanocoating: A Novel Approach to Corrosion Protection for Offshore Pipelines	M327B	Effect of Addition of Emulsifiers and sterilization on the physical stability of tigernut-date-coconut milk drink
T335A	A Preliminary Study on the Carbon Footprint of Rubberwood Primary School Chair		

ABSTRACTS

TRACK 1:

FUNDAMENTAL SCIENCES

M130B

IMPACTS OF ANGULAR WIDTH ON THE PHYSICAL PROPERTIES, EVOLUTION, AND PROPAGATION OF CMEs DURING THE TRANSITION PHASE FROM SOLAR CYCLE 24 TO SOLAR CYCLE 25

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A solar cycle is a characteristic of the Sun, which influences the occurrence of solar events on the Sun. There is a need to study the trend of CMEs of varying angular widths during the transition phase from solar cycle 24 to solar cycle 25 in order to gain a deeper understanding of how this could affect their physical properties, evolution, and propagation in the future. As part of the analysis, quantitative methods such as descriptive statistics, Spearman's correlation coefficient test, time-series plots, and scatter plots are used to investigate the trend of CMEs with varying angular widths, and the correlation between angular width and CME properties. There is evidence from this research that types I, II, III, and IV CME show a similar pattern to the trend in the number of sunspots. There is a high degree of similarity between the type I CME occurrence pattern and the sunspot number, as shown by the r value of 0.795. At different stages of the solar cycle, different types of CMEs become apparent, and wider CMEs are more likely to occur during periods when there are a greater number of sunspots on the surface of the earth. The R values for the angular width as a function of angular height and duration of a CME yield moderate values of 0.503 and 0.610, respectively. There is also a tendency for wider CMEs to experience deformation as a result of the constraints placed on them by the surrounding magnetic fields. In addition, trajectory deflections were observed both in narrow and wide CMEs that occurred near coronal holes at the same time. CME models could benefit from this, as well as mitigation measures and damage prevention measures introduced as a result of CMEs.

Keywords: Sun; Coronal Mass Ejections; Angular Width; Solar Cycle; transition phase

M132B

ENHANCING MATERIAL QUALITY CONTROL IN CONSTRUCTION: A DATA-DRIVEN APPROACH USING PDCA AND DMAIC

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Quality control is essential during the implementation of a building project to guarantee its smooth execution and adherence to the established plan. Furthermore, the materials utilized in a construction must also conform to the prescribed standards. The presence of substandard material is undesirable. Therefore, it is necessary to implement material quality control processes to identify the cause of the issue and subsequently correct it, so preventing its recurrence in the future. In order to prevent the recurrence of material quality problems, the PDCA and DMAIC techniques, together with other quality tools, are employed to identify the underlying causes and implement improvements. The analysis of FMEA data uncovers the underlying reasons for quality problems in cast concrete, which can be attributed to three principal components: human factors, material factors, and procedural factors. The hammer test results confirmed an improvement in concrete quality, with an increase of 42 kg/cm2, equivalent to around 26.25% (from 162 kg/cm2 to 204 kg/cm2). Similarly, the compressive strength test values showed an increase of 68.17 kg/cm2, equivalent to around 40% (from 170.42 kg/cm2 to 238.59 kg/cm2).

Keywords: PDCA, DMAIC, Improvement, Quality Control, Cast Concrete

M133B

EXPLORING EPIPHYTES DYNAMICS ACROSS DIVERSE LANDSCAPES IN OIL PALM PLANTATION: ECOLOGICAL INSIGHTS

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Epiphytes are essential components of ecosystems, contributing significantly to biodiversity and ecological balance. In Malaysia, the oil palm plantations are one of the largest producers of palm oil globally and an important aspect of the country's economy. Although oil palm plantations often lead to a reduction in biodiversity, they still manage to support ecological balance by fostering the growth of epiphytes. However, the distribution and ecological value of epiphytes in oil palm ecosystems remain understudied. This research focuses on the diversity and abundance of epiphytes within three distinct landscapes (fringe, middle, inner) of an oil palm plantation in Banting, Malaysia. The objective is to evaluate how species diversity and abundance of epiphytes vary across these landscapes. A total of 15 species of epiphytes were identified with *Nephrolepis biserrata* (357 individuals), *Davallia trichomanoides* (316 individuals), and *Rumohra adiantiformis* (255 individuals) being the most dominant species. The Shannon-Wiener Diversity Index (H') revealed that the middle landscape (H' = 1.90) had the highest diversity, while the inner landscape exhibited the greatest species richness (R' = 2.25). Nevertheless, the Evenness Index was the lowest in the inner (E' = 0.40), indicating a partial dominance of certain species. A Kruskal-Wallis test confirmed a significant difference in the species distribution of epiphytes across all landscapes, with $p < 0.05$. The study highlights the adaptive capacity of different epiphyte species and the conditions that promote their distribution. Future research can be done to explore the benefits and ecological roles of epiphytes, providing a clearer understanding of their impact on the agricultural industry.

Keywords: abundance, biodiversity, conservation, species composition, macrohabitat

M134B

BIODIVERSITY OF UNDERSTORY VEGETATION IN OIL PALM PLANTATION: INSIGHTS FROM BANTING, MALAYSIA

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Understory vegetation has great potential to maintain biodiversity, ecosystem health, and agricultural sustainability in oil-palm plantations. However, little is known about how monoculture in oil palm plantations affect biodiversity, particularly in understory vegetation especially in the Banting region of Selangor, Malaysia. This study seeks to investigate the diversity, abundance, and distribution of understory vegetation across the fringe, middle, and inner zones of an oil palm plantation in Banting. Using quadrat sampling, vegetation data were gathered, resulting in the identification of 36 species from a total of 1630 individuals. The fringe zone had the highest number of individuals with 596, followed by the middle zone with 557 individuals, and the inner zone with 477 individuals. The dominating species included *Nephrolepis acutifolia*, *Paspalum conjugatum*, *Ageratum conyzoides*, and *Nephrolepis cordifolia*. The middle zone recorded the highest value for Shannon–Wiener Diversity Index (H') with H' = 2.43 and Margalef Richness Index (R') with R' = 4.11 while evenness peaked in the inner zone (E' = 0.60) despite its lower diversity (H' = 1.97). A Kruskal-Wallis test revealed significant differences in species distribution between the diversity of understory vegetation across all zones ($p < 0.05$) where the differences come from the fringe and the inner zones ($p < 0.05$). The findings suggest that light availability and canopy cover might be the factors that influenced understory vegetation patterns within the plantation. This study provides better understanding of the ecological dynamics of understory vegetation in managed ecosystems of oil palm and provides a basis for further research in biodiversity conservation within agricultural landscapes. Future research should explore the ecological functions of understory vegetation to better inform sustainable oil palm management practices.

Keywords: abundance, conservation, diversity, ecosystem dynamics, zonal distribution

M135B

ANTIOXIDANT ASSAY AND ISOLATION OF 2-(3-BUTOXYPHENYL)-5-HYDROXY-4H-CHROMEN-4-ONE FROM THE LEAVES OF SYZYGIUM GUINEENSE

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Despite being claimed as a valuable antioxidant with the potential to eliminate free radicals and reduce oxidative stress, the plant Syzygium guineense has little scientific data to validate this assertion. In this study, crude ethanol extract of Syzygium guineense leaves was fractionated based on solvents of increasing polarity; starting with hexane, chloroform, ethyl acetate, and methanol. The fractions were subjected to phytochemical screening which indicated that the ethyl acetate and methanol fractions exhibited the highest level of activity. This can be attributed to the presence of almost all secondary metabolites obtained from the crude ethanol extract within these fractions. The antioxidant assay of all four fractions was conducted using 1,1-diphenyl-2-picrylhydrazyl (DPPH), IC_{50} value, ferric reducing antioxidant power assay (FRAP), and Total Antioxidant Content (TAC), The results of the DPPH scavenging assay and the IC_{50} value show that the antioxidant activity of the methanol and ethyl acetate fractions is significantly higher compared to the chloroform and hexane fractions. However, the findings from FRAP and TAC suggest that the methanol fraction has the highest antioxidant capacity, while the ethyl acetate fraction has the lowest antioxidant capacity. In contrast, the chloroform and hexane fractions occupy an intermediate position in both methods. This revealed that the methanol fraction with robust antioxidant efficacy in all three methods is the most potent among the fractions. The antioxidant activity was compared to that of ascorbic acid. The results demonstrate that the leaf extract of S. Guineense possess noteworthy antioxidant activity and has the potential to act as a source of natural antioxidant. Encouraged by the results of the IC_{50} value and DPPH screening, Column chromatography of the ethyl acetate fraction leads to the isolation of a bioactive compound H-30 which upon characterization using FT-IR, ^{1}H and ^{13}C NMR was proposed to be 2-(3-butoxyphenyl)-5-hydroxy-4H-chromen-4-one (Flavonone).

Keywords: *Phytochemical screening, Syzygium guineense, Antioxidant assay, Flavonone.*

M136B

Behavioural Patterns And Faecal Glucocorticoid Metabolites (Fgm) Concentrations In Captive Malayan Tigers At National Wildlife Rescue Centre (Nwrc), Perak, Malaysia

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Captivity is often inadequate in providing optimum environments for natural behaviours, leading to stereotypic behaviours that indicate stress in animals, which is particularly concerning for critically endangered species such as the Malayan tigers. This study assessed behavioural patterns and faecal glucocorticoid metabolites (FGM) concentrations in captive Malayan tigers to investigate the interactions among these parameters in relation to sex, age, and time of day over six weeks. Results showed that male tigers exhibited significantly longer stereotypic pacing than females ($p < 0.05$), with pacing more prevalent in the morning ($p < 0.001$). Young males paced longer than old ones ($p < 0.001$). Active behaviours were significantly greater in females and young tigers, particularly in the morning sessions ($p < 0.001$). Resting behaviours were longer in females but more common in males, with old tigers rested significantly more, especially during afternoon sessions ($p < 0.001$). Grooming occurred more frequently in the afternoon ($p < 0.001$), with females groomed significantly longer. FGM analysis showed that the mean FGM concentration was 70.3 ng/g, with females exhibiting higher levels than males ($p = 0.073$). Correlation analysis revealed that stereotypic pacing had a moderate negative correlation with FGM concentrations, with a trend toward significance ($r = - 0.317$, $p = 0.073$). Active, resting, and grooming behaviours exhibited no significant correlations with FGM. These findings suggest that sex, age, and time of day could affect both behaviour and physiology in captive Malayan tigers, with a potential correlation between stereotypic pacing and FGM levels. Understanding these patterns can aid in developing strategies to improve Malayan tigers' welfare in captivity.

Keywords: Malayan tigers, *Panthera tigris jacksoni*, stereotypic behaviour, faecal glucocorticoid metabolites (FGM), animal welfare, conservation

M137B

ERGONOMIC POSTURE ASSESSMENT AND MUSCULOSKELETAL DISORDERS AMONG WELDERS IN STEEL MANUFACTURING IN NEGERI SEMBILAN, MALAYSIA

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Welders in manufacturing factories are frequently subjected to non-ergonomic working conditions, leading to Work-related Musculoskeletal Disorders, or WMSDs, which are a major contributor to work-related injuries and disabilities. This cross-sectional study aims to identify ergonomic risk factors that potentially cause WMSDs and assess the work posture risk score among welders at the steel factory in Negeri Sembilan, Malaysia; based on the requirements of the Guideline for Ergonomic Risk Assessment at Workplace 2017, Department of Occupational Safety and Health Malaysia. A questionnaire was used to gather sociodemographic data, and Cornell Musculoskeletal Discomforts Questionnaire (CMDQ) was used to assess body parts discomforts among 60 welders. Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA) were used to examine the work posture of 15 welders completing their work in standing and sitting welding positions. Ergonomic risk factors identified in this study include awkward posture, static and sustained posture and repetitive motion. From CMDQ, the welders had at least 1 to 2 times of discomfort for the past working week, on four main body parts includes neck (86.7%, n=52), lower back and upper back (80.0%, n=48), right wrist (53.3%, n=32) and left wrist (13.3%, n=8). The RULA total score for standing and sitting welding position was 6, indicates a medium risk of musculoskeletal disorders, necessitating further investigation and immediate modification. However, REBA score of 8 shows that welders involved in sitting welding position having high risk of musculoskeletal disorders, where the position require further investigation and implementation of immediate changes.

Keywords: Ergonomics; Musculoskeletal disorders; Ergonomic posture assessment; Welders; RULA; REBA

M139B

ISOLATION AND IDENTIFICATION OF TANNIN-DEGRADING BACTERIA FROM GOAT FECES, RUMINAL FLUID, AND RUMEN GUT

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Tannins are toxic polyphenols present in various plants, contributing to microbial attacks and plant protection due to their astringence and bitter taste. However, high tannin inclusion in poultry diets will result in dyspepsia, hampering nutrient absorption and digestion. Interestingly, several bacteria occupying the rumen and gastrointestinal tract (GIT) of animals may tolerate tannins and degrade them by wielding tannase enzymes. The study aims to isolate and characterize potential tannin-degrading bacteria (TDB) from several ruminant specimens. The TDBs were isolated based on their tannin hydrolyzing ability on a minimal salt medium (MSM) agar complemented with 0.2% tannic acid as the sole source of carbon and energy. The maximum tannin tolerance of the isolates was characterized using increased tannin concentrations on the MSM agar plates. Furthermore, the tannase activity was also evaluated over a five-day incubation. A total of 42 tannin degraders were isolated, and 10 TDBs were chosen for further characterization based on the hydrolyzed zone produced. Molecular identification revealed the presence of *Bacillus cereus* (TDB536), *Lysinibacillus macroides* (TDB17), *Acinetobacter nosocomialis* (TDB18, 20, 23, 24, 30, 35), and *Staphylococcus saprophyticus* (TDB40). TDB17, TDB18, and TDB24 showed the highest tannic acid tolerance at 1.0%, while TDB36 and TDB40 exhibited the lowest tolerance at 0.4%. Each TDB displayed varying tannase activities, ranging from 11.56 to 42.08 U/mL over a five-day incubation period. TDB5 and TDB35 demonstrated significantly higher tannase activity on day 2 ($p<0.05$). Meanwhile, TDB23 and TDB24 showed the highest tannase activity on day 4 ($p<0.05$). Among the isolates, *A. nosocomialis* strain AE6 (TDB24) from feces exhibited the highest tannase activity (42.08 U/mL) and represented the best TDB. The isolated strains demonstrate their capabilities in reducing tannin's antinutritional effects in poultry feed.

Keywords: *Acinetobacter* strain, Identification, Tannase, Tannic acid, Tannin-degrading bacteria.

P140B

PHYTOREMEDIATION POTENTIAL OF FOUR PLANTS IN CONTAMINATED WITH PB AND CD NEAR THE PULP AND PAPER INDUSTRIAL AREA, INDONESIA

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Agricultural land around industrial areas has the potential to be contaminated with heavy metals, especially cadmium and lead. One way to reduce metal contaminants in plants is through phytoremediation. The assessment of the effectiveness of phytoremediation in extracting or depositing metals is currently being conducted in Sidoarjo, East Java Province, Indonesia. The study was arranged according to a factorial randomized block design, where Factor 1 was 2 heavy metal contaminated lands, and Factor 2: was four types of phytoremediation plants, including vetiver grass (Chrysopogon zizanioides), paper flower (Zinnia elegans), sunflower (Helianthus annuus), and snake plant (Sansevieria trifasciata), all of which can function as phytoremediator. The parameters observed included soil characteristics at a depth of 0-20 cm including soil pH, soil Cd and Pb metal content and plant growth including Plant height, heavy metal accumulation, reduction, and plant absorption efficiency. The results of the experiment showed that the soil reaction was alkaline with the final levels of heavy metal Pb between 1.46-1.72 ppm and Cd levels between 0.35-0.48 ppm. During the four-week observation period, Vetiver grass, Zinnia, Sunflower, and Sansevieria showed a proportional decrease in metals over time, with the highest accumulation rate occurring in the first week. Sunflower plants showed high adaptability to contamination, while Vetiver grass showed the highest metal absorption capacity. Ideal phytoremediation plants should have high biomass productivity, short lifespan, tolerance, and high contaminant accumulation capacity.

***Keywords**:* Heavy metals, Plants, Phytoremediation, Reduction, Soil

P141B

RESEARCH AND DEVELOPMENT OF A ROSELLE PETAL MATURITY DETECTION SYSTEM UTILIZING HSV IMAGE SEGMENTATION METHOD, BASED ON RASPBERRY PI AND INTERNET OF THINGS TECHNOLOGY

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Roselle is a fiber-yielding plant that offers extensive benefits for both food and health, prompting many farmers to cultivate it. The timing of harvesting roselle petals is crucial in its cultivation because it impacts post-harvest quality. Currently, harvest timing is based on estimates, which are not very precise. Therefore, a tool to detect the maturity of roselle petals ready for harvest is necessary. This tool will be developed using digital image processing technology and the Internet of Things, comprising hardware like the Raspberry Pi and PiCamera module, and software applications such as the Roselle Automatic Online System (RAOS) and a Python application on the Raspberry Pi. Roselle farmers will use the RAOS application to check petal maturity, after which the PiCamera module will capture an image of the roselle. The image will be processed using the HSV image segmentation method to determine the petals' maturity. The maturity identification results will be processed by a web service and sent back to the RAOS application as a detection result notification. The roselle object detection test concluded with an accuracy of 80%, while the maturity detection of roselle petals using the HSV image segmentation method achieved an accuracy of 75%. The detection process is influenced by lighting and camera quality.

***Keywords**:* Roselle; Digital Image Analysis; HSV Image Segmentation Method; IoT (Internet of Things); Raspberry Pi microcomputer

P142B

EFFERVESCENCE TABLET-ASSISTED DISPERSIVE SOLID PHASE-MICROEXTRACTION BASED ON MULTI-TEMPLATES MOLECULARLY IMPRINTED POLYMER/GRAPHENE OXIDE FOR PRECONCENTRATION AND DETERMINATION OF OAC DRUGS IN AQUEOUS SAMPLES

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In this study, the multi-templates molecularly imprinted polymers (mt-MIPs) based on surface modification by graphene oxide (mt-MIPs/GO) with three drug compounds as the template, namely omeprazole, amoxicillin and clarithromycin (OAC), were prepared by precipitation polymerization and used as the adsorbents in an effervescent tablet-assisted dispersive solid-phase microextraction (DSPM), and coupled with gas chromatography-mass spectrometry (GC-MS) for the simultaneous selective extraction, separation and determination of OAC drug compounds in water samples. A 180 mg effervescent tablet (10 mm diameter 2 mm thickness) consisted of Na_2CO_3, NaH_2PO_4 and mt-MIPs/GO was used as an adsorbent and the separation occurred with the aid of CO 2 released by reaction of an acid source and a base source. Based on Transmission Electron Microscopy analysis (TEM), the mt-MIPs/GO cavities remain unchanged after the addition of the effervescent agent. Several important parameters were optimized using the one-factor-at a-time approach. Under the optimized conditions, the mt-MIP/GO-DSPM/GC-MS method gave LODs for analytes as low as 0.30-0.80 µg/L, LOQs from 1.0-2.1 µg/L and high precisions with intra- and inter-day RSDs of 7.5- 6.1%. In conclusion, this developed method offers many advantages such as simultenous extraction of OAC drugs due to the mt-MIP/GO, having no need for complex devices or instrumentation, easy operation, high sensitivity/accuracy and short extraction time by the dispersion of effervescent tablets.

Keywords: multi-templates molecularly imprinted polymers (mt-MIPs), graphene oxide (GO), effervescent tablet, dispersive solid-phase microextraction (DSPM), simultaneous extraction

P143B

AND USE IMPACT ON SEEDBANK DIVERSITY IN MONTANE BOGS FORESTS: A STUDY ON TREE RESTORATION EFFORTS

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Land use changes significantly impact seedbank diversity in montane bogs forests. This study examines the effects of land use changes on seedbank diversity and how restoration efforts through tree planting can help in ecosystem recovery. The research was conducted by comparing species diversity in primary and secondary forests within montane bogs. This study aims to identify tree diversity in the montane bogs of Gayo Highlands, Central Aceh. This research was conducted the research between January and August 2024 at two montane bogs locations, namely: Pantan Terong and Atu Gajah, covering a total area of 15.77 hectares. The research locations were selected using the purposive sampling method, and samples were collected using the transect method with ten observation plots. The number of species in the primary forest was 166, whereas in the secondary forest, it was significantly lower at 43. The results indicate that several species experienced population decline, especially in secondary forests, with species such as *Dacrycarpus imbricatus* and *Myrsine avenis* classified as vulnerable due to decreased natural dispersal agents. Tree restoration efforts are considered essential to restoring seedbank diversity and mitigating the impacts of land use changes. Planting tree species that support natural dispersal agents can accelerate ecosystem recovery and help maintain biodiversity stability in montane forest areas.

***Keywords**:* Land Use, Seedbank, Montane Bogs, Aceh Tengah, Restoration

P144B

TREE AND MEDICINAL PLANT DIVERSITIES IN UCS FOREST, PUNCAK ALAM, SELANGOR MALAYSIA

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Universiti Cawamgam Selangor (UCS) Forest, Puncak Alam, Selangor is a lowland dipterocarp forest and are considered as secondary forest due to destructive logging activities about a few decades ago. UCS forest still retains its natural-occurring tropical rainforest tree and medicinal plant species. Its biodiversity status is still unknown. The objectives of this study are to determine the distribution of tree and medicinal plant that are inhabiting the UCS Forest, to analyse the variety of different type of trees, medicinal plants, and their relative abundance, and to calculate the biodiversity index of the forest using multiple indices such as Margalef, Pielou, Simpson, and Shannon-Wiener Index. For Tree diversity, a five quadrat were set up, and for medicinal plant diversity a five transects were also set up. A total of 146 tree species individuals consisting of 73 different species and 28 different families were recorded and analyzed. For medicinal plants, a total of 610 samples were meticulously collected and identified up to the family level. UCS Forest is a secondary forest which currently undergoing a regeneration phase with a high degree of species diversity and species richness within it and an even distribution of the tree and medicinal plant species. UCS Forest has variety different types of tree species as well as their abundancy were analyzed successfully. The biodiversity indices value of the tree and medicinal plant were also calculated using Shannon-Wiener Index and Simpson Index, with an addition of Margalef Richness Index and Pielou's Evenness Index, and their values were known to prove that UCS Forest is a forest with a highly diversified species and an even distribution of the tree and medicinal plants. With these data acting as a baseline study, further scientific research and conservation efforts will now be available to be work for.

Keywords *:* Biodiversity, Tree, Medicinal Plants, UCS Forest, quadrat, transect.

P145B

SPECIES COMPOSITION AND VEGETATION STRUCTURE IN CONSERVATION PARTNERSHIP AREAS OF THE GUNUNG LEUSER NATIONAL PARK

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The Indonesian government's policy to resolve land management conflicts in Gunung Leuser National Park (GLNP) is a conservation partnership through an agroforestry scheme as an effort to restore the ecosystem and improve community welfare. Agroforestry is a land management system designed to overcome problems arising from land-use change. The study aimed to identify species composition and vegetation structure in the conservation partnership area of the GLNP regarding ecosystem restoration efforts. Data were collected through vegetation analysis on 1 ha plots in three typologies of agroforestry application (upper, middle, and lower area). The results show variations in species composition and vegetation structure, with a higher diversity index in the upper region of the conservation partnership area. Vegetation in the upper area showed a diverse species composition, consisting of Shorea javanica, Sloeatia elongataand Koompassia excelsa. In contrast, Archidendron pauciflorum, Parkia speciosa, Durio zibethinus, and Nephelium lappaceum dominated vegetation in the middle and lower areas, indicating ongoing agroforestry practices. This highlights the potential to increase plant diversity as ecosystem restoration efforts continue under agroforestry schemes. Endemic species exist in the upper area due to its location in the GLNP rehabilitation zone, where vegetation cover remains relatively intact. This study provides a deeper understanding of vegetation dynamics in conservation partnership areas managed through agroforestry and provides recommendations to improve the effectiveness of ecosystem restoration efforts.

Keywords: conservation partnership, vegetation analysis, vegetation structure, species composition, agroforestry

P146B

ASTATOCO VITALIS: A COST-EFFECTIVE THERAPEUTIC APPROACH UTILIZING ASTAXANTHIN AND TOCOTRIENOLS FOR ANTI-INFLAMMATORY TREATMENT

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Known for their potent antioxidant and anti-inflammatory properties, astaxanthin and tocotrienols have remained underexplored in their synergistic effect, especially in inflammation-related pathways. Though the combination of these two is not new, previous studies only combined these two compounds to investigate the impact of their consumption on improving the cognitive functions of the elderly, with a ratio of 2:1 astaxanthin to tocotrienols. These compounds are considered premium compounds as astaxanthin was priced at RM 735.00 for 50 mg and tocotrienols at RM 1,241.00 for 10 mg (Sigma Aldrich, 2024). To produce more cost-effective therapeutic compounds, we evaluated the synergistic anti-inflammatory effects of these compounds on CALU-3, A549, and RAW 264.7 cell lines, both individually and in combination. We have tested various concentrations of astaxanthin and tocotrienols individually using the concentration set by previous studies. However, we noticed that 25 µg/mL for each compound did inhibit Nitric Oxide (NO) to 30%, which is not favoured as we wish to achieve IC50. Further optimization experiments were conducted, and we found that concentrations of 4 µg/mL of each compound were sufficient to achieve IC50 without inducing toxicity. Utilizing a Box-Behnken design, we tested 15 formulations and determined that a 4 µg/mL astaxanthin and 4 µg/mL tocotrienol combination provided optimal NO inhibition. Not only that, but the combination also possessed synergistic effects, as confirmed through isobologram analysis. It could be concluded that the combination offers a more cost-effective solution for anti-inflammatory treatment as it used lower concentrations of both compounds while achieving efficacy. These findings suggest that *AstaToco Vitalis* could be an economically viable and potent therapeutic agent for inflammation.

Keywords: Anti-inflammatory, Astaxanthin, Cost-effectiveness, Synergy, Tocotrienols

P147B

TREE-SPECIES SELECTION AND RICHNESS OF THE TEMBAWANG FOREST, LOCAL WISDOM IN SUPPORTING FOOD SECURITY AND IMPROVING THE ENVIRONMENT IN A SUSTAINABLE MANNER

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Tembawang Dusun Gutok is a small forest that was collectively inherited by the ancestors according to family customs and lineage. This tembawang, which was farmed and then left fallow, is about ninety years old, having been planted and cared for several generations. Examining the diversity of woody species and the sustainability of growing species—particularly those that are utilized by the community—are the main objectives of this research. The study was conducted in 2023–2024 utilizing a survey approach along with sensus evaluation. The study found 30 tree species, with fruit-bearing trees accounting for 90%. Tengkawang (*Shorea stenoptera*), durian (*Durio zibethinus*), and kelampai (*Elastiospermum tapos*) are three prominent species with a significance value index of more than 30% in nature. Several species have developed a species normal curve as a result of the analysis of their presence at younger growth stages, confirming their long-term viability in the Tembawang forest. Given the importance of these species to the community, particularly as fruit-producing trees used for direct consumption, processed food, and supply in local markets, some species require a silvicultural touch to maintain their survival. The selection of tree species planted based on the village community's local wisdom can help with food security, and according to the findings of a separate investigation, tembawang forests benefit the environment by storing carbon significantly per unit area.

Keywords: Food security, forest sustainability, species richness, species selection, tembawang forest,

P148B

MANAGEMENT OF *TEMBAWANG,* A TRADITIONAL COMMUNITY FOREST IN WEST KALIMANTAN, FOR BIODIVERSITY CONSERVATION

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Tembawang is a land use system still managed by the indigenous people of Kalimantan, the Dayak, in the form of forest gardens. The form of forest gardens indicates that there is biodiversity as its component. This study aims to explain the *tembawang* management system carried out by the Dayak community and its contribution to maintaining the biodiversity of tropical forests. The study was conducted using a survey method in several *tembawang* locations in West Kalimantan. Data collection was carried out through interviews and observations in the field. The study results showed that the current management of *tembawang*, seen from its ownership, consists of private and community-owned, obtained from an inheritance system. The origin of *tembawang* is from natural forests that were cut down for rice farming activities and from settlements that have been abandoned for various reasons. The *tembawang* planting pattern is polyculture, consisting of various types of forest and agricultural plants deliberately planted by the community to be categorized as an agroforestry system with a random planting pattern. The types and structures of diverse and tiered plants can meet the needs of food, housing, energy, and health. The various plants that make up *tembawang* are generally endemic plants that contribute to maintaining the biodiversity of tropical forests. So that the *tembawang* ecosystem has economic, ecological, and social value for the lives of the Dayak people. This traditional land management can be adopted for sustainable forest management to support the preservation of biodiversity.

***Keywords**:* tembawang, Dayak, inheritance, biodiversity, agroforestry

P149B

LAND COVER DYNAMICS OF SOCIAL FORESTRY USING GOOGLE EARTH ENGINE AT LATIMOJONG FOREST MANAGEMENT UNIT, SOUTH SULAWESI, INDONESIA

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Social forestry is a government priority program in an effort to improve community welfare and preserve forests. The success of social forestry can be measured by increasing forest cover. This research aims to measure the dynamics of changes in forest cover in social forestry permit areas using Google Earth Engine at KPH Latimojong. The method used is machine learning (GEE) using sentinel data. Analysis was carried out on all Social Forestry areas. The dynamics of land cover change are described and linked to field findings. The research results show that land cover in the Latimojong PS KPH permit area is 16,522.23 Ha between 2018 and 2023. Significant changes in land cover occurred in three categories, namely forest, agriculture and open land. This research shows that land cover dynamics have different trends. Forest area increased significantly, agricultural area and open land decreased.

Keywords *:* Social forestry, Machine Learning, Google Earth Engine, Land Cover, Latimojong

P150B

COMPARATIVE STUDY OF NOCTURNAL INSECT DIVERSITY IN INTEGRATED PEST MANAGEMENT (IPM) RICE FIELDS IN INDONESIA AND MALAYSIA

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Rice is a staple food for the majority of Southeast Asia's population, including Indonesia and Malaysia. The commercial cultivation of rice has created vast agricultural landscapes, particularly in rural areas, forming complex ecosystems where insects play crucial roles. However, this ecosystem balance is threatened by factors such as excessive pesticide use, climate change, and unsustainable land management practices. This study examines nocturnal insect diversity within rice ecosystems, comparing insect abundance in fields managed under Integrated Pest Management (IPM) systems and conventional farming practices. The study was conducted from May to July in Selangor, Malaysia, and Lamongan, Indonesia. Insect samples were collected using modified light traps. The results showed that in the IPM rice fields of Sungai Besar, Selangor, Malaysia, 5 insect orders were found, comprising 11 families and 15 genera, while in conventional fields in the same area, 5 orders with 14 families and 17 genera were identified. In the IPM fields of Desa Besur, Lamongan, Indonesia, 6 orders, 10 families, and 12 genera were discovered, whereas conventional fields only had 6 orders, 7 families, and 5 genera. Predator guild structures were more diverse in IPM fields compared to conventional fields, where pest species were more dominant. These findings highlight the positive impact of environmentally friendly agricultural practices on insect populations, particularly beneficial predators, and offer significant insights into sustainable rice cultivation.

***Keywords**:* agroecosystem, beneficial insect, identification, light trap,

P151B

POTENTIAL OF PEATLAND AFTER BURNING AS A SOURCE OF ARBUSCULAR MYCORRHIZAL FUNGI INOCULUM

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Revegetation of peatlands after burning is very important to do. To ensure the success of the peatland revegetation process after burning, additional biofertilizers containing beneficial microorganisms are required, one of which is arbuscular mycorrhizal fungi (AMF). The study's objective was to describe the potential of peatlands after burning as a source of AMF inoculum. This inoculum can be used as a biofertilizer for revegetation of peatlands after burning. A sampling of soil and plant roots was conducted in two different locations, one-year-old and four-year-old peatlands after burning in Kubu Raya Regency, West Kalimantan. Next, the samples were taken to the Silviculture Laboratory of the Faculty of Forestry, Tanjungpura University to observe the AMF. Plant roots were taken from the dominant vegetation at the research location, namely *Melastoma malabathricum*, *Macaranga peltata, Callicarpa longifolia, Vitex pinnata,* and *Acacia mangium*. The results of the study showed that the density of AMF spores in the soil (rhizosphere) at the research location was at a very dense level. These results were followed by the percentage of root infection of the pioneer vegetation being at a high to very high level. Thus, peatlands after burning at the research location have great potential as a source of AMF inoculum. Furthermore, this inoculum can be developed as a biofertilizer based on AMF.

***Keywords**:* arbuscular mycorrhizal fungi (AMF); peatlands after burning.

M210B

ANTAGONISTIC ABILITY OF *BACILLUS* SPP. AGAINST THE PATHOGEN *FUSARIUM* SP. CAUSES OF CHILI PLANT WILTING (*Capsicum Annum L.)* AND MECHANISM OF ACTION

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Chili is a key horticultural commodity in Indonesia, yet its production has declined, leading to insufficient supply to meet national demand. Consequently, the government resorts to chili imports. One significant challenge in chili cultivation is Fusarium wilt, a disease that has proven resistant to both rotational and chemical control methods, the latter of which also poses environmental risks. This study investigates the potential of biological control using antagonistic bacteria, specifically Bacillus sp., to inhibit Fusarium growth. To assess the antagonistic properties of *Bacillus* sp., an experiment was conducted where filter paper containing Bacillus sp. was placed 3 cm from Fusarium sp. isolates in a petri dish, with the Fusarium isolate positioned at the center. Additionally, enzyme activity tests were performed on *Bacillus* sp. to evaluate its amylase, protease, and cellulase production. For this, isolates were cultured on Nutrient Agar (NA) media supplemented with 1% starch, skim milk, and carboxymethyl cellulose (CMC), respectively, and incubated for 24 hours. The results indicated that Bacillus sp. isolates exhibited varying degrees of effectiveness in inhibiting Fusarium growth, with diameters of inhibition recorded as follows: Bcz 20 at 65.33 mm, Bcz 14 at 64.00 mm, and Bcz 16 at 63.67 mm. Furthermore, the enzyme activity tests confirmed that these Bacillus strains produced amylase, protease, and cellulase enzymes capable of suppressing Fusarium growth. Molecular analysis through 16S rRNA gene sequencing revealed that these isolates share high similarity with known Bacillus species. This research underscores the potential of *Bacillus* sp. as a sustainable biological control agent against Fusarium wilt in chili cultivation, providing an environmentally friendly alternative to chemical pesticides.

***Keywords**: Bacillus* sp.; Fusarium; Antagonist; Enzyme Activity

M212B

SECANG WOOD AS A DYE FOR GMELINA WOOD AND LENTO-LENTO WOOD AT DIFFERENT TIMES

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The staining process is an effort to increase the decorative value of wood that has a color that is less bright or less attractive. One of the natural dyes is Sappan Wood. This research aims to analyze the coloring process with Sappan Wood with the parameters of the depth and distribution of the dye as well as the color changes that occur. The wood used in this research were gmelina wood (Gmelina arborea Roxb.) and lento-lento wood () with dimensions of 2 x 5 x 20 cm. The Sappan Wood is made into powder with a size of 100 mesh. Before the coloring process, initial treatment is carried out, the sample is soaked at 80ºC for 24 hours using distilled water. The coloring process was carried out by soaking the samples at a temperature of 100ºC for 6 hours and 12 hours using Sappan Wood. The results showed that the depth of the dye increased with the initial treatment. The distribution of coloring materials in Gmelina and Lento-lento Wood can be seen in the ray and fibers wood. There was a color change in both Gmelina Wood and Lento-lento Wood. Gmelina Wood treated with Sappan Wood contains Phenol, 2-methoxy-4-(1-propenyl) -(CAS) Isoeugenol and Octadecanoic acid (CAS) Stearic acid, while Lento-lento Wood contains Phenol, 2,6- dimethoxy-(CAS) 2,6- Dimethoxyphenol and Phenol, 2.6-dimethoxy-4-(2-propenyl) -(CAS) 4-Allyl-2,6-dimethoxyphenol.

Keywords: *gmelina, lento-lento, pewarnaan, secang; waktu*

M213B

PERCUT WATERSHED MONITORING AND EVALUATION SUPPORTS SUSTAINABLE WATERSHED MANAGEMENT IN NORTH SUMATRA

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The Percut Watershed in North Sumatra is vital in supporting the region's ecological and socio-economic systems. However, the watershed has been increasingly impacted by rapid urbanization, deforestation, pollution, and unregulated land use, leading to environmental degradation and decreased water quality. This study aims to assess the current state of the Percut Watershed and evaluate the effectiveness of ongoing management practices to support sustainable watershed management in line with environmental conservation and community development goals. The research utilizes a combination of water quality analysis, land-use mapping through Geographic Information Systems (GIS), and stakeholder engagement to monitor key environmental indicators. The research results show that the Percut Watershed has a restored classification where the total value of the watershed carrying capacity reaches 101.75 (including the "moderate" criteria). Criteria that need attention are critical land and flood vulnerability. The land parameters in the Percut Watershed are considered quite good, with the erosion index in the Percut Watershed also having a moderate value; this is because, apart from natural topographic factors, there is also a mismatch in land use with existing land capabilities. The condition of the water system in the Percut Watershed is considered quite good because the flow regime coefficient value is low, which indicates the land's ability to hold and store water is quite good—high annual flow coefficient value. The use of regional space in the Percut Watershed is still good. Attention needs to be paid, especially to cultivated areas that are topographically less suitable for agricultural cultivation. Effective monitoring and evaluation are crucial for addressing these challenges and ensuring the sustainable management of the watershed.

Keywords: Percut Watershed, monitoring and evaluation, sustainable watershed management, environmental conservation, water quality.

M214B

Effect of Mycovirus Infection on the Hydrolytic Enzymes Activity on Fusarium oxysporum f. sp. cubense Tropical Race 4, the Causal Agent Banana Fusarium Wilt

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Mycovirus are virus that affect fungal host cellular regulation, which could cause a pathogenic fungus to be less pathogenic or hypovirulent. Fusarium oxysporum f. sp. Cubense Tropical Race 4 (FocTR4) isolate P2S from Johor, a pathogenic fungus that causes banana Fusarium wilt, have been found to be co-infected with two mycovirus, resulting in a decrease of disease severity in Cavendish bananas. As hydrolytic enzymes are part of the essential infection mechanism of fungal pathogens to ensure successful penetration into the host, it was suggested that the low severity observed in the P2S isolate could be due to a decrease in enzymatic activity. Hence, a comparative study on the regulation of hydrolytic enzymes among isolates P2S, mycovirus-cured P2S (CP2S) and non-mycovirus infected isolate POH27 was conducted. Based on metatranscriptome analysis, isolate P2S was discovered to be co-infected by 2 mycoviral strains putatively named as Fusarium odoratissimum unclassified virus 1 (FoURV1), unclassified RNA mycovirus and Fusarium odoratissimum mycobunyavirales-like virus 1 (FoMYV1), Bunyavirales, a negative single-stranded RNA mycovirus. Thus, hydrolytic enzyme activity (cellulase, exoglucanase, endoglucanase, pectinase and protease) of P2S, CP2S and POH-27 isolates were measured using quantitative assays by culturing the fungal isolates in broth supplemented with specific substrates. It was found that cellulases, exoglucanase, xylanase and protease enzymatic activity of isolate P2S downregulated when compared to CP2S and POH27 isolates. In short, this study provided an important insight to the hypovirulence mechanism of co-infection mycoviruses, FoURV1 and FoMYV1 in isolate P2S, causing the down-regulation of cellulases, exoglucanase, xylanase and protease enzymes involved in the pathogenicity of FocTR4.

Keywords: Banana, Fusarium wilt, hypovirulence, hydrolytic enzyme, mycovirus

M215B

THREE-FACTOR RESPONSE SURFACE OPTIMIZATION FOR MANGANESE ADSORPTION BY FERROMANGANESE ORE AND HUMUS MIXTURE

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Challenges exist in removing manganese from wastewater at near neutral to neutral pH. However, adsorption and oxidation mechanisms can facilitate the manganese removal within neutral region. Manganese-oxide contained media with addition of organic material are able to accelerate these processes. In this study, mixture of ferromanganese ore and humus were used to investigate optimum conditions of dosage, pH and contact time for manganese adsorption by using Response Surface Methodology. Experimental design had involved three operating variables i.e. dosage (2 to 4 g), pH (3 to 7.5) and contact time (90 to 270 min) with an associated response of manganese adsorption (%). Experimental data was obtained from the adsorption study then fitted to a second order polynomial regression model. Regression analysis and analysis of variance (ANOVA) were used to examine the fitness of the model towards the data. R2 value from the regression analysis was 0.9783 signifies that the fitness of the model is good. The F-value was 50.21 and the p-value (Prob >F) was less than 0.05 indicate that the model terms are significant at 95% confidence level. Optimum conditions given by the model were 3.79 g of the mixture dosage, pH of 6.47 and contact time of 124.59 min with 93.82% of Mn adsorption. These values had been verified successfully.

Keywords: Ferromanganese Ore, Humus, Optimization, Manganese Adsorption, Response Surface Methodology

M216B

A REVIEW: INNOVATIVE PLANT BASED MEAL REPLACEMENT AS AN ALTERNATIVE SOLUTION FOR WEIGHT CONTROL MANAGEMENT THROUGH A VERY LOW-CALORIE DIET CONCEPT

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Meal replacement can be the preferred option over the regular meal during breakfast, lunch, and dinner. The convenience of meal replacement products contributes to the popularity. Not only for working adults, meal replacement also appeals to individuals with hectic schedules and those juggling household responsibilities. Meal replacement products often contain a combination of important nutrients focused on at providing a balanced and convenient alternative to traditional and regular meals. These products generally include a combination of protein, carbohydrates, healthy fats, vitamins and minerals, as well as dietary fibres to meet the nutritional demands of the body. There are numbers of meal replacement products with distinct ingredients to fit the preferences of the individuals. Innovative plant-based meal replacement is now emerging and designed as an alternative solution for weight control management through a very low-calorie diet concept. This review aims to compare the types of meal replacement based on its ingredients and claiming, the effect of meal replacement on satiety, weight loss as well as metabolic health.

Keywords: meal replacement, plant-based, very low-calorie diet, high protein, high fiber, weight control

M217B

UNRAVELING MUTUALISTIC DYNAMICS: HOST SPECIFICITY OF *Blastophaga* sp. FIG WASPS FROM *Ficus deltoidea* var. *Deltoidea*

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Ficus deltoidea, commonly known as Mas Cotek, is a member of the Moraceae family and originates from Southeast Asia. With 13 documented varieties, it engages in obligate mutualism with the fig wasp (Agaonidae). This study delves into the mutualistic relationship between *F. deltoidea* and its pollinators, with a specific focus on *Blastophaga* sp. fig wasps found in *F. deltoidea var. deltoidea*, within the *F. deltoidea* complex. An experiment to identify the pollinator specificity of *Blastophaga* sp. from variety *deltoidea* towards seven native varieties of *F. deltoidea* was conducted in the Terengganu Germplasm Collection of Universiti Sultan Zainal Abidin, Terengganu. A male donor tree from variety *deltoidea* was positioned in the middle, surrounded by 14 other recipient trees that consist of seven varieties of *F. deltoidea*, including *deltoidea* variety as the control. Findings reveal that *Blastophaga* sp. Fig wasps from var. *deltoidea* demonstrates a tendency for host sharing, not only accessing var. *deltoidea* but also var. *angustifolia,* var. *trengganuensis*, var. *bilobata*, var. *kunstleri,* and var. *motleyana*. Chi-square test also showed a significant difference between the number of entered and not entered male and female figs of *F. deltoidea* ($\chi 2 = 164.35$, $df = 7$, $P < 0.05$). These findings challenge traditional assumptions of strict host specificity and emphasize the intricate nature of mutualistic interactions within *Ficus* species. This research provides valuable insights into the dynamics of gene flow mediated by pollinators, emphasizing the necessity for further molecular characterization to deepen our understanding of the mechanisms underlying these interactions.

***Keywords**:* fig trees, mutualism, host sharing, pollinators, varieties

P220B

COMPARATIVE EFFECTIVENESS OF DIFFERENT ANIMAL MANURE AND THE PHYTOTOXICITY EVALUATION ON THE GROWTH AND YIELD OF *Abelmoschus Esculentus* L. (OKRA) VEGETABLE.

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The study aimed to evaluate the comparative effectiveness of different animal manures and the phytotoxicity evaluation on the growth and yield of *Abelmoschus esculentus* L. (Okra). A seed germination bioassay was conducted using okra, animal litter extracts was prepared with distilled water (solid to water ratio of 1:10) and distilled water was used as control. 10 seeds of okra was placed on top of the filter paper, each having three replicates and placed in an incubator with no light for five days and the result revealed GI value of <50% was recorded on Okra seeds mounted on PM medium (45.81%) illustrating phytotoxicity, GI value of between 50% and 80% was recorded on Okra seeds mounted on GM medium (64.10%,) illustrating moderate phytotoxicity while GI Value of >80% was observed on Okra Seeds mounted on a CM medium (82.27%) illustrating no phytotoxicity. In addition, potting experiment was conducted to determine the effect of different animal manure on the growth and yield of the crop. The treatments were: Control (no manure), 10g, 20g, 30g and 40g of animal manure replicated three times and the results of the potting experiment showed that the highest evaluated parameters such as plant height. Stem girth, leaf area, number of leaves, number of fruit, weight of fruit, wet and dry weight of shoot and root was obtained on okra vegetable planted in PM at varying concentrations followed by GM and CM respectively while the control recorded the least values, excessive application of poultry manure can cause delay or no growth as what was observed in this study were there was slow germination rate at 1-4 WAP at a treatment of 40g. In conclusion the results revealed that Okra vegetable responded well to the application of poultry, goat and cow manure but poultry manure gave the best result.

Keywords: Organic manures; Vegetables; Phytotoxicity evaluation; Plant nutrition, Compost.

P221B

HALIDE SUBSTITUTION EFFECTS ON THE BANDGAP AND CRYSTAL STRUCTURE OF 2D HYBRID PEROVSKITES FOR OPTOELECTRONIC APPLICATION

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This study investigates the complex influence of halide substitutions on the chemical, structural, and optical properties of two-dimensional (2D) hybrid perovskites, specifically focusing on the compounds 2AMPPbX_4 (X=Br and I). Through meticulous synthesis and characterization techniques, including FT-IR and X-ray diffraction analysis, we elucidate the impact of halogen variation on the molecular structure and crystal lattice parameters of the materials. Surprisingly, despite the distinct halides, both compounds exhibit an orthorhombic crystal structure, though with significant differences in lattice parameters and space group arrangements. Notably, our UV-Vis analysis reveals a remarkable tunability of the band gap, spanning more than 66 nm across the visible spectrum, showcasing the potential for tailored optical properties in optoelectronic applications. This comprehensive exploration sheds light on the intricate interplay between halogens and 2D hybrid perovskites, offering valuable insights into their potential as light-sensitizers and paving the way for further advancements in the field of optoelectronics.

Keywords: Halide substitutions; Two-dimensional hybrid perovskites; Optoelectronic properties; Band gap tuning; Crystal structure.

P222B

ACCURACY COMPARISON BETWEEN EASY QIBLA AND TOTAL STATION

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Qibla is the direction from any location towards Kaaba in Mecca. It is one of the requirements of salah for Muslims. Easy Qiblah is a mobile app developed by ESERI, UniSZA which provides, other than direction of qibla, azimuth and altitude of the sun and the moon on actual time. This data is regularly used by falak and astronomy researchers and enthusiasts, which means its accuracy is critical in academia. Therefore, this study is aimed to compare data accuracy provided by Easy Qibla and total station by measuring actual azimuth of the sun and the moon. To observe the sun and the moon, a total station is erected on station 1 with station 2 is set as the reference object (RO). The azimuth of station 2 from station 1 is pre-determined by GPS device, with precision of 5mm. Several readings were taken by observing both sun and moon, while Easy Qibla is showing actual time data. Every time the sun or the moon was targeted, screenshots of Easy Qibla were taken and thus capturing the actual time data. The actual azimuth of the targeted sun or moon shown on the total station display was recorded. The Azimuth given by Easy Qibla is tabulated next to azimuth shown on the total station for each reading taken, and therefore the differences in those readings are the errors. Preliminary results after sixteen readings show that the lowest error is 0.0005°, while highest error is 0.025°, with an average of 0.0148°. Data collected on another may give different results due to the declination of the sun. The errors are inclusive of, but limited to, human error and total station error. In conclusion, the early result shows that the errors are insignificant in considerably low accuracy field of studies like determining qibla or new moon observation.

Keywords: Easy Qibla, azimuth, error, total station, application

P223B

ESTIMATION OF CARBON SEQUESTRATION IN RUBBER VEGETATION USING REMOTE SENSING

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Indonesia is a high greenhouse gas (GHG) emitter with 12.3%; carbon dioxide (CO 2) is one type of GHG currently increasing in the Earth's atmosphere. The CO 2 absorption can be increased through rubber plantations because rubber plants, such as forest plants, can process CO 2 as a carbon source for photosynthesis. This research aims to analyze carbon uptake with tree density, biomass of rubber vegetation, and carbon content based on Soil Organic Carbon (SOC) and make a map of carbon potential distribution using remote sensing. This research was conducted in the Sungei Putih Research Unit, Galang Sub-district, using the survey as a method by collecting secondary and primary data, determining the sampling location point based on Normalized Difference Vegetation Index (NDVI) classification, remote Sensing image processing with Landsat 9, SPOT, and ASTER images processed through Google Earth Engine (GEE). From this study, the potential carbon stock obtained in each observation plot produced varying values. Based on calculations using the selected model, called the NDVI square model (A3), the carbon distribution obtained based on field data ranges from 675 -675.15, an area with a high carbon distribution. The average potential carbon stock received in the field based on the measurement of the standing trunk section is 29.43 tons/ha with an area range of 3.12 ha. The highest amount of carbon stock and the largest average stem diameter is in plot 11 with an average diameter of 16.63 cm and a biomass content of 90.64 kg/ha.

Keywords: Biomass, carbon, Remote Sensing, GEE; Rubber

P224B

PHOSPHINE-FREE APPROACH FOR THE SUZUKI-MIYAURA REACTION, ANTIFUNGAL EFFICACY, *IN SILICO* ANALYSIS, AND MOLECULAR DOCKING STUDIES OF DIMERIC IODIDE-BRIDGED PALLADIUM(II) COMPLEXES

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The iodide-bridged dimeric palladium(II) complex $[Ph_4P]_2[Pd_2I_6]$, which can be derived from commercial sources or TWC's waste, was synthesized and characterized through elemental, thermal, and spectroscopy analysis. The phosphine-free $[Ph_4P]_2[Pd_2I_6]$ complex exhibits excellent catalytic activity for the Suzuki reaction of aryl iodides and bromides with phenylboronic acid in ethanol, yielding outstanding results (>92%) under mild conditions (75°C) and fast reaction periods (30 min) in aerobic conditions. The antifungal results revealed that the complex showed moderate to good inhibitory activities against *Candida utilis* and *Saccharomyces cerevisiae* at varying concentrations. Furthermore, the molecular docking study examined protein-ligand interactions between $[Ph_4P]_2[Pd_2I_6]$ and the target protein, isomaltase. The Estimated Free Energy of Binding for the complex is -14.60 kcal/mol, suggesting a strong binding affinity between $[Ph_4P]_2[Pd_2I_6]$ and isomaltase. The physicochemical properties assessed by the SwissADME website indicated no blood-brain barrier (BBB) permeation with minimal gastrointestinal absorption was predicted. $[Ph_4P]_2[Pd_2I_6]$ was anticipated to exhibit a Toxicity Class 4, with an LD_{50} value of 700 mg/kg, suggesting a favorable safety profile according to Protox III web servers. In conclusion, the acquired catalytic and biological results indicate that the $[Ph_4P]_2[Pd_2I_6]$ may be a potential option for future development as a free-phosphine catalyst for Suzuki reaction and antifungal agent, respectively.

Keywords: antifungal activity, cross-coupling, *in silico* study, molecular docking, palladium (II) complex

P225B

MORPHOLOGICAL CHARACTERIZATION OF PMMA NANOFIBERS: EFFECTS OF ELECTROSPINNING VOLTAGE AND CONCENTRATION

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Electrospinning is an effective technique for generating nanofibers with adjustable shape, rendering it highly advantageous for applications in materials science and nanotechnology. This work involved a morphological investigation of poly(methyl methacrylate) (PMMA) nanofibers utilising field emission scanning electron microscopy (FESEM) to investigate the influence of polymer content and applied voltage on fibre development. PMMA concentrations of 10%, 15%, 20%, and 25% (w/w) were electrospun at voltages between 10 kV and 20 kV. The findings indicated that elevated voltages (exceeding 15 kV) resulted in shorter fibres with greater diameters due to enhanced jet instability. Reduced voltages (below 10 kV) generated elongated, continuous fibres with diminished diameters. The concentration of the polymer was a critical determinant; larger concentrations (25%) resulted in homogenous fibrous structures, but lower concentrations (10% and 15%) yielded beaded fibres, particularly at reduced voltages. The ideal fibre morphology was noted at a 25% concentration and 10-15 kV, resulting in smooth, continuous fibres. The findings, corroborated by FESEM imaging, illustrate the essential influence of both voltage and polymer concentration in modulating PMMA fibre morphology via electrospinning.

Keywords: Electrospining, Nanofibre, Polymer Concentration, Poly(methyl methacrylate) (PMMA), Morphology

P226B

BIODIVERSITY AND VIRULENCE CHARACTERIZATION OF ENTOMOPATHOGENIC FUNGI ISOLATED FROM SOILS IN DIFFERENT REGIONS OF NIGERIA

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Studying the diversity of the indigenous entomopathogenic fungi (EPF) is a prerequisite to effective insect pest control. Three subsoil samples from three locations within 11 states were used to isolate the fungi using insect bait method. Three fungal rates, 1.0×10^2, 5.0×10^1 and 7.5×10^1 spores/ml, were applied to the *Galleria* larvae. EPF occurred in 41.1% of the soil sampled. These fungi belong to five and an unidentified genus. High species diversity was observed in Abuja with 6 species, and a uniform diversity of 5 species in Gombe, Ibadan, Jos, Kano, Lagos, Nasarawa and Port Harcourt. The Shannon-Weiner index ranges from 2.48 to 1.84. Similarly, species evenness showed a distinct similarity across the sites and ranges from 0.99 to 0.92. Simpson Diversity Index was found to be highest in Bauchi with 0.31 and lowest in Abuja with 0.19. The mortality of the *Galleria mellonella* (L.) larvae differed significantly (P<0.01) with EPF species and time of exposure. There exist a ($P < 0.001$) relationship between larval mortality and conidial concentration within and among the species. The virulence of isolates on *Galleria mellonella* based on LC_{50} differs among sampling sites even within the same species. The present study uncovered the diversity and occurrence of EPF in soil across Nigeria. The results can be useful in the selection of the best adapted EPF in the study area, or it could be a baseline for molecular study.

Keywords: Entomopathogenic fungi, Biodiversity, Virulence, Soil conditions, Biocontrol

P227B

FECT OF POROSITY ON THE STRUCTURAL INTEGRITY OF TIN-POLYDIMETHYLSILOXANE (PDMS) COMPOSITES

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Ionising radiation offers significant benefits in medical diagnostics and treatments, yet poses serious health risks without effective shielding. Porosity and structural integrity are key to the high attenuation of the shielding material. Thus, this study assesses the potential radiation absorption performance of the composites by evaluating the structural integrity and porosity of newly fabricated composites based on tin and polydimethylsiloxane (PDMS). The structural analysis is performed using Field Emission Scanning Electron Microscopy with Energy Dispersive X-ray spectroscopy (FESEM-EDX). Fourier Transform Infrared (FTIR) analysis was conducted to analyse the functional group and chemical bond present in the composite. ImageJ software quantified the porosity of the composites, revealing a uniform, homogeneous dispersion of tin powder within the PDMS matrix. The results highlight that each composite's porosity does not significantly increase as the composition of metal filler increases, which is a natural occurrence within the composite structure. Hence, further observational analysis of radiation attenuation is needed to verify and establish a direct correlation between porosity and the radiation shielding performance of the composites.

Keywords: Metal and polymer composite, radiation shielding, porosity

P228B

LANDSLIDE HAZARD MODELING USING THE ARTIFICIAL NEURAL NETWORK (ANN) APPROACH IN THE BIANG LOE RIVER WATERSHED

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Bantaeng Regency was declared by the Regional Environmental Impact Control Agency as a landslide-prone area in the rainy season. On the basis of these data, it is necessary to map the vulnerability of landslides with methods and techniques for modeling the prediction of landslide vulnerability that are continuously developing. One of them *uses the artificial neural network* model. This study was conducted to identify the distribution of landslides in the Biang Loe watershed, analyze the factors that affect the occurrence of landslides and map the level of landslide vulnerability via the ANN model. With this goal, identifying the factors that affect the occurrence of landslides and determining the areas where landslides occur through maps can be useful for the surrounding community as a source of information related to the level of landslide vulnerability. The stages of this research are as follows: 1) landslide identification, 2) data collection, 3) data processing, and 4) data analysis and validation. The results of the study indicate that, from the inventory data, there were 103 landslide events, with the highest number occurring in 2018, 2019, 2022, 2020 and 2021. In addition, highly influential factors include the direction of the slope, lithology, slope, curvature of the Earth, distance from the river and existence of maps from ANN modeling that can inform the public regarding areas prone to landslides. Thus, to reduce the occurrence of landslides, awareness among the surrounding community about the importance of good and appropriate land management in the future is necessary.

Keywords: Landslides, Biang Loe watershed, Mapping, Artificial Neural Network

P229B

ISOLATION AND CHARACTERIZATION OF ANTIBACTERIAL – PRODUCING ACTINOMYCETES FROM SOIL IN LUWU TIMUR REGENCY, SOUTH SULAWESI, INDONESIA

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Soil microorganisms present a valuable reservoir for isolating and identifying products of therapeutic significance. Among these, actinomycetales emerge as a crucial subgroup. Actinomycetes, classified as Gram-positive, facultative anaerobic bacteria with a fungus-like filamentous structure, stand out as primary producers of natural antibiotics. The objective of this study was to isolate, identify, and explore the potential of antimicrobial-producing actinomycetes from the soil in East Luwu, South Sulawesi, Indonesia. Primary and secondary screening was performed against Escherichia coli, Staphylococcus aureus and Candida albicans. Nine isolates of actinomycetes were isolated from soil sample collected from different location in Luwu Timur. All isolates were tested for antagonistic test against 3 pathogenic microbe. Two active isolates T2 and T4 were selected for futher study. The active isolates were further fermented and extracted using ethyl acetate (1:1) as a solvent to obtain antibacterial compounds. The results of antimicrobial activity testing indicate that the ethyl acetate extract produced from actinomycetes isolates T2 and T4 can inhibit E. coli and S. aureus at a concentration of 0.25 mg/paper disk, while it is unable to inhibit C. albicans. Isolate actinomycetes T2 and T4 were identified using 16S rRNA sequence. Isolate of actinomycetes T2 shows a similarity of up to 99% with *Streptomyces costaricanus* strain NBRC 100773, while isolate T4 exhibits a similarity of up to 97% with *Streptomyces lannensis* strain TA4-8. The antibacterial activity observed in these isolates makes them potential candidates for the creation of novel antibiotics in the pharmaceutical field.

***Keywords**:* Actinomycetes; antibacterial; 16S rRBA; *Streptomyces lannensis* strain TA4-8; *Streptomyces costaricanus* strain NBRC 100773

P230B

EVALUATION OF ANTI-QUORUM SENSING OF BIOAGNPS AGAINST *PSEUDOMONAS AERUGINOSA* SP. USING *IN VITRO* AND IN SILICO APPROACHES

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Here, we report the evaluation of anti-quorum sensing of bioAgNPs against *P. aeruginosa* sp. using *in vitro* and in silico approaches. In this study, *Streptomyces* sp. PBD-311B was used for the biosynthesis of AgNPs. Then, the synthesized bioAgNPs were characterized using UV-Vis spectroscopy, TEM, and SEM analysis. The anti-quorum sensing of bioAgNPs against *P. aeruginosa* sp. was tested using TEMA, swimming motility and biofilm production, then further observed using SEM and TEM analysis. Finally, the presence of protein corona bioAgNPs was observed using SDS-PAGE and was identified using LCMS analysis. Finally, molecular docking study was evaluated using protein corona bioAgNPs with the outer membrane of *P. aeruginosa* sp. A successful formation of bioAgNPs was initially observed by color changes from light-yellow color dark to brown color. Furthermore, the broad LSPR peaks ranging from 413 to 426 nm suggest polydispersity of bioAgNPs sizes. As measured using TEM, the size of the synthesized bioAgNPs was in the range of 2 to 15 nm with majority in spherical shape. The MIC value of bioAgNPs against *P. aeruginosa* sp. was 2.4 mg/mL and it showed significant inhibition at early and late stages as observed using SEM and TEM analysis. Furthermore, after being treated with sub-MIC of bioAgNPs, the swimming motility and biofilm production of *P. aeruginosa* sp. was inhibited and showed significant reduction. Protein corona bioAgNPs at ~63 kDa was successfully identified and three hypothetical proteins were proposed, **e**sterase (PDB ID:1ESC), narbonolide/10-deoxymethynolide synthase PikA1(PDB ID :8CZC) and narbonolide/10-deoxymethynolide synthase PikA2 (PDB ID:3PQ9). Molecular docking study showed that corona proteins with two outer membrane proteins of *P. aeruginosa* sp.; OprF (PDB ID: 1WP1) and OprD (PDB ID: 3D5K) show high affinity binding. These findings suggest that bioAgNPs may possess targeting and specificity in their interactions, indicating that nanoparticles can selectively engage with specific bacterial proteins. The identified binding sites and interactions in this study highlight the potential role of bioAgNPs in disrupting quorum sensing pathways in *Pseudomonas aeruginosa sp*.

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STATISTICAL ANALYSIS OF ISOLATED METRIC TYPE III SOLAR RADIO BURSTS (SUBTYPE VI) DURING THE ASCENDING PHASE OF SOLAR CYCLE 25

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Solar radio bursts (SRBs) of Type III have been extensively studied for over 70 years, leading to a well-established theoretical framework. However, during Solar Cycle 25 which started since December 2019, there has been a high occurrence of Type III subtype VI bursts, which are distinguished by their longer durations and repeated rapid bursts. This subtype presents an intriguing variation in behaviour, making it a key area of interest for further investigation during this solar cycle. We present a statistical analysis of 150 isolated metric Type III solar radio bursts, specifically focusing on subtype VI, characterized by rapid, repeated rapid bursts with long durations. These observations were conducted using ground-based data from the CALLISTO network during the ascending phase of Solar Cycle 25, particularly within the timeframe of 2024. Data were collected from the open-source CALLISTO network, with an emphasis on isolated SRB type VI. We derived drift rates to derive the power-law equation and compared these findings with existing literature. Additionally, we conducted spatial and temporal analyses to investigate potential correlations between Type VI bursts and other solar phenomena, such as solar flares and Coronal Mass Ejections (CMEs). The power-law fitting equation for the drift rate we obtained is: $dfdt=0.22 \cdot f0.78$ which aligns well with previous research findings. Other results show strong agreement with previous studies and reveal a notable correlation between Type III subtype VI bursts and other solar activities, including flares and CMEs. By evaluating the characteristics of Type III subtype VI bursts, this study contributes to the broader theoretical understanding of Type III solar radio burst variants, offering insights into their underlying physical processes.

***Keywords*:** radio bursts, flares, coronal mass ejections, solar cycle

M310B

EFFECT OF SUGAR CANE BLOTONG APPLICATION TIME ON IMPROVEMENT OF SOIL BIOLOGICAL PROPERTIES IN PLANTS PRODUCING PALM OIL (*ELAEIS GUINEENSIS* JACQ)

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Soil fertility is a determining factor in plant productivity, therefore efforts are needed to improve soil properties. Fertilization is one of the essential elements for plant growth. As the main medium, fertilizer is currently not only limited to inorganic fertilizer, but organic fertilizer is also starting to be widely applied, one of which is in oil palm plantation companies. Providing organic fertilizer can improve soil properties, maintain total soil organic matter reserves, balance the use of inorganic fertilizer in order to reduce its negative impact on the soil, and indirectly increase land productivity. The biological properties of the soil greatly influence soil fertility, organic fertilizer is one effort to improve the biological properties of the soil, sugar cane cake has a high nutrient content so that it is sufficient for the nutrient improvement process. Blotong is a solid waste produced from the process of grinding sugar cane stalks to become sugar. In one milling process, Blotong will usually produce around 3.8% of the weight of the sugar cane. The aim of this research is to determine the timing of application of sugar cane filter cake to improve soil biological properties in oil palm producing plants (*Elaeis Guineensis* Jacq). Observations were carried out at Afdeling III, Adolina Gardens, PT. Perkebunan Nusantara IV from August 2022 to April 2023. The method used is RAK (Randomized Block Design) Non Factorial. The treatment; W0= Control (without sugarcane filter cake application); W1= 2 months (after sugarcane filter cake application); W2= 4 months (after sugarcane filter cake application); W3= 6 months (after sugarcane filter cake application); W4= 8 months (after sugarcane filter cake application). The results showed that the application of filter cake had a significant effect on soil biological parameters, namely Rhizobium sp. (4 months after sugarcane filter cake application). The application of filter cake can increase the trichoderma population, thereby causing a decrease in the ganoderma population. The success of a cultivation is determined by the organic material content in the soil, because organic material is an element that plays a role in increasing the physical, chemical and biological fertility of the soil. Without the provision of organic materials, it can result in physical, chemical and biological degradation of the soil which can damage soil aggregates and cause soil compaction.

Keywords: Sugarcane Blotong, Soil Biological Properties, Organic Fertilizer

M312B

LAND USE SUITABILITY BASED ON SPATIAL PATTERN IN BIANG LOE WATERSHED

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Efforts to stabilize land use are through spatial planning based on achieving environmental function sustainability. Environmental stability can be done through spatial utilization activities that pay attention to the carrying capacity in the use of the land. The most important thing in realizing sustainable land use is to take into account spatial planning, in this case paying attention to the spatial pattern. This study aims to identify land use and spatial plans in the watershed on Biang Loe, analyze the suitability of land use with the spatial plan, and provide direction for land use that is not in accordance with the spatial plan in the Biang Loe watershed. There are 4 stages in analyzing this suitability data; 1. Preparation and data collection stages (primary data and secondary data); 2. Data processing stages, namely combining data between land use and spatial patterns; 3. Data presentation stages in the form of land unit results of suitability data; and 4. Data analysis stages are details of suitability data and providing direction on data that is not in accordance with the spatial pattern plan. The results obtained in this analysis are that the appropriate land use is 3,919.98 ha (82.59%) which is detailed in the cultivation area (3,222.01 ha) and in the protected area (697.97 ha). Meanwhile, the inappropriate land use is 826.07 ha (17.41%) which is detailed in the cultivation area (773.73 ha) and in the protected area (52.34 ha). The direction given to data that is not in accordance with the spatial pattern by looking at the soil and water conservation element as a consideration for the suitability of land use. The directions given include forest management with an agroforestry pattern, application of soil and water conservation technique, settlements with a garden yard system, settlements with infiltration well plots, enrichment, and intensification patterns on rice fields as existing land.

M313B

DISCRIMINATION OF *KLEINHOVIA HOSPITA* IN SOUTH SULAWESI USING FTIR, CHEMOMETRIC APPROACH

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Paliasa (*Kleinhovia hospita* Linn) is a plant that has been used in traditional medicine for various diseases by several ethnic in South Sulawesi, including hepatitis and liver cancer (Makassarese, Buginese, and Torajanese). The discrimination and classification of *Kleinhovia hospita* from various regions in South Sulawesi are important to ensure the consistency of the quality of raw materials for traditional medicine using Fourier Transform Infrared (FTIR) spectroscopy combined with a chemometric approach. The leaves of *Kleinhovia hospita* from each region were measured using FTIR in the mid-infrared region (4000–400 cm^{-1}), followed by Principal Component Analysis (PCA) for plant classification. The results showed that *Kleinhovia hospita* can be differentiated through visual analysis of the FTIR spectra using marker bands, where the score plot from FTIR spectroscopy revealed four groups based on regions that have similar compound contents with the following intensity ranges: group 1 from the Camba area (26.907-98.505); group 2 (Barru, Takalar, Soppeng, and Toraja) (12.875-99.994); group 3 (Pangkep, Bulukumba, Pinrang, Bantaeng, and Malino) (9.771-99.404); and group 4 (Sidrap, Bone, and Pare-Pare) (4.825-99.513). This study concludes that FTIR spectroscopy combined with a chemometric approach can be used as a rapid analytical method for the discrimination and classification of *Kleinhovia hospita* based on its growing location from various regions

Keywords: *Kleinhovia hospita* Linn, FTIR, Chemometrics, PCA, Intensity

M314B

THE IMPACTS OF DIFFERENT ADSORBENTS ON THE TREATMENT OF PRODUCED WATER GENERATED FROM OIL INDUSTRIES

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Produced water (PW) is a water associated with hydrocarbons that is produced alongside crude oil during oil extraction. The PW comprises of formation and injected water containing chemicals which represents the largest volume of waste stream in oil and gas production operations on most offshore platforms. The petroleum industry generates approximately 250 million barrels per day of PW, making it a substantial byproduct and the primary waste stream in terms of volume. Because of the complexity nature of PW, in this studies, different adsorbents have been investigated to target specific pollutants in the PW. This includes composite of raw Corn and Rice straws to target Pb heavy metal, composite of Fe/Al nanoparticles for desalination and activated Carbon derived from the Corn and Rice straw to remediate hydrocarbon. Various adsorption parameters that are critical to the PW treatment were considered for optimization studies. The results indicated that all the adsorbents were effective in the removal of the respective adsorbents. The maximum percent removal efficiencies for Pb were found at optimum conditions to be 99.59 % @ 40 min., 97.47 % @ 0.6g dosage, 95.62 % @ pH 6, 97.04 % @ 303K and 97.88 % @ 10 mg/L concentration. For desalination, the highest removal efficiencies were found as 75.85 % @ 40 min., 69.45 % @ 0.2 g dosage, 94.01 % @ pH 8, 93.48 % @ 303 K, and 85.2 % @ 10 mg/L concentration. While for hydrocarbon removal efficiencies, the results were 94.44 % @ 30 min., 82.41 % @ 0.3g dosage, 74.42 % @ pH 10, 70.15 % @ 328 K and 80.3 % @ 10 mg/L. All these results conformed to a Langmuir adsorption isotherm with significant R^2 near to 1.0 compared with the Freundlich isotherm. Thus, the study demonstrates that remediation of PW required systematic approach of using different adsorbents to target different pollutants.

M315B

LOW TEMPERATURE AC PHOTOELECTROCHEMICAL ETCHING OF SI-DOPED N-TYPE GAN: NANOSTRUCTURE FABRICATION FOR ENHANCED MSM PHOTODETECTOR PERFORMANCE

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This study investigates the fabrication of nanostructured Si-doped gallium nitride (GaN) using low temperature alternating current photoelectrochemical (ACPEC) etching at varying etching durations for MSM photodetector applications. Using a 400 W mercury high-pressure vapor lamp (Hg-HPVL) and a 4% KOH electrolyte with 50 Hz of 100 mA alternating current, the structural and optical characteristics of the nanostructured GaN samples were examined. Current–voltage (I-V) measurements were conducted to analyse the Schottky contact of platinum-deposited GaN for MSM photodetector performance. FESEM micrographs revealed coral-like and nano-tunnel pore formations, while AFM imaging showed a significant increase in surface roughness compared to as grown sample. The minimal difference between average pore depth and RMS surface roughness values indicates successfully fabricating a nano-coral structure with a uniform, evenly distributed depth. Raman spectroscopy showed shifts in the A_1(LO) peak wavelengths and an increase in the E_2 (high) peak intensity across different etching times compared to as grown sample. XRD analysis further confirmed the presence of both compressive and tensile strain across all samples. Additionally, I-V measurements of the MSM photodetector demonstrated a higher current gain in all nanostructured samples compared to as grown sample under various environmental conditions. These findings indicate that low temperature ACPEC etching is an effective approach for fabricating nanostructured GaN with high sensitivity for photodetector applications.

***Keywords**:* Si-doped GaN, photoelectrochemical, MSM photodetector, low temperature, nanostructure

M316B

METHIONINE AND HISTIDINE IN WASTE-BASED VERMICOMPOST

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A significant increase in the amount of waste over the years has become a concern, as it poses a challenge to effectively managing waste materials. Domestic waste contains a significant amount of protein, which decomposes into amino acids. These amino acids could be developed as animal feed supplements. Vermicomposting is a process that involves the decomposition of waste, facilitated by the activity of earthworms, producing a nutrient-rich end product that also contains amino acids. Methionine and arginine are essential amino acids in poultry and are crucial for the animal's survival, as their deficiencies can reduce the quantity and quality of poultry products. The objective of this research is to determine the presence of methionine and arginine in vermicompost. The methodology involved vermicomposting mixed organic waste in a selected environment, followed by protein extraction using ethanol. The extracted protein was hydrolysed, and the amino acids formed were separated using ion exchange chromatography. The Xanthoproteic and Sakaguchi tests were performed to determine the presence of methionine and arginine, respectively. The eluted fractions from the anion exchange column tested using the Xanthoproteic test showed the absence of an orange solution and indicated the presence of non-aromatic amino acids, which include methionine. The fractions from the cation exchanger showed a red-orange colour change in the Sakaguchi test, which indicated the presence of arginine. Although not confirmed, the results indicate methionine and arginine production through vermicomposting. However, LC-MS verification of their presence is necessary. Thus, this work highlights vermicompost as a potential source of methionine and arginine for animal feed supplements, leading to a more cost-effective and safer waste management approach.

***Keywords**:* methionine, arginine, ion-exchange chromatography, vermicompost

M317B

TERMITE DIVERSITY ON PALM OIL PLANTATION IN PINRANG REGENCY, SOUTH SULAWESI, INDONESIA

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The conversion of forest land into various other uses, such as oil palm plantations, has influenced the biodiversity of flora and fauna. Habitat changes also affect termites' behavior, which naturally act as decomposers to become destructive organisms. Termite attacks on oil palm plantations have reduced productivity and caused farmers significant economic losses. This study aims to determine termite diversity in oil palm plantations managed by the community in Bonne Village, Patampanua District, Pinrang Regency, South Sulawesi, Indonesia. Termite specimens were collected from 4 sampling protocol transects, placed randomly in oil palm plantations. Each transect measures 100 m in length and 2 m in width, then divided into 20 adjacent sections (each measuring 5 m x 2 m). In each section, a person/collector looks for, examines, and collects termites in microhabitats such as surface soil, litter piles, palm oil stalks, nests on oil palm trunks, dead logs, and other parts that termites may occupy. Examination of termite specimens uses morphological and morphometric characters to determine the type. The research showed that two species of termites were found: Odontotermes javanicus and Microcerotermes serratus. The diversity of termites was categorized lower at the research location. Efforts to regularly maintain the cleanliness of oil palm plantation areas by eliminating food materials and sources of infection may contribute to reducing termite diversity.

M318B

Analysis of Infiltration Rates in the Agroforestry System of *Arenga pinnata* (Sugar Palm) in Bonelemo Barat Village, Luwu Regency, Suso Watershed

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Agroforestry has benefits in improving ecological balance, such as helping prevent soil erosion, reducing land degradation, and improving the water cycle by slowing surface water flow and increasing infiltration into the soil. One of the agroforestries that is developing in the Suso watershed is sugar palm (Arenga pinnata). This research aims to identify the infiltration rate in sugar palm agroforestry and the physical soil properties that influence it. The research was carried out by measuring the infiltration rate using a double-ring infiltrometer and taking soil samples in a plot measuring 20 m × 20, as well as identifying the vegetation in the plot by making sub-plots measuring 10 m × 10 m, 5 m × 5 m, and 2 m × 2 m. The highest infiltration rate value on sugar palm agroforestry land is in plot 7, while the lowest is in plot 2. Plot 7 has an infiltration rate value of 102 mm/hour (medium fast), which is on a flat slope with a high canopy density (91, 29%). Plot 2 has an infiltration rate of 12 mm/hour (medium slow), which is on a steep slope with a sparse canopy density (38.76%). The presence of forest plants such as sugar palm (Arenga pinnata), jabon putih (Anthocephalus cadamba), and white teak (Gmelina arborea) on agroforestry land can increase the infiltration rate. The use of sugar palm agroforestry land, which combines forest plants and other plants in it, is better compared to using land with just one type.

Keywords: Agroforestry, Arenga Pinnata, Infiltrasi, Suso Watershed

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M320B

Toward Novel Therapeutics: A Synthetic Approach to Pachydermin from *Chamonixia pachydermis* as a Promising Pharmacological Agent

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Pachydermin, an oxylated tetramic acid with 3-chloro-4-hydroxyphenyl substituent, was isolated from the New Zealand basidiomycete, *Chamonixia pachydermis*. Its degradation product exhibits antibacterial activity against *Bacillus subtilis*, and its derivatives are anticipated to have similar or better potentials. In this work, a novel approach for the synthesis of the natural product, pachydermin and its derivatives was developed *via* β,β-diketoester intermediates. The synthetic route began with the synthesis of *N*- benzylated β,β-diketoester as the key structural moiety, from glycine ethyl ester as the starting material. Subsequently, oxalyl subunit was inserted, as well as other acyl/alkyl subunits at C3-position of the diketoester ring *via* acylation/alkylation reactions leading to the required intermediates of pachydermin. Alkene functionalities at C5-position could then be introduced using different alkyl or aryl aldehydes, with the aid of different bases which include diisopropylamine, NaH, Et3N, K2CO3 as well as ionic liquids. Insertions of methyl and 4-nitrobenzylidene functionalities at C3- and C5-positions, respectively, were highlighted for the synthesis of the target derivatives. Selective decarboxylation, ester hydrolysis and *N*- benzyl deprotection could eventually lead to the required target compounds and derivatives. The molecular structures of all synthesized compounds were confirmed by mass spectroscopy (MS) and nuclear magnetic resonance (NMR) spectroscopy. Preliminary biological tests (antibacterial and anti- quorum sensing) were also performed to evaluate their potential pharmacological properties.

Keywords: pachydermin*, Chamonixia pachydermis*, tetramic acid, β,β-diketoester.

M321B

EFFECT OF PALM PALM SHELL BIOCHAR AND P FERTILIZER K ON PLANT GROWTH AND PRODUCTION SOYBEAN (*Glycine max*)

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This research used a Factorial Randomized Block Design (RAK) with two factors studied, namely: 1. The first factor is Palm Oil Shell Biochar consisting of 4 treatment levels, namely: B0 = 0 Control, B1 = 2 Kg/plot, B2 = 4 Kg /plot, B3 = 6 Kg/plot. 2. The second factor is P and K Inorganic Fertilizer which consists of 4 treatment levels, namely: P0 = 0 g control, P1= 16 g + 36 g/plot, P2= 20 g + 40 g/plot, P3 = 24 g + 44 g/plot). The parameters observed were plant height (cm), number of pods, number of filled pods, number of empty pods, number of seeds (grains), weight of seeds (g), soybean disease inventory. The results of the research showed that the effect of palm oil shell biochar on the growth and production of soybean plants had a very significant effect on the average parameters of plant height, number of pods, number of filled pods, number of empty pods, number of seeds, seed weight, and weight of 100 seeds with B3 treatment (6 kg / plot) as the highest data average for each parameter. However, the effect of the interaction of palm oil shell biochar and P and K fertilizer on the growth and production of soybean plants had no significant effect on the average parameters of plant height, number of pods, number of filled pods, number of empty pods, number of seeds, seed weight, and weight of 100 seeds by treatment. B3P3 (6 kg/ plot and P 24 g + K 44 g)) as the highest data average for each parameter.

Keywords: Soybean Plants, Palm Oil Shell Biochar, P and K Fertilizer

M322B

Characteristics of Kepah (M. meretrix) and Mangroves As Its Habitat in The Main Clam-producing Area of Bagan Asahan, North Sumatra, Indonesia

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The Bagan Asahan mangrove ecosystem is one of the ecosystems on the east coast of North Sumatra that has enormous potential, one of which is the kepah fish (Meretrix meretrix). Kepah lives among mangrove roots in mud substrates, sandy mud, and mangrove litter that decomposes into mud. This research aims to analyze the morphological characteristics of kepah shells through morphometric studies, distribution patterns, substrate C-organic content, and analyzing the suitability of vegetation and ecosystems. Shell morphometric analysis was carried out by measuring the length, height, and thickness of the shell of each individual at each station. Distribution was analyzed based on shell length and frequency patterns. The results showed that the common kepah size being 2.70-2.99 cm. The relationship between morphometric growth and shell dimensions is strong and positive. The distribution of kepah is grouped. Mangrove vegetation includes six genera: five core types and one peripheral type. Rhizophora has the highest importance value (127.06%), followed by Sonneratia (79.04%) and Avicennia (74.39%). The C-organic content of the substrate ranged from 1.48%-1.74%, suitable for M. meretrix.

M323B

Effect of Ba^{2+} Substitution at A-site on Structural, Electrical and Magnetic Properties of $Sm_{0.5}Ca_{0.5}MnO_3$ Manganite

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Mixed valence perovskite manganite has been the focus of extensive research due to its intriguing properties, including colossal magnetoresistance and charge ordering. Through this study, charge ordered $Sm_{0.5}Ca_{0.5-x}Ba_xMnO_3$ (x=0-0.40) were synthesized using conventional solid-state method and their structural analysis were investigated through X-Ray diffraction data analysis. The X-ray diffraction patterns showed that all samples were present in single phase and crystallized in orthorhombic structure with *pnma* space group. Rietveld refinement analysis revealed unit cell volume slight increase with increases Ba^{2+} concentration, suggesting that Ba^{2+} substitution may occur at the Ca-site of manganite. While the effect of Ba^{2+} substitution on electrical and magnetic properties were carried out through electrical resistivity via four-point probe and AC Susceptibility measurement. Electrical resistivity measurement showed insulating behavior for $Sm_{0.5}Ca_{0.5-x}Ba_xMnO_3$ (x=0-0.40) across temperature of 30-300K under 0T. By applying 0.8T of external magnetic field with the same range of temperature, the resistivity of the sample decrease despite showing the insulating behavior, hence shows the colossal magnetoresistance effect. In addition, by the increase of Ba^{2+} concentration, the resistivity of manganite shows significant decrease thus, showing that charge-ordered phase is gradually weakened. With the weakening of charge-ordered phase, with related to the increase of tolerance factor and increase of electron bandwidth as average ionic radius at A-site increased with Ba^{2+} substitution. Magnetization versus temperature measurements showed pure $Sm_{0.5}Ca_{0.5}MnO_3$ exhibit paramagnetic behavior with charge-ordered temperature T_{CO} around 270K. Ba^{2+} substitution at A-site weakened charge-ordered state at x= 0.1-0.4 inducing ferrimagnetic-paramagnetic transition.

***Keywords*:** Manganite, Charge Ordered, Structural, Electrical Resistivity, Magnetic

M324B

Potentials and Limitations of Cold adapted Hydrogen Producing Bacteria; A Mini Review

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Low-temperature bacteria are potential future renewable energy producers due to their ability to produce biohydrogen. However, the bacteria have shown poor hydrogen yields due to a slow metabolic rate and a long lag phase, often caused by their restricted growth temperature limit. The ineffective search for new biocatalysts from cold environments and the application of modification techniques almost jeopardise the economic viability of these strains in biohydrogen production research. In this article, the potential for cold genetic and enzymatic adaptation that has led to the continuous expression of novel biocatalysts of biotechnological importance was reviewed under the following headings: cold-adapted bacteria, biohydrogen-producing bacteria, strategies for adaptation to stress at low temperatures, performance of cold-adapted bacteria in biohydrogen production, challenges of cold-adapted bacteria in biohydrogen production and prospects. In this relatively unexplored area, finding new strains can improve their hydrogen production by studying their unique properties.

Keywords: Low temperature; cold-adapted bacteria; Biohydrogen production; Gene expression; enzyme production

M325B

Antibacterial Activity Of *Piliostigma Thonningii* Extracts Against Bacterial Species Isolated From Open Wound

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Wound care constitutes an important part of routine care given by health professionals to the community population. The antibacterial activity of *Piliostigma thonningii* crude extracts against bacterial species isolated from open wound was investigated. The phytochemical screening of *Piliostigma thonningii* extracts was conducted using standard qualitative methods. The antibacterial activity of *Piliostigma thonningii* extracts was assayed using agar well diffusion method. The phytochemical screening of *Piliostigma thonningii* leaf extracts commonly contained flavonoids, anthraquinones, terpenoids and saponins, while stem-bark extracts indicated the presence of alkaloids, anthraquinones, saponins and steroids. The test isolates used include *Staphylococcus aureus, Staphylococcus haemolyticus* and *Pseudomonas aeruginosa*. *The Piliostigma thonningii* methanol leaf extract showed greater inhibitory effect against test bacterial isolates at 10 and 20 mg/mL concentration with zones of inhibition ranging from 15.00-21.00 mm and 28.00-32 mm, while methanol stem-bark extracts recorded zones of inhibition from 12.00-18.00 mm and 22.00-28.00 mm at 10 and 20 mg/mL respectively. The results obtained show that extracts were more active than ciprofloxacin which served as positive control with zones of inhibition ranging from 6.00-10.00 mm and 12.00-18.00 mm at 10 and 20 mg/mL concentration, Therefore, extracts obtained from this plant could be promoted for search of new leads against the test bacterial pathogens, The result has justified their utilization by traditional medicine practitioners for the treatment of wound and other related ailments associated with the test bacterial isolates.

***Keywords**:* Antibacterial, Phytochemical, Extract, Bacteria.

M326B

Aboveground biomass model of mangrove forest using Sentinel 2A imagery in east Sumatera coastal, Indonesia

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Mangrove ecosystems have a role as a sink of carbon dioxide (CO2) from the air. The ability of mangroves to absorb large amounts of carbon provides benefits related to global warming. When humans are not allowed to harvest mangrove forest timber, the potential for carbon trading can be an alternative. Therefore, statistics and information on the distribution and amount of carbon in a mangrove forest are required. The objectives of this research is to map the aboveground biomass of natural mangrove forests on the coast of North Sumatra and develop the best possible biomass equation model using many vegetation indices. Aboveground biomass was measured using non-destructive sampling and SENTINEL 2A satellite images. The independent variables for biomass estimating models are NDVI, GNDVI, and TVI. The coefficient of determination R^2 is used to choose the most suitable model for the equation. The result of selecting the equation model in estimating biomass on the surface is $y = 23.29x^{3.1585}$, which is influenced by the GNDVI variable in the power equation model. GNDVI (Green Normalized Difference Vegetation Index) is a selected vegetation index to estimate biomass on the surface with a coefficient of determination (R^2) of 60%. The average biomass content of mangrove forests at the study site was 249.06 tons/hectare, with the highest biomass of 510.68 tons/hectare.

Keywords: *carbon absorption, forest inventory, coastal protection, vegetation index, and satellite image*

M327B

Effect of Addition of Emulsifiers and sterilization on the physical stability of tigernut-date-coconut milk drink.

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Previous research has reported that tigernut milk is unstable during storage due to formation of starch granules at the bottom layer. Consumer acceptance of tigernut milk and related products is known to be negatively impacted by this instability and the less-than-ideal flow characteristics of the product and as a result, require development. This research focused on studying the physical stability of tigernut-date-coconut milk drink after being treated with xanthan gum, sodium caseinate and sterilization technique. Tigernut milk and a tigernut-date-coconut milk drink (6:2:2) were stabilized using 3% sodium caseinate and 0.1% xanthan gum. The samples were then sterilized at 121°C for 15 minutes. The viscosity, colour, and gravitational stability (sedimentation) of treated and untreated samples, before and after sterilization were evaluated. The results demonstrated that sterilization reduced the color intensity of the milk while increasing its viscosity. Additionally, sterilization successfully eliminated sedimentation observed in unstabilized milk, enhancing the overall stability of the beverages. Also, Sodium caseinate and xanthan gum were able to physically stabilized both the sterilized and unsterilized tigernut milk. These findings highlight the effectiveness of sterilization and emulsifiers in improving the physical properties of tigernut-based milk products, offering valuable insights for the development of high-quality, shelf-stable functional beverages.

Keywords: Sterilization; physical stability; tigernut; sodium caseinate; xanthan gum.

M328B

Floristic Composition and Conservation Assessment of Lowland Dipterocarp Forests in UiTM Puncak Alam, Selangor, Malaysia

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The lowland dipterocarp forests, once widespread in tropical regions, have been significantly diminished due to land use changes, leaving only fragmented remnants. This study focuses on documenting the floristic composition, species diversity, and conservation status of the lowland dipterocarp forest at Universiti Teknologi MARA (UiTM) Puncak Alam Campus, Selangor, Malaysia. Understanding the plant resources in these forest remnants is vital for evaluating their ecological, economic, and medicinal potentials, as well as for contributing to sustainable management and conservation strategies. Additionally, the data gathered serves as a baseline for protecting plant taxa at risk of extinction. The study's objectives include documenting the forest's floristic composition and species diversity, preparing a comprehensive inventory and spatial map of plant resources, and assessing the conservation status of species based on the IUCN Red List. Fieldwork was conducted along permanent trails, where all trees with a diameter at breast height (DBH) of ≥10 cm within 5 meters of the trails were identified, tagged, and recorded for family, genus, and species. Additional data, such as DBH, tree height, and geographic coordinates, were collected. Samples were marked with numbered tags, photographed, and prepared as voucher specimens deposited in the AuRIns herbarium lab. Preliminary results highlighted the dominance of five key plant families: Burseraceae, Myrtaceae, Fagaceae, Rubiaceae, and Dipterocarpaceae/Euphorbiaceae/Melastomataceae. Notably, two endangered species (*Madhuca utilis* and *Psydrax maingayi*) and four vulnerable species (*Memecylon urceolatum*, *Mesua ferrea*, *Nephelium costatum*, and *Sandoricum koetjape*) were identified. These findings emphasize the ecological importance of the UiTM Puncak Alam forest and its role as a refuge for threatened species. This study provides essential data for understanding forest stand dynamics, species distribution, and conservation requirements. It also highlights the potential for sustainable utilization of plant resources, contributing to biodiversity conservation efforts and protecting species at risk extinction. The findings underscore the need for continuous monitoring and conservation efforts to safeguard the ecological integrity and biodiversity of lowland dipterocarp forests.

Keywords: Lowland Dipterocarp Forests, Floristic Composition, Conservation Assessment, Endangered and Vulnerable Species

M329B

Modulating The Metabolism of Soil Fungi: Use Of Toxic Volatiles As A Tool For Selective Isolation

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A huge variety of secondary metabolites with wildly disparate chemical structures and biological functions can be found in the kingdom of fungi. Five volatile compounds—dimethylsulfoxide, naphthalene, cineole, petroleum, and formaldehyde—were employed in the current work as part of a novel chemotechnique. This led to the isolation of 82 fungus from soil samples collected at three different depths. The pure cultures were inoculated and fermented in the presence or in the absence of volatile compounds. A total of 100 crude extracts was analysed by HPLC and evaluated for preliminary screening of antimicrobial activity against pathogenic microorganisms using the MTT assay. 20 out of 100 crude extracts showed significant antibacterial activity against *Escherichia coli*, 17 out of 100 against *Enterococcus faecium*, 15 out of 100 against *Pseudomonas aeruginosa* and 25 out of 100 against *Staphylococcus aureus*. 26 out of 100 crude extracts showed antifungal activity against *Candida albicans*. From the analysis of the above data, 8 out of the 82 fungal isolates were selected for further study. These include *Aspergillus nomius*, *A. terreus, Byssochlamys nivea*, *Talaromyces aculeatum*, *P. commune*, *Pseudallescheria minutispora*, *Trichoderma citrinoviride,* and *T. virens*, which were fully identified by morphological and genetic techniques. Their metabolites were purified by semi-preparative HPLC and identified by spectroscopic (MS, NMR, UV/Vis) and X-ray diffraction techniques. Significant changes in secondary metabolic profiles were observed with volatile exposure. Therefore, the utilisation of hazardous volatile molecules offers a new method for selective isolation and permits the modification of fungal metabolism.

Keywords: dimethylsulfoxide, MTT assay, volatile compounds, HPLC

TRACK 2:

ADVANCED TECHNOLOGY

M110A

FUNCTIONAL IMPROVEMENT OF KEFIR'S PHYSICOCHEMICAL AND SENSORY ATTRIBUTES WITH MANGO PEEL PUREE

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Kefir is a cultured dairy beverage characterised by its acidic flavour and smooth texture, achieved through the fermentation of kefir grains. This research investigates the impact of mango peels on the physicochemical, nutritional, and sensory properties of milk kefir to enhance its quality while addressing agricultural waste management. Mango peels, rich in antioxidants and phenolic compounds, were made into puree and incorporated into kefir formulations (F1-F4) in varying concentrations which are 5%, 10%, 15%, and 20%. Nutritional compositions analysis, probiotic analysis, physicochemical analysis and sensory evaluation were applied. Results showed that the control kefir, without mango peels, exhibited the highest protein (16.69%) and ash content (0.80%) but the lowest fat (0.98%) and sugar content (12.50). Formulations with mango peels demonstrated increased fat and flavonoid content, with F3 having the highest fat (6.37%) and F2 the highest flavonoid concentration (1.148 mg QE/mL). The DPPH assay indicated consistent antioxidant activity across formulations (IC_{50}: 1.54-1.55%), close to ascorbic acid (1.52%). Sensory evaluations revealed that higher concentrations of mango peels significantly improved kefir's colour, texture, taste, and overall acceptance, with F4 achieving the highest scores in taste (6.22) and overall acceptance (6.44). The study concludes that mango peels can enhance kefir's nutritional and sensory attributes while promoting sustainability in agricultural practices. Statistical analyses confirmed significant differences ($p<0.05$) among formulations for key parameters.

Keywords: Kefir, Physicochemical Properties, Sensory Attributes, Mango Peel Puree

M111A

OXIDATIVE STABILITY OF COOKIES FORMULATED WITH KIWI (*Actinidia deliciosa*) AS ACTIVE INGREDIENT

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Kiwi, renowned for its nutritional richness, was a subject of intensive study due to its potential health benefits. With high levels of vitamins, fibre, and antioxidants, particularly in its flesh and peel, kiwi presented an opportunity to improve the nutritional content of baked goods. This study delved into the oxidative stability of cookies, aiming to enhance the shelf life and nutritional value by incorporating kiwi extracts. Fatty foods, especially cookies, faced challenges of oxidative degradation, prompting the exploration of natural antioxidants over synthetic options. The research questions investigated the antioxidant capacity of kiwi extract, its effectiveness in extending the cookie shelf life, and the optimal concentration for maximum antioxidant activity which is 200 ppm of kiwi peel extract. The study objectives included assessing kiwi extracts' impact on cookie oxidative stability using Peroxide Value (PV) and Thiobarbituric Acid (TBA) tests, considering both flesh and peel components, and evaluating the antioxidant properties of kiwi flesh and peel extracts. The significance lies in addressing the demand for clean label ingredients, providing a natural alternative to synthetic additives. The methods used to assess the antioxidant potential were Total Phenolic Content (TPC), Total Flavonoid Content (TFC), 2,2-Diphenyl-1-picrylhydrazyl (DPPH), and Ferric Reducing Antioxidant Power (FRAP). Additionally, for the analysis of cookies, PV and TBA tests were conducted. The study found that kiwi extracts, particularly from the peel, significantly enhanced the antioxidant properties of cookies compared to control cookies formulation. The incorporation of kiwi extract effectively prevented oxidation, aligning with the trend of functional foods with enhanced health benefits. These findings contribute not only to consumer's health which may reduce the risk of many diseases but also influence baking industry practices, encouraging the development of sustainable, nutrient-rich baked goods with improved shelf life. This research opens avenues for further studies on kiwi's antioxidant capabilities in diverse food applications, contributing to advancements in food preservation and sustainable ingredient utilisation.

***Keywords**:* Kiwi, Oxidative Stability, Cookies

M112A

INTEGRATED GEOGRAPHIC INFORMATION SYSTEM (GIS) AND ANALYTICAL HIERARCHY PROCESS (AHP) IN PUBLIC GREEN OPEN SPACE MANAGEMENT IN MEDAN CITY.

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Medan, as one of Indonesia's largest cities, requires adequate green open spaces. This research focuses on analyzing the sufficiency and distribution of public green open spaces in Medan City, as well as assessing the priority levels for their management. The study utilized Geographic Information Systems (GIS) to evaluate the distribution and sufficiency of these spaces and employed the Analytical Hierarchy Process (AHP) to determine management priorities. In-depth interviews were conducted with key informants from the Medan City government, and Focus Group Discussions (FGDs) were held to reach a consensus on management priorities. The findings reveal that public green open spaces are spread across 21 districts in Medan, with varying sizes. The largest green open space is located in Medan Belawan District, while the smallest is in Medan Perjuangan District. Management priorities identified include the functional aspect, which ranked highest with a criterion value of 0.467, followed by the physical aspect at 0.324, and the managerial aspect at 0.209. For sub-criteria, the Green City Program was the top priority with a value of 0.808, followed by Funding and Coordination at 0.738, Green Community at 0.524, and Place for People to Interact at 0.476. Local Regulations and Increasing the Number of Public Green Open Spaces were less prioritized, with values of 0.262 and 0.192, respectively. Among alternative strategies, Enhancing Green Community Participation (0.590) and the Green City Action Plan (0.410) were deemed most important. This research offers advanced tools and approaches for more effective and sustainable management of Medan City's green open spaces, aiming to improve the quality of life for residents and create a healthier, greener urban environment.

Keywords: *Analytical Hierarchy Process (AHP), Geographic Information Systems, Green City, Green Community, Green Open Space, Medan City*

M113A

ELECTRON-POSITRON PAIR PRODUCTION AND THERMAL NEUTRINO EMISSION IN THE LOCAL UNIVERSE

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Thermonuclear conditions found in explosive massive-stars require the use of not only efficient, accurate but thermodynamically consistent stellar equation of state (EoS) routines. Many massive-low metallicity stars end their life as Pair-Instability Supernova (PISN) by means of electron-positron pair productions. We used thermodynamically consistent EoS tables to numerically calculate the thermonuclear energy produced by electron-positron pairs in rotating 150 and 200 $M_{\odot}$ at Small Magellanic Cloud (SMC) and rotating and non-rotating 500 $M_{\odot}$ at Large Magellanic Cloud (LMC). As expected, the effect of rotation of reducing the oxygen core mass had increased the thermal energy within the threshold of the pair-creation instability. Similarly, stars with lower mass loss produced higher thermal energies, which completely explode the stars as PISNe without remnant. On the other hand, the non-rotating 500 $M_{\odot}$ might have only reached the instability region due to its lower metallicity which is capable of suppressing the mass loss such that the thermonuclear energy maintains a certain amount of elements into the pair creation region. At the final explosion of the stars, the helium core mass reduced the thermal energies in trying to avoid the pair-creation region. Many implications of these results for the evolution and explosion of massive stars are discussed.

***Keywords*:** Stars; electron-positron pairs; neutrino; energy`

M114A

GRAPHENE OXIDE NANOPLATE-REINFORCED THERMOPLASTIC ELASTOMER NANOCOMPOSITES: NEXT-PRODUCTION MATERIALS FOR HIGH-PERFORMANCE APPLICATIONS

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This study investigated the improvement in thermoplastic elastomer (TPE) properties reinforced by graphene oxide nanoplates (GONPs). TPE is a blend of polylactic acid (PLA), natural rubber (NR), and liquid-epoxidized natural rubber (LENR) as a compatibilizer. TPE/GONPs nanocomposites were processed using TPE as the host matrix, and their mechanical, electrical, and structural properties were characterized. The mechanical properties of the nanocomposites improved as the filler loading increased until an optimal value of filler loading was reached. Based on the experimental results, the GONPs clearly influenced the electrical conductivity owing to the disruption of the percolated network of the GONPs. It is believed that the high aspect ratio of GONPs is a significant issue concerning the constitution of a special interface region between the GONPs and the matrix and the great performance of the composites. GONPs-derived TPE nanocomposites are poised to revolutionize a large range of manufacturing processes.

Keywords: Graphene oxide Nanoplates, Nanocomposites, Thermoplastics, Electrical Conductivity, Thermoplastic Elastomer.

M115A

THE USE OF EMPTY FRUIT BUNCHES (EFB) FOR BIODEGRADABLE PLASTIC UTENSIL ALTERNATIVES

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The widespread use of disposable plastic utensils has raised significant environmental concerns owing to their nonbiodegradable nature. This has led to an increasing interest in the development of biodegradable alternatives. This study aimed to produce a functional biodegradable spoon using an empty fruit bunch (EFB) in three different formulations: S1 (55% EFB), S2 (70% EFB), and S3 (85% EFB). The study evaluated the physicochemical and biodegradation properties of these formulations, including hardness, fracturability, moisture content, water absorption, solubility, water activity, surface morphology, and biodegradability. Biodegradation was monitored in both wet and dry soil for 15 days. Increasing EFB concentration improved hardness, fracturability, moisture content, and water absorption ($p<0.05$), while solubility decreased. Higher EFB levels also reduced water activity. SEM images showed S1 had a rougher surface and more porosity due to lower EFB content. The biodegradation rate was higher in wet soil than in dry soil ($p<0.05$). No changes in hardness were observed across all storage methods after 28 days. S1 (55% EFB) was identified as the optimal formulation, offering the best balance between physicochemical properties and biodegradability for a biodegradable spoon.

Keywords: Biodegradable utensils, Empty fruit bunch (EFB), Physicochemical properties, Biodegradation rate, Sustainable materials

M116A

APPLICATION OF NANOCLAY FOR THE REMOVAL OF POLYCYCLIC AROMATIC HYDROCARBONS FROM AQUEOUS SOLUTION AND SIMULATED PETROLEUM WASTEWATER

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Polycyclic aromatic hydrocarbons (PAHs) are a group of priority pollutants that are persistent, hazardous, ubiquitous, and toxic, which are released to the environment through natural and anthropogenic sources. The ongoing study highlights the development and evaluation of a nanoclay designed to remove these substances from aqueous solution and simulated petroleum wastewater. A smectite-based clay known as Montmorillonite-bentonite was modified with dimethyldioctadecyl ammonium chloride (DMDAC) using ion-exchange reactions and the hydrothermal method to create the organo-modified nanoclay. To analyze the synthesized nanoclay, Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), and scanning electron microscopy (SEM) were utilized. The nanoclay exhibited remarkable efficiency in reducing PAHs in wastewater, achieving adsorption rates between 93.64% and 99.79%. Various experimental parameters such as pH, sorbent mass, contact time, and temperature were examined. The removal efficiency and hydrophobicity of PAHs were found to be associated with their log Kow values, with the order being benzo[k]fluoranthene > fluoranthene > anthracene > phenanthrene > fluorene.

Keywords: Nanoclay; Adsorbent; PAHs; Simulated Petroleum Wastewater; Hydrophobicity.

M117A

CROSS-PLATFORM SPEAKER DIARIZATION: EVALUATING THE SCALABILITY AND FLEXIBILITY OF MALEO

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Maleo is an innovative automatic speaker diarization system that combines the latest technologies in speech processing and machine learning. Through a structured procedure, the system meticulously designs itself to discern and segregate audio recordings based on individual speakers. Initiation involves advanced audio processing to eliminate noise from the raw audio file. Subsequently, the refined audio undergoes analysis by two prominent models: Whisper, which leverages robust speech recognition through large-scale weak supervision, and Pyannote. Audio is a neural network-based solution tailored explicitly for speaker diarization tasks. The outcomes of this analysis are encoded in the ONNX format, ensuring interoperability and efficient execution across diverse computational platforms. Maleo's performance is subsequently benchmarked across GPU, CPU, and WebGPU environments to assess computational efficiency and energy efficacy, positioning it as a dynamic and sustainable solution in speaker diarization technology. This research underscores Maleo's potential to surmount the challenges within diarization tasks, demonstrating high efficiency, remarkable adaptability, and the capacity for optimal operation across varying computational infrastructures.

Keywords: speaker diarization, cross-platform, performance

M118A

SCENARIO MODELLING FOR TAPANULI ORANGUTAN HABITAT PRESERVATION IN CENTRAL TAPANULI

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Preserving the habitat of the critically endangered Tapanuli orangutan (Pongo tapanuliensis) is essential for sustainable forest management and ecosystem stability in the Central Tapanuli Regency. This study aimed to develop scenario models to assess the future of orangutan habitats by identifying key drivers of habitat decline. This research uses a mixed methods approach, integrating literature reviews, secondary data analysis, and field surveys within the drivers, pressures, circumstances, impacts, and responses (DPSIR) framework. Dynamic systems modeling is explored using four scenarios: business as usual (BAU), threat model, policy, and welfare and rehabilitation model. The threat model predicts a significant decline in forest cover from 15,300 ha in 2010 to approximately 11,000 ha by 2060. The BAU scenario suggests a slower decrease to 14223.1 ha, while the policy, welfare, and rehabilitation models forecast better outcomes, with the latter projecting an increase to 14981.9 ha by 2060. Key factors impacting habitat sustainability include population dynamics, land use changes, and policy interventions. Practical strategies, such as strengthening protected areas, forest restoration, and community welfare improvement, demonstrate significant potential to curb habitat loss. Policies focusing on family planning, agricultural intensification, and anti-illegal logging education are particularly effective. This research provides actionable insights for policymakers and conservationists aiming to safeguard the Tapanuli orangutan's habitat, highlighting the critical role of strategic policy interventions.

***Keywords**: Tapanuli orangutan, DPSIR framework, Forest management, Conservation policy, Sustainable development.*

M119A

MOLECULAR DOCKING, DRUG LIKENESS, PHAMACOKINETICS AND DFT CALCULATIONS OF SOME ANTI-LASSA FEVER AGENTS

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Lassa fever is a viral hemorrhagic fever caused by the Lassa virus which is found in West Africa and is transmitted through contact with the urine or feces of infected rodents. The fatality rate for Lassa fever is 1-15%. However, the rate is higher in pregnant women and people with underlying medical conditions. GPC protein was identified as the main target for combating of Lassa fever, Lymphocytic Choriomeningitis Virus (LCMV) and also Ebola virus. Molecular docking virtual screening was performed to screen and identify the best lead compounds. SWISSADME and pkCSM were used to predict the drug likeness and ADME properties of the studied compounds. The chemical reactivity of the studied compounds was computed using DFT calculations. Based on the Molecular Virtual Docking Screening performed on compound 15, it was identified as the best lead compounds in this study, with Moldock score of -168.523Kcalmol^{-1}. The drug likeness and ADMET properties prediction performed showed that the studied compounds including the best lead compound were drug like in nature with good pharmacokinetic profile, and they all have Bioavailability Score of 0.55 respectively. Furthermore, based on the DFT calculations, compound 1 with energy gap -11.4 was identified in this study as the most reactive compound. Base on this research the compound identified can serve as potential drugs for Lassa fever based on their mole dock score, Drug likeness and DFT.

Keywords: Molecular docking, Drug-likeness, Pharmacokinetic.

P120A

ENHANCING INDONESIAN FOOD SAFETY: DEEP NEURO-FUZZY RICE QUALITY CLASSIFICATION

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Indonesia imports a lot of rice to suit national demand. Fake rice, first detected in China and then in Indonesia, threatens food safety and public health. Fake rice, commonly laced with non-edible ingredients, may cause digestive difficulties, poisoning, and cancer. Developing an accurate and efficient fake rice detecting technology is vital. Using DNFS, an advanced hybrid model of neural networks and fuzzy logic, this paper presents a fake rice detecting system. A collection of actual and fake rice samples was assessed using DNFS. The model used neural networks and fuzzy logic to improve classification and prediction. After training and testing on the dataset, the DNFS model accurately identified genuine rice from fake rice. The system's rice sample classification accuracy, precision, and efficacy were assessed. The findings show that the DNFS model detects bogus rice accurately and reliably. This method may be used to identify various counterfeit food goods as well as fake rice in Indonesia. The method might improve food safety and public health. Based on Adam optimizer training outcomes. The 7: 2: 1 scenario has the greatest accuracy at 93% and a 20% loss value. A model for detecting fake rice using convolutional neural networks may be developed. Rice detection yields Medium, Fake, and Premium Rice.

Keywords: Food Security, Fake Rice Detection, Rice Classification, Image Processing, Convolutional Neural Network

P121A

ASSESSMENT OF MICROPLASTIC POLLUTION IN MALAYSIA'S FRESHWATER ECOSYSTEMS: A CASE STUDY OF SUNGAI KERANJI, KAMPAR, PERAK

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Microplastics (MPs) have been found to have contaminated most if not all the world's aquatic environments. The adverse effects of MPs on the aquatic food web and marine and freshwater ecosystems creates a major environmental and ecological risk which will only worsen in the future. Numerous studies have been conducted on MPs in the marine environment, but not the same can be said for freshwater environments. In order to investigate the extent of microplastic (MP) pollution in Malaysia's freshwater systems, this study focuses on identifying and analyzing MPs in Sungai Keranji, Kampar, Perak. The analysis was conducted using microscopic inspection to accurately assess the presence and characteristics of MPs in the samples. The results of the MP analysis found 122 individual MPs identified in both bulk water (67.2%) and sediment (32.8%) samples from Sungai Keranji. The MP concentration was found to be 6.83 MPs/L in bulk water and 0.27 MP/g in sediment. The most abundant MP characterizations were the fiber (50%) and fragment (33.6%) MP type, black (31.1%), blue (21.3%) and red (16.4%) MP colour, translucent (41%) and opaque (35.2%) MPs, and < 0.150 mm in size (50.8%). Potential sources of microplastics include the washing of synthetic clothing and illegal garbage disposal or incineration. To address this, prevention methods such as awareness campaigns, stricter penalties, and increased government proactivity are recommended. This study concludes that significant microplastic pollution exists in Sungai Keranji, Kampar, Perak, with fibers and fragments being the most common types, and highlights the need for further research and preventive measures to mitigate the growing environmental risk.

Keywords: Freshwater contamination, Microplastic sources, Environmental mitigation.

P122A

PERFORMANCE CHARACTERISTICS ASSESSMENT OF SUSTAINABLE MATERIALS USING LIFE CYCLE ASSESSMENT (LCA)

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It is often assumed that wood is preferable to oil-based products, but if the source is not sustainable then this potential advantage is illusory. Consumers and manufacturers are concerned about product compliance in terms of the environment to ensure sustainable consumption and production patterns. Environmental certification with respect to this compliance has therefore increased. One green marketing effort to aid the adoption of sustainable development practices is eco-labelling. Deck board materials were used as an example of a potentially sustainable material. Samples were collected from several industrial suppliers in the sector since their market share is rapidly growing, especially for garden design. A cradle to grave life cycle assessment was carried out to identify the environmental impacts of wood, plastic and composites used for decking application. The objective is to compare the impacts between three different materials used by commercial suppliers. The functional unit of the study was 1m^2 per deck board per year of use. The aim is to deepen the knowledge of energy and environmental specifications for material selection and to assess the competitiveness of composites decking in environmental terms in its market. The study proves that better material selection will definitely help reduce the environmental impact. Composite deck board may show higher lifespans than wood and plastic deck boards and could furthermore be recycled as well, which would lead to improvement in comparable environmental impacts. This would probably encourage the use of an Environmental Products Declaration (EPD) for these products and stimulate competition between industries to launch more environmentally friendly products in the future.

Keywords: LCA, EPD, Green Marketing.

P123A

PREDICTION OF TENSILE STRENGTH, HARDNESS, AND MELTING POINT OF NICKEL AND IRON-NICKEL SUPERALLOYS BASED ON COMPOSITION USING MACHINE LEARNING

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Superalloys are a class of materials renowned for their exceptional ability to retain mechanical properties at elevated temperatures. Nickel superalloys, with a nickel content ranging from 38% to 76%, and iron-nickel superalloys (15-60% iron, 25-45% nickel) are extensively employed within the aviation industry due to their resilience in harsh operating environments. These components encounter extreme temperatures during operation, significantly impacting their tensile strength and melting point. Furthermore, high-speed rotation and abrasive conditions necessitate materials with superior hardness. Consequently, material modifications are crucial to ensure these turbine gas components meet the minimum required properties. Machine learning (ML) and deep learning (DL) offer promising solutions for the design of materials with tailored tensile strength, hardness, and melting point properties. This study investigates the efficacy of two machine learning models and one deep learning model in predicting these crucial material properties. The model with the most favorable prediction accuracy is identified through the systematic variation of key parameters. The results of this investigation reveal that the Artificial Neural Network (ANN) model outperforms other models in predicting superalloy material properties. This capability is leveraged to modify the composition of INCONEL-718, successfully achieving significant enhancements in tensile strength (1592 MPa), hardness (152 HRB), and melting point (1665°C).

Keywords: Nickel superalloys, Iron-nickel superalloys, Machine learning, Deep learning, Physical and Mechanical properties.

P124A

LAND COVER CHANGE ANALYSIS IN THE POTENTIAL AREA OF THE TAPANULI ORANGUTAN ECOLOGICAL CORRIDOR BETWEEN THE WEST AND EAST BLOCKS OF THE BATANGTORU HUTAIMBARU ECOSYSTEM, SOUTH TAPANULI

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Planning and design of suitable wildlife ecological corridors can mitigate the negative impacts of habitat fragmentation to provide opportunities for dispersal of individuals in their remaining habitat. This study aimed to analyse land cover change from 2004 to 2024 in potential corridor areas connecting Tapanuli orangutan populations between the West to the East block of the Batang Toru Forest Ecosystem. The study was conducted in Hutaimbaru, South Tapanuli, North Sumatra. The total study area was 1,099.13 ha with land cover classes of forest, shrubs, paddy fields, open areas, settlements and water. Land cover change analysis using Train ISO Cluster Classifier to get a picture of each pixel in the band of satellite imagery and GIS to overlay the land cover change map. The largest land cover class in the Hutaimbaru ecological corridor in 2004 was forest cover with an area of 956.38 Ha (87.01%) of the total area. The results of the analysis of land cover change from 2004 and 2014 showed the largest increase is shrubs with an area of 159.02 ha, while the largest decrease is forest with an area of 162.02 ha. In 2024, the largest increase is shrubs of 176.31 ha, while the largest decrease is forest with an area of 203.51 ha. Land cover conditions in the Hutaimbaru ecological corridor are still dominated by forests with a total area of 590.84 ha (53.76%). Identifying land cover change in the Hutaimbaru ecological corridor area is an important step in developing corridor planning and design for sustainable adaptive management.

Keywords: *Ecological Corridor, Tapanuli Orangutan, Land Cover, Train ISO Cluster Classifier, Sustainable Management*

P125A

SUSTAINABLE AGROFORESTRY SYSTEM SUPPORTING SULAWESI'S ENDEMIC BEE FEEDING WALLACETRIGONA *INCISA*

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Abstract. The Sulawesi honey bee *Wallacetrigona incisa* is an endemic bee species found on Sulawesi. This bee is docile and does not sting, making it easier to handle. It has the highest production potential compared to other Trigona bees in various agroforestry areas. Additionally, it can produce 13 types of diversified products with high economic value.The research aims to find a sustainable agroforestry system to support the native Sulawesi bee, *Wallacetrigona incisa*, in obtaining food. The research methods included direct observation, semi-structured interviews, focus group discussions, tracking secondary data, and laboratory analysis. The analysis utilized descriptive analysis for ecological assessment, including vegetation analysis and evaluation of sustainable food availability. The research findings suggest that *Wallacetrigona incisa* bees in the Apisilviculture system have access to a wide variety of food sources throughout the year. There are 131 species of food sources, including 22 types of Forestry Plants, 30 types of Industrial Plants, 36 types of Fruit Plants, 9 types of Vegetable Plants, 4 types of Ornamental Plants, and 10 types of Weed Plants. The vegetation structure of the Apisilviculture System in North Luwu Regency consists of 3 types: Agrosilvicultural (77.89%) with 8 sub-types, Agrosilvopastural type (17.31%) with 2 sub-types, and Agroaquaforestry type (4.81%) with 1 sub-type.

Keywords: agroforestry system, sustainability, honey bee, *Wallacetrigona incisa*

P126A

STUDY OF SOIL ERODIBILITY IN ITS RELATIONSHIP WITH COFFEE PLANT PRODUCTIVITY BASED ON AGROFORESTRY IN SILAEN DISTRICT TOBA REGENCY

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Coffee plants (*Coffea* sp.) are currently a plantation crop that is in great demand by farmers in Silaen District. However, the soil conditions in Silaen District are dominated by sandy soil, which can trigger soil sensitivity to high erosion potential. One of the efforts to mitigate the decline in coffee production can be done through estimating the soil erodibility index in Silaen District. This research aims to estimate the soil erodibility index and obtain its relationship with agroforestry-based coffee production in Silaen District, Toba Regency. The method for determining land boundaries using land map units (SPL) in the form of land use, soil type and slope. The parameters used are soil texture (M), organic matter (a), structure (b), and permeability (c) as well as coffee beans. Statistical analysis of data takes the form of correlation tests and data regression tests. The results of data analysis show that the highest wet weight of coffee cherries is found at SPL 8 with plantation land use, Typic Hapludands soil type and land slope of 8- 15%. The wet weight value of coffee fruit at SPL 8 is 2.19 t ha-1 with an erodibility value of 0.39. The lowest wet weight of coffee beans is found at SPL 2 with the use of moor land, Andic Eutrudepts soil type and land slope of 8-15%. The average value of wet weight of coffee beans at SPL 2 is 0.15 t ha-1 with an erodibility value of 0.28.

Keywords*:* Coffee Plant Production, Soil Erodibility Index, Soil Type, Sandy Soil, Toba Regency

P127A

WASTE POTENTIAL AND LOGGING TIMES IN PEOPLE'S TEAK FORESTS

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Abstract. The process of logging is a crucial part of forest product harvesting, and it plays a significant role in utilizing forest resources. However, current logging activities often lead to a high level of waste, indicating a lack of efficient resource use. This research aims to analyze the logging activities in community teak forests, assess the potential for waste and logging time, and identify the factors contributing to excessive waste and logging time in these forests. The goal is for the findings to provide valuable information for community teak forest managers and forestry agencies, aiding them in formulating policies related to teak logging. The research methodology involves using a descriptive approach to comprehensively describe and explain the logging activities in teak forests. The research followed a quantitative approach, involving the recording and analysis of data such as length, diameter, and volume. It focused on community teak forest stands that were cut down in the research location. The analysis consisted of two stages: potential logging waste and logging time. The results revealed that the largest waste potential came from branch waste, followed by waste above branch-free, stump waste, and main stem waste. Branch waste and waste above branch-free were identified as suitable raw materials for furniture. The logging activities were found to be quite slow, with the diameter of the stump and the volume of wood identified as the main factors contributing to the large potential waste and time in community teak forests.

Keywords: waste potential, logging time, and community teak forests.

P128A

BABALAN WATERSHED: CURRENT STATUS AND MANAGEMENT STRATEGY SUPPORTS SUSTAINABLE DEVELOPMENT GOAL

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The Babalan Watershed is one of the critical watersheds in North Sumatra, Indonesia, and is of significant environmental, economic, and social importance. This research aims to assess the current status of the Babalan Watershed and analyze watershed management strategies that support the Sustainable Development Goals (SDGs). This research combines geographical information system (GIS) analysis, field surveys to evaluate watershed conditions and laboratory data analysis. Focus Group Discussions with stakeholders were also conducted to develop watershed management strategies using SWOT analysis. The monitoring and evaluation results show that the total value of the watershed carrying capacity reached a score of 94. Based on Minister of Forestry Regulation Number 61 of 2014, it is included in the "medium" criteria. The condition of the water system in the Babalan watershed is considered quite good because the flow regime coefficient value is low. That means the land's ability to hold and store water quite well. The results of this research highlight the importance of integrated watershed management, emphasizing the role of reforestation, soil, and water conservation, as well as community-based initiatives in increasing the resilience of watersheds to climate change. The proposed management strategies focus on balancing environmental conservation with sustainable economic development. These include promoting agroforestry, improving land-use planning, and strengthening local governance. By aligning these strategies with the SDGs, the Babalan Watershed can serve as a sustainable water management model in Indonesia, contributing to long-term environmental sustainability and community well-being.

Keywords: Babalan Watershed, sustainable development, watershed management, climate resilience, SDGs.

P129A

ENHANCING TOMATO PRODUCTION WITH LIQUID ORGANIC FERTILIZER AND GROWING MEDIA COMBINATIONS

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Tomato plants are one of the vegetable commodities that have high economic value. One of the efforts to increase optimal tomato production can be made by applying the appropriate composition of planting media and concentration of liquid organic fertilizer. This study aims to determine the effect of liquid organic fertilizer concentration and the combination of growing media on the growth and yield of tomato plants. This research is a factorial experiment with a completely randomized design consisting of 2 factors and repeated 3 times. The first factor is the concentration of liquid organic fertilizer which consists of 4 treatment levels. Meanwhile, the second factor is the composition of planting media which consists of 3 treatment levels. The results showed an interaction between the number of fruits per harvest period and fruit weight per harvest period. Treatment of fruit weight per fruit and fruit set significantly influenced the single treatment. The test results of vitamin c content in tomato fruit, the highest result is 22.43 mg/100 g. The treatment of planting media composition of soil: husk charcoal: cow dung (1:1:1) gave the best results on the parameters of fruit weight per fruit (37.48 grams), and fruit set (61.90%). The treatment of liquid organic fertilizer concentration of 3ml/l gave the best results on fruit weight per fruit (38.17 grams), and fruit set (62.02%). The combined treatment of POC NASA concentration of 3 ml/l and the composition of planting media soil: husk charcoal: cow dung (1:1:1) gave the best results on the parameters of the number of fruits per harvest period (11.33 fruits) and fruit weight per harvest period (450.13 g) in the 3rd harvest period.

***Keywords**:* Liquid organic fertilizer, planting, tomato

P130A

DYNAMIC SIMULATION OF LAND MANAGEMENT FOR CORN CULTIVATION ON CRITICAL LAND IN PASURUAN DISTRICT

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The activity of managing land resources is essentially an attempt to balance existing land conditions with agricultural commodity requirements. A dynamic system is described, modeled, and simulated using system dynamics. The study's goal was to create a dynamic model scenario for land management in Pasuruan Regency for maize growing on important land. The model simulation was created with Powersim Studio Express Ver. 10 software, while data processing was handled with Microsoft Office 2016. Using a model simulation scenario (25% erosion control fund), the physical sustainability sub-model indicates that there is a trend of increasing the extent of covered land followed by a decrease in annual erosion weight. The corn farming revenue obtained by the economic sustainability sub-model at the conclusion of the projection year was Rp. 10,961,909, indicating that the corn farming is capable of providing economic welfare for the business players to a greater extent when revenue value increases. In addition, the research's findings inspire actionable steps to be taken from the public's thinking revolution, including a willingness to invest money in erosion prevention projects.

***Keywords**:* Critical Land, Corn, Land Management, and Dynamic Models.

P131A

NUMERICAL STUDY OF NOZZLE TILT VARIATION ON PELTON TURBINE PERFORMANCE

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Pelton turbines are the most efficient type of water turbine when compared to other types of water turbines. Pelton turbines consist of a set of blades that are rotated by water sprayed through a nozzle. The function of the nozzle is to direct the water jet to the blade, converting pressure into kinetic energy with the speed of the water entering the tubin chamber. So in this case the author aims to conduct an analysis that focuses on the variation of the nozzle angle with a tilt of 90 ° and 65 ° using two nozzles with positions A and B in the hope of getting the results of using a nozzle that can maximise performance on the pelton turbine. The method used in this research is using CFD Simulation by finding the input value of pressure (Pa) and flow rate (m/s) from the flow discharge parameter (Q) of 50 l/m, then calculations are carried out to obtain the value of pressure and flow rate on the nozzle. By conducting the method used, the researcher obtained the results in the form of the highest pressure value at the position of nozzle A 65° inclination angle of 108604 N/m^3 with a flow rate of 9.221 m/s. The conclusion that can be obtained in this study is that the more precisely positioned the nozzle inclination angle, the more it will maximise the value of the parameters used.

Keywords: Pelton Turbines, Water Turbine, Nozzle Spray, Nozzle Tilt, CFD.

M210A

MACHINE LEARNING ASSISTED SCANNING OF PYRIMIDINE-PYRAZOLE DERIVATIVE COMPOUNDS AS STEEL CORROSION INHIBITORS IN HYDROCHLORIC SOLUTION

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Industrial production often suffers due to corrosion that leads to decreased equipment performance and its shorter lifespan. This analysis sought to evaluate the performance of pyrimidine-pyrazole derivatives as corrosion inhibitors for steel in hydrochloric acid using machine learning methods to forecast the efficiency based on their electronic features. The electronic features of pyrimidine-pyrazole derivatives were then predicted using a variety of machine learning algorithms including K-Nearest Neighbors (KNN), Support Vector Regression (SVR), Extreme Gradient Boosting (XGB), Gradient Boosting (GB), Extra Trees (ET), and Artificial Neural Network (ANN). The relationship connecting corrosion inhibitor performance and the electronic properties found in DFT simulations was established. To represent the compounds' chemical structure SMILES and AlvaDesc descriptors were utilized. To boost performance of the model, RFE decreased the number of descriptors. The quality of the models was assessed through an examination of R^2. KNN resulted in an R^2 of 82.35%, SVR hit 89.67%, while GB got a R^2 of 93.24%. ET secured an R^2 of 90.78%, and ANN managed an impressive R^2 of 88.93%. The XGB model obtained the best precision with an R^2 of 96.50%, thus being the most efficient approach. To validate the models, this paper also compared the predicted results with past experimental findings. The analysis shows that the most accurate method for estimating the degree to which pyrimidine derivatives inhibit corrosion is the XGB model, with an accuracy of 96.50%. The time and cost associated with finding effective corrosion inhibitors for steel in chemical solutions were significantly reduced by this method.

Keywords: Organic Inhibitors, Pyrimidine-Pyrazole, Machine Learning, KNN, SVR, XGB, GB, ET, ANN, DFT

M211A

INTEGRATING FOOD TECHNOLOGY AND POLYMER FOR SUSTAINABLE AGRICULTURAL PRACTICES: ENHANCING TOMATO SHELF LIFE WITH NATURAL COATINGS

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In the realm of advanced food technology, coatings play a pivotal role in enhancing the shelf life and quality of fresh produce. This study investigates the application of a D-Limonene and carrageenan-based coating on tomatoes, focusing on its effects on moisture retention, pH stability, and antioxidant activity. The coating, derived from natural polymer and essential oil, is evaluated for its potential to reduce water loss, extend shelf life, and preserve the quality of tomatoes under various storage conditions. Experimental results reveal that the D-Limonene coating enhances moisture content, especially under room temperature conditions, with a notable increase in water retention compared to uncoated tomatoes. pH analysis further indicates that the coating helps maintain acidity, a critical factor in flavor preservation and microbial growth inhibition. Additionally, the coating demonstrates antioxidant potential, effectively scavenging DPPH radicals, particularly at lower concentrations. The findings underscore the importance of integrating polymer technology and food science to create sustainable post-harvest solutions. By combining natural materials like carrageenan and essential oils, this research contributes to eco-technology approaches for reducing food waste and improving agricultural sustainability.

Keywords: Coating, Polymer technology, Food preservation, Moisture retention, Antioxidant activity

M212A

BIOLOGICAL ACTIVITY OF MAHOGANY BARK (*Swietenia mahagoni* (L.) Jacq) GROWING AT DIFFERENT ALTITUDES IN BARRU REGENCY, SOUTH SULAWESI

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Mahoni is a multipurpose plant whose bark is used as a natural dye and an ingredient in traditional medicine in addition to its wood, which is widely used as a raw material for the furniture industry. This study aims to examine the biological activity of mahogany bark extract against *Staphylococcus aureus* and *Escherichia coli* bacteria. In Barru District, South Sulawesi Province, trees growing at 8, 23, and 68 meters above sea level provided the mahogany bark sample. The maceration method was used in the extraction procedure using methanol as the solvent. The methanol extract was then subjected to the agar diffusion method. This method involves placing paper disks soaked in the extract on an agar plate inoculated with the test microorganisms. The extract diffuses into the agar, creating a concentration gradient that inhibits the growth of the microorganisms. The study's findings show that extracts from the bark of mahogany trees grown at elevations of 8, 23, and 68 meters above sea level have inhibitory effects on E. coli bacteria of 6.59 mm, 7.73 mm, and 6.43 mm, respectively, compared to 15.33 mm for the control group. In the meantime, with control of 14.49 mm, the inhibitory strength against S. aureus bacteria was 9.92 mm, 10.26 mm, and 9.58 mm, respectively. Therefore, it can be concluded that mahogany bark extract exhibits antibacterial activity, which makes it a possible option for use as an antimicrobial drug's raw material.

Keywords: Bark, mahogany, *Escherichia coli*, *Staphylococcus aureus*

M213A

EXPLORING THE IMPACT OF BREWING TECHNIQUES AND ROASTING LEVELS ON THE METABOLOMICS AND ANTIOXIDANT PROFILE OF *COFFEA LIBERICA*, *COFFEA ARABICA*, AND *COFFEA CANEPHORA*

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Apart from being a widely consumed beverage, coffee is a rich source of bioactive components that have possible benefits for health. Emphasizing differences in roasting degree and brewing technique, this study investigates the metabolomics profile and antioxidant capacity of three different species of coffee: *Coffea liberica*, *Coffea arabica*, and *Coffea canephora*. Metabolomic profiling was conducted using LC-MS/MS, allowing the identification and quantification of key metabolites such as chlorogenic acids, caffeine, and Maillard reaction products on a variety made by immersion (infusion and French press), pour-over (V60), and espresso. In addition, we assessed the impact of light, medium, and dark roasting levels on antioxidant capabilities using DPPH and FRAP tests, as well as total phenolic content (TPC) and total flavonoid content (TFC). Notable outcomes for *Coffea liberica* revealed that light roasted brewed with V60 retained the highest TPC (21.05 ± 1.27 GAE µg/mL), TFC (42.73 ± 1.00 µg/mL), DPPH (82.77% radical scavenging activity), and FRAP (121.84 ± GAE µg/mL). In contrast, medium and dark roasts showed decreased antioxidant capacities for TPC, TFC, DPPH, and FRAP, respectively. Furthermore, light roasted brew preserved higher levels of chlorogenic acids, underscoring their superior antioxidant potential. This comprehensive study highlights the complex interactions between coffee species, roasting levels, and brewing methods in determining both the chemical composition and antioxidant potential of coffee brews. The findings have important implications for optimizing coffee preparation to enhance its health benefits.

Keywords: Coffee species, roasting degree, brewing methods, metabolomics profiling, antioxidant capacity

M215A

MAPPING VEGETATION DYNAMICS AND COASTLINE CHANGE USING REMOTE SENSING TECHNIQUES IN PANTAI CERMIN, SERDANG BEDAGAI, NORTH SUMATRA

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Coastal regions are important not only for their biological value, but also as economic and cultural hubs for human populations around the world. Coastal areas face a variety of issues arising from coastal changes, such as accretion and abrasion, which are further intensified by human-induced modifications in land use and land cover. This study aims to analyze changes in coastline and changes in vegetation density in Pantai Cermin District, Serdang Bedagai district. This study used remote sensing methods to calculate the extent of coastline change in Pantai Cermin District, Serdang Bedagai regency using Landsat imagery in 2011 and Sentinel-2 for 2016 and 2021. Changes in vegetation, especially in coastal areas, can cause changes in the coastline. Changes in vegetation density were analyzed by performing NDVI transformations images, while coastline changes were analyzed using Digital Shoreline Analysis System (DSAS), then analyzed the relationship between changes in vegetation density and changes in coastline. From the results of the study obtained in 2011-2021 there was a change in the coastline of 196.36 Ha with a more dominating abrasion value of 107.98 Ha higher than accretion. The results of the analysis show a relationship between changes in the coastline that have occurred with vegetation density in Pantai Cermin District. The results showed that changes in the coastline were dominated by erosion. In the area, there had been mangrove damage in Pantai Cermin District. Therefore, it is necessary to rehabilitate or restore mangroves in Pantai Cermin District for the preservation of the ecosystem and the economic benefits of the surrounding community.

Keywords: coastline, DSAS, NDVI, remote sensing

M216A

PREVALENCE AND ANTIBIOTIC RESISTANCE OF *ENTEROCOCCUS FAECIUM* AND *E. FAECALIS* IN MUNICIPAL WASTEWATER INTEGRATED WITH HOSPITAL EFFLUENT IN NORTHERN MALAYSIA

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Antibiotic resistance is a critical global health crisis, with *Enterococcus faecium* and *Enterococcus faecalis* emerging as significant multidrug-resistant pathogens. The Malaysia National Surveillance of Antimicrobial Resistance Report highlights a concerning rise in resistant strains, particularly to ampicillin, gentamicin, vancomycin, and linezolid. This study investigates the abundance and antibiotic resistance of *E. faecium* and *E. faecalis* from municipal wastewater integrated with hospital effluent in northern Malaysia from October to December 2023. Wastewater samples were serially diluted and plated on *E. faecium* chromogenic agar, with colony-forming units (CFU/mL) calculated. A total of 90 isolates were selected for analysis, and antibiotic susceptibility was assessed using the Kirby-Bauer disk diffusion method against six antibiotics, determining the Multiple Antibiotic Resistance (MAR) index. Results indicated a higher prevalence of *E. faecalis* (3.60×10^2 to 2.00×10^4 CFU/mL) compared to *E. faecium* (5.00×10^1 to 8.00×10^3 CFU/mL). Among 37 *E. faecium* isolates, resistance rates were: ampicillin (16%), gentamicin (3%), vancomycin (0%), chloramphenicol (5%), ciprofloxacin (16%), and linezolid (11%). For 53 *E. faecalis* isolates, resistance rates were: ampicillin (13%), gentamicin (2%), vancomycin (9%), chloramphenicol (11%), ciprofloxacin (2%), and linezolid (4%). The MAR index ranged from 0.16667 to 0.83333 for *E. faecium* and from 0.16667 to 0.33333 for *E. faecalis*, suggesting a greater potential public health threat from *E. faecium*. These findings underscore the urgent need for enhanced surveillance and targeted interventions to address the spread of antibiotic-resistant enterococci in wastewater systems. Increased awareness and proactive measures are essential to mitigate the public health risks posed by these resistant strains in both environmental and clinical settings.

***Keywords**:* Antibiotic Resistance, *Enterococcus faecium*, *Enterococcus faecalis*, Municipal Wastewater, Hospital Effluent

M217A

PATTERNS OF ANTIBIOTIC RESISTANCE IN STAPHYLOCOCCI ASSOCIATED WITH BOVINE SUBCLINICAL MASTITIS

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Bovine mastitis, a common disease in dairy cattle, leads to significant economic losses, particularly due to subclinical mastitis (SCM), which spreads undetected. Staphylococci, especially *Staphylococcus aureus* and coagulase-negative staphylococci (CoNS), are major mastitis pathogens in Asia. The widespread use of antibiotics has contributed to the emergence of multidrug-resistant (MDR) bacteria, posing risks to both animal health and food safety. Monitoring antibiotic resistance is crucial for an effective mastitis management and ensuring public health. The aim of this study is to identify the staphylococci associated with SCM in bovine milk and to assess their antibiotic resistance profiles. This study investigates SCM in bovine milk from a dairy farm in Malacca, Malaysia, using milk samples collected from 20 cows in August and October 2023. SCM was diagnosed via the California Mastitis Test (CMT), and bacterial isolates were cultured on Mannitol Salt Agar (MSA). Antibiotic susceptibility was assessed using the Kirby-Bauer disk diffusion method. This study assessed SCM and bacterial isolates in bovine milk. The CMT revealed that 56% of samples were SCM-positive. From 153 isolates obtained via MSA, 84 were identified as presumptive coagulase-positive staphylococci (CoPS) and 69 as CoNS. Antibiotic resistance profiling indicated 52% resistance to penicillin, 12% to cefoxitin, and 5% to tetracycline, while all were susceptible to erythromycin. This study highlights the significance of SCM and the necessity for monitoring antibiotic resistance in dairy cattle. These findings suggest that in general the emergence of antibiotic resistance in bovine SCM is associated with the recurrent and excessive use of antibiotics in dairy management. Continuous monitoring of these resistance patterns is vital for developing effective control strategies in veterinary practice and combating antibiotic resistance in animal health.

***Keywords**:* Bovine mastitis, Subclinical mastitis, Staphylococci, Antibiotic resistance

M218A

PHOTOELECTRODE MATERIALS FOR GREEN HYDROGEN PRODUCTION: A CONCISE OVERVIEW

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The production of green hydrogen via photoelectrochemical (PEC) water splitting represents a promising pathway for sustainable energy generation, harnessing sunlight to split water into hydrogen and oxygen. At the heart of this technology are photoelectrode materials, which play a critical role in determining the efficiency, stability, and scalability of hydrogen production systems. This overview presents the fundamental properties required for photoelectrodes, including suitable bandgap, high light absorption efficiency, and stability in aqueous environments. We also briefly discuss the performance of various material classes such as metal oxides, nitrides, phosphides, chalcogenides, perovskites, and hybrid materials, highlighting their strengths and challenges. Additionally, we address advances in surface engineering, including nanostructuring and protective coatings, which aim to enhance efficiency and durability. We conclude by exploring emerging trends in materials research and opportunities for future advancements that could accelerate the commercialization of PEC-driven green hydrogen production.

Keywords: Green hydrogen, photoelectrochemical water splitting, sustainable energy, photoelectrode materials

M219A

CRITICAL CULTIVATION PARAMETERS FOR OPTIMIZED ASTAXANTHIN BIOSYNTHESIS IN *HAEMATOCOCCUS PLUVIALIS*: A SYSTEMATIC REVIEW

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Haematococcus pluvialis is a significant natural source of astaxanthin, a carotenoid with potent antioxidant properties. Optimizing cultivation parameters is critical in enhancing astaxanthin production for various industrial applications. Despite substantial research, there is a need to consolidate evidence on the best cultivation conditions for *H. pluvialis*. This review aims to identify the most effective cultivation parameters for maximizing astaxanthin production in *H. pluvialis*. Following the PRISMA 2020 guidelines, a systematic search was conducted across multiple databases, including Scopus, Web of Science, and PubMed. Studies evaluating the effects of specific cultivation parameters on astaxanthin production in *H. pluvialis* were screened. Data extraction focused on experimental designs, cultivation methods, and astaxanthin yield. The risk of bias was assessed using the Cochrane Risk of Bias tool for laboratory-based studies and meta-analyses were performed where applicable. Preliminary findings suggest that factors such as high light intensity, specific nutrient limitations, nitrogen deprivation, and high salinity are key contributors to increased astaxanthin accumulation. Further analysis should focus on identifying optimal temperature ranges and inoculum concentrations. This review has identified key cultivation parameters that drive astaxanthin production in *H. pluvialis*. The findings may assist in refining cultivation strategies for commercial production. Future research should focus on standardizing experimental protocols to ensure better comparability across studies.

Keywords: *Haematococcus pluvialis*, astaxanthin, cultivation parameters, stress conditions, carotenoids

P220A

PROXIMATE COMPOSITION, THERMAL AND RHEOLOGICAL PROPERTIES OF ICE CREAM SUBSTITUTED WITH DIFFERENT PROPORTIONS OF PALM SUGAR AS NATURAL SWEETENER

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Ice cream is a frozen dessert made primarily from milk, skimmed milk, and whipping cream, and is sweetened with either sugar or artificial sweeteners. As consumers increasingly lean towards healthier food choices, developing ice cream varieties that reduce sugar intake has become a key focus in the food industry. This shift is largely motivated by the awareness that consuming calorie-dense foods can lead to serious health problems like obesity and diabetes, especially in children and young adults. However, substituting ingredients in ice cream formulations can significantly impact its properties. Thus, this study aims to evaluate the proximate composition, thermal, and rheological properties of ice cream formulated using palm sugar as a sweetener. Five ice cream formulations were tested, each containing different ratios of sucrose to palm sugar: F1 (100:0), F2 (80:20), F3 (50:50), F4 (20:80), and F5 (0:100). The proximate composition was analyzed using AOAC methods. To assess thermal behavior, a Differential Scanning Calorimeter (DSC) was employed to measure the enthalpy values, while a rheometer was used to conduct both steady flow and dynamic rheological analyses. Incorporating palm sugar as a sweetener led to notable changes, with an increasing trend in moisture, protein, and fat content as the amount of palm sugar increased. As the proportion of palm sugar rose, the enthalpy of melting decreased. Additionally, the storage modulus (G') was lower than the loss modulus (G") across all formulations, indicating the ice cream's viscous nature. These results suggest that palm sugar has the potential to be successfully used in ice cream production.

Keywords: Palm Sugar, Ice Cream, Proximate Composition, Thermal Behaviour, Rheology

P221A

PITCH STUDY OF BIFACIAL PHOTOVOLTAIC SYSTEM DESIGN USING PVSYST: A CASE STUDY IN PUNCAK ALAM, MALAYSIA

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Bifacial photovoltaic (bPV) modules or solar panels represent a significant advancement in photovoltaic (PV) technology, offering increased efficiency and energy yield compared to traditional monofacial PV (mPV) modules. Unlike mPV module, which capture sunlight only on their front surface, bPV modules are designed to absorb light on both their front and rear surfaces. This study presents the design of a 36.4 kW fixed tilted ground-mounted bifacial grid-connected photovoltaic (bGCPV) system for a selected location in UiTM Puncak Alam, Selangor, using PVsyst software. The PVsyst version 7.4 software was used to simulate the design, focusing on optimizing a specific bGCPV system design parameter which is pitch variation and its impact on system performance. In this simulation the design parameter such as tilt angle, orientation, module height, and albedo are chosen to be 11˚, 0˚, 1.5 m, and 0.30, respectively. This study focus only on system with 2 modules in height with portrait orientation. The variation of pitch values between 3.0 m to 20.0 m were analysed, where the range for the optimal pitch of the simulated system were obtained to be 4.0 m to 6.0 m. This simulation revealed that by increasing the pitch value, the energy yield will be enhanced, however this increment reaches a saturated point where this point is an optimal pitch value for the system. This study provides insight for PV industry in choosing the optimal pitch value for their solar system.

Keywords: Bifacial photovoltaic system; Pitch; Produced Energy; Ground Coverage Ratio; Energy Yield

P223A

A COMPARATIVE STUDY OF DEMINERALIZATION AND PHYSICAL ACTIVATION IN ENHANCING THE POROSITY AND ADSORPTION PROPERTIES OF RECOVERED CARBON BLACK PYROLYZED FROM WASTE TIRE

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Annually, over 1 billion tires are discarded worldwide, leading to significant environmental issues stemming from inadequate recycling options. Pyrolysis exhibits potential by transforming waste tires into recovered carbon black (rCB), a material with potential for use as an adsorbent. The adsorption efficiency of rCB is constrained by its inadequate porosity and high ash content. This research aims to improve the porosity structure and adsorption characteristics of rCB using two main techniques: demineralization and physical activation. Hydrochloric acid at various concentrations (0, 1, 5, 6, 10 M) was employed for demineralization, followed by the addition of 6 M potassium hydroxide (KOH). Physical activation was conducted at temperature range of 300, 350, 400, 450, and 500 °C for durations of 1, 2, and 3 hours. Demineralization decreased the ash content from 11.36% to 8.05% and removed iron (Fe) and magnesium (Mg). Nonetheless, there were minimal enhancements in the Brunauer-Emmett-Teller (BET) surface area and iodine adsorption number (IAN) due to limited pore development. Conversely, physical activation markedly enhanced the porosity of rCB, attaining a peak BET surface area of 127.56 m2/g and an IAN of 100.01 mg/g at 450 °C for 1 hour. Increased temperatures resulted in pore collapse, especially at 500 °C. The findings indicate that short physical duration significantly enhances the structure of rCB. This facilitates the widespread use of treatment for environmental remediation, including the treatment of wastewater containing dyes.

***Keywords**:* recovered carbon black (rCB), waste tire, demineralization, physical activation, surface area, porosity, adsorption

P224A

STRUCTURAL DESIGN OF MACROPOROUS LAYERED DOUBLE HYDROXIDE CATALYSTS: ALLEVIATING MASS TRANSPORT CONSTRAINTS IN BULKIER TRIGLYCERIDES

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Layered double hydroxides (LDHs) serve as potential catalysts for biodiesel production through triglyceride (TAG) transesterification; nevertheless, mass transport limitations hinder their effectiveness, especially with larger TAG molecules. This study addresses this limitation by synthesizing macroporous MgAl and ZnAl layered double hydroxides (LDHs) using a polystyrene templating method. Thorough characterization reveals the successful formation of macroporous structures with significantly increased the physiochemical properties and its structural design compared to conventional LDHs. XRD confirmed the successful restoration of the LDH structure following calcination and rehydration, with enhanced crystallinity seen in the macroporous materials. The BET surface area analysis revealed a substantial increase (~10x for MgAl) in the macroporous layered double hydroxides (LDHs). SEM and TEM images demonstrated the macroporous network with average pore diameters ~300 nm, consistent with the dimensions of the polystyrene template. The XPS analysis revealed slight changes in surface elemental composition and oxidation states, indicating the impact of the macroporous structure on surface properties. Catalytic testing with various TAGs (C4-C18) demonstrates a notable enhancement in catalytic activity, particularly for higher TAGs, due to improved mass transfer. The turnover frequencies of macroporous materials significantly exceed those of conventional LDHs, exceeding them by approximately 20 times for the MgAl system and 15 times for the ZnAl system. The findings highlight the efficacy of macroporous LDHs as very effective catalysts for biodiesel production, overcoming the inherent mass transfer limitations of conventional LDH catalysts.

***Keywords**:* layered double hydroxides (LDH), macroporous, triglycerides, mass transfer, biodiesel

P225A

COMPARATIVE EFFECTS OF LONG-TERM VS. SHORT-TERM COFFEE CONSUMPTION ON METABOLIC HEALTH: A SYSTEMATIC REVIEW

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Coffee consumption is linked to various health outcomes, particularly its potential role in obesity risk management. While long-term coffee intake has been associated with sustained metabolic benefits, the effects of short-term consumption warrant further exploration. This systematic review aims to compare the metabolic effects of long-term versus short-term coffee consumption through a comprehensive analysis of available studies, focusing on energy balance, lipid metabolism, and appetite regulation. This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A thorough literature search was conducted in Scopus, Web of Science (WOS), and Google Scholar to identify studies published until 2024. The review included longitudinal and observational studies examining long-term coffee consumption effects, alongside clinical trials, cross-sectional, and case-control studies focused on short-term consumption. Studies not published in English, reviews, and meta-analyses were excluded. Study quality using Newcastle-Ottawa Scale (NOS) were reported. Evidence indicates that long-term coffee consumption is associated with favorable metabolic outcomes, including improved lipid profiles, enhanced insulin sensitivity, and beneficial changes in gut microbiota. Conversely, short-term coffee intake has been shown to acutely influence energy expenditure, appetite regulation, and lipid metabolism. Notably, the bioactive compounds in coffee, such as caffeine and polyphenols, may play critical roles in mediating these effects, with variations observed based on individual lifestyle factors and consumption patterns. The metabolic effects of coffee consumption differ significantly between long-term and short-term intake, highlighting the complexity of coffee's role in obesity risk management. This review underscores the need for further research to elucidate the mechanisms involved and to provide clearer dietary recommendations regarding coffee consumption for obesity prevention and metabolic health.

Keywords: Coffee consumption, obesity, lipid metabolism, metabolic health

P226A

INNOVATIVE UTILISATION OF FERRITE MAGNETIC NANOPARTICLES WITH ELECTROMAGNETIC FIELD PROPAGATION FOR ENHANCED OIL RECOVERY USING 3-D FINITE ELEMENT METHODS

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Exploring advanced technologies for enhanced oil recovery (IOR) is essential for extending the productive lifespan of oil reservoirs. This study introduces an innovative use of ferrite magnetic nanoparticles (FMNPs) in conjunction with electromagnetic field (EMF) propagation to improve oil recovery processes. We use three-dimensional finite element methods (FEM) to construct a model and simulate the interaction between FMNPs and electromagnetic fields (EMFs) inside the porous medium of an oil reservoir. The FMNPs are engineered to respond to electromagnetic fields, resulting in localized heating and a reduction in the viscosity of crude oil, hence facilitating its flow and extraction. The 3-D Finite Element Method (FEM) simulations provide a comprehensive analysis of temperature distribution, fluid dynamics, and magnetic field interactions. These simulations provide critical insights into optimizing nanoparticle concentration, electromagnetic field (EMF) frequency, and field intensity to maximize recovery efficiency. The findings demonstrate a significant enhancement in the displacement and recovery rates of oil, highlighting the potential of this technology as a transformative approach to enhanced Oil Recovery (EOR). The study evaluates the method's scalability, environmental impact, and economic viability, suggesting a possible use in practical scenarios.

Keywords: IOR, FMNPs, FEM, EMF, Economic Feasibility,

P227A

DOUBLE-LAYERED TIN-POLYDIMETHYLSILOXANE (PDMS) COMPOSITES: EVALUATION OF POROSITY AND STRUCTURAL MORPHOLOGY OF POLYMERIC COMPOSITES

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Radioactive material exposed unwanted exposure to patients and medical workers when handling it due to high-energy photon emitted. The pursuit of advanced materials for radiation protection has led to significant performance of the composite, combining different substances to strengthen and address specific needs. Porosity is one of the parameters that determine the performance of the composite. The porosity of the metal-polymer composite influenced the radiation protection performance. Lower porosity and gap in the composite are associated with high radiation protection performance as the gaps that allow radiation to pass through have reduced. A recent study focused on the particle distribution of fillers which reduces porosity and enhances mechanical properties and radiation protection performance. In this manuscript, the structural morphology of the tin-PDMS composite will be discussed. This includes density, particle distribution, and oxygen composition from Field Emission Scanning Electron Microscopy (FESEM-EDX), Fourier Transform Infrared Spectroscopy (FTIR), and percentage of porosity for different compositions of composite by using ImageJ. In addition, the porosity of the composite will be discussed by data of ImageJ analysis to detect the gap pores and gaps in the composite.

Keywords: Double layer composite, metal-polymer, porosity, radiation shielding

P229A

MOLECULAR INSIGHTS INTO KOMBUCHA TEA: A FUNCTIONAL FOOD PERSPECTIVE

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Kombucha, a fermented tea beverage produced by a symbiotic culture of bacteria and yeast, has gained popularity due to its diverse bioactive compounds and potential health benefits. Variations in the tea base, such as green tea (*Camellia sinensis*), agarwood tea (*Aquilaria malaccensis*), and moringa tea (*Moringa oleifera*), are believed to influence kombucha's physicochemical properties and metabolite profiles. This systematic review aims to compare the physicochemical and metabolite profiles of kombucha prepared with green tea, agarwood tea, and moringa tea. This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A thorough literature search was conducted in Scopus, Web of Science (WOS), and PubMed to identify studies published until 2024. The review included the details of organic acid levels, polyphenol content, antioxidant properties, and microbial profiles of kombucha derived from specified tea types. Studies not published in English, reviews, and meta-analyses were excluded. Study quality using Newcastle-Ottawa Scale (NOS) were reported. Significant differences were found in the bioactive profiles of kombucha from various tea bases. Agarwood tea kombucha showed increased phenolic content post-fermentation. Moringa tea kombucha exhibited elevated levels of phenolics, flavonoids, and antioxidants after eight days. Green tea kombucha maintained a higher pH than moringa tea kombucha, demonstrating notable antibacterial effects. Additionally, kombucha blends with moringa and aloe vera showed enhanced antioxidant activity. The choice of tea base significantly impacts kombucha's physicochemical and metabolite profiles, influencing its potential health benefits and suitability for functional food applications. Each type offers unique bioactive profiles that may cater to different health needs. Further research is needed to optimize kombucha formulations based on tea type.

Keywords: Kombucha, green tea, agarwood tea, moringa tea, bioactive compounds

P230A

A COMPARATIVE STUDY OF DIFFERENT THRESHOLDING TECHNIQUES IN SEGMENTING POROUS GALLIUM NITRIDE IN FIELD EMISSION SCANNING ELECTRON MICROSCOPY IMAGES

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The analysis of porous Gallium Nitride (GaN) structures is critical for understanding the optoelectrical properties of photodetector devices. This study presents a comparative evaluation of three image thresholding techniques Otsu's thresholding, Niblack thresholding, and adaptive thresholding for the quantitative and qualitative analysis of porous GaN nanostructures using Field Emission Scanning Electron Microscopy (FESEM) images. Quantitative evaluation focuses on porosity and average pore size while qualitative is a visual interpretation by the expert in the field. The results indicate that adaptive thresholding yields the highest porosity value at 55.19%, whereas Otsu's thresholding identifies the largest pore size, measuring 7.01 pixels. Meanwhile, feedback from the experts in the field suggested that all thresholding techniques used in the study were moderately satisfactory in segmenting the porous GaN. However, 55.60% of the scholars agree that adaptive thresholding is recommended among the stated techniques. In conclusion, based on the results, the study suggests using adaptive thresholding in the quantitative analysis of porous GaN.

***Keywords**:* Etching, Gallium Nitride, Image Processing, Porous, Thresholding

P231A

EVALUATING THE EFFICICANCY OF PETROLEUM BASED POLYURETHANE VERSUS GREEN POLYURETHANE: A COMPARATIVE STUDY ON THE PHYSICAL, MECHANICAL AND MORPHOLOGICAL PROPERTIES FOR ENHANCING GROUTING APPLICATION

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Polyurethane has become an essential material in the construction industry, particularly in grouting applications, due to its strong adhesive and sealing properties. Traditionally, industrial polyurethanes derived from petrochemical sources have been widely used. However, growing environmental concerns have prompted the development of greener alternatives made from renewable sources, incorporating different blowing agents. This study compares three types of polyurethane: industrial polyurethanes, eco-friendly versions using 1,1-dichloro-1-fluoroethane (HCFC 141b), and eco-friendly polyurethanes with water as the blowing agent. Their physical, mechanical, and morphological properties were evaluated. The foam reaction times of all polyurethane types met standard benchmarks for grouting materials, with cream times ranging from 10 to 20 seconds and rise times exceeding 48 seconds. The castor polyol-based, water-blown polyurethane exhibited the lowest apparent density while maintaining significant mechanical strength compared to petroleum-based polyurethanes. All polyurethane samples demonstrated compression strengths and moduli above the standard values for grouting materials (compression strength: 30–150 kPa; modulus: 150–500 kPa). FTIR analysis confirmed full curing across all samples, with the expected chemical bonds present. Morphological analysis revealed a uniform cell structure in all types, despite variations in cell size, resulting in no gaps between cells, contributing to their strong mechanical performance. This study identifies green polyurethane as offering superior performance for the grouting industry, presenting it as a viable replacement material with reduced environmental impact.

***Keywords**:* Polyurethane; Castor Oil Polyol; Different Blowing Agent; Physical properties; Compression strength

M311A

COFFEE AS A FUNCTIONAL FOOD: DOES BREWING METHOD MATTERS?

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Coffee is one of the most widely consumed beverages globally and is increasingly recognized for its potential as a functional food due to its rich content of bioactive compounds. Beyond its stimulant effects, coffee contains polyphenols, diterpenes, and other compounds that have been linked to numerous health benefits, including antioxidant, anti-inflammatory, and neuroprotective properties. Understanding how different brewing methods influence the abundance and activity of these compounds is critical for maximizing health benefits and aligning coffee consumption with personalized nutrition strategies. This systematic review aims to determine the types of active compounds in coffee with beneficial health effects and assess which brewing methods—such as espresso, French press, cold brew, or filtered—result in the highest concentrations of these compounds. By identifying the specific compounds and the brewing techniques that optimize their presence, this research offers insights into how coffee can be tailored to individual health needs, paving the way for its use in precision nutrition and functional food interventions. The findings will not only highlight coffee's role in supporting various health outcomes but also empower individuals to make informed decisions about coffee preparation, ensuring that it can be incorporated into diets based on personal health goals. This research contributes to the growing field of precision functional foods, where dietary components are customized for individual health benefits, offering a novel approach to dietary personalization that goes beyond standard nutritional recommendations.

Keywords: coffee, functional food, cold brew, hot brew, bioactive compounds

M312A

TAILORING OXIDATION DEGREES OF GRAPHENE OXIDE (GO) BASED RECOVERED CARBON BLACK (RCB) OF WASTE TIRE THROUGH VARYING POTASSIUM PERMANGANATE CONCENTRATION

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The disposal of waste tires poses a critical challenge, contributing significantly to environmental degradation and resource waste. This study presents a novel approach to tire recycling, transforming recovered carbon black (rCB) from waste tires into high-value graphene oxide (GO) via a modified Hummers method. GO samples with different oxidation degrees were synthesized from rCB of waste tire through modified Hummers method with varying the concentration of potassium permanganate ($KMnO_4$) at 1g (GO1), 3g (GO3), and 5g (GO5). X-ray diffraction (XRD) confirmed that increased $KMnO_4$ concentrations led to a higher oxidation degree, enhancing the crystallinity and order of the graphene layers. Fourier-transform infrared spectroscopy (FTIR) analysis showed that higher $KMnO_4$ concentrations intensified GO's oxidation level and polarity, evidenced by the prominence O–H stretching (3395 cm^{-1}) in GO5. Morphologically, GO5 exhibited a more aggregated structure and reduced particle size distribution, indicating thorough oxidation. This work demonstrates a tunable oxidation process for GO derived from waste tire rCB, with $KMnO_4$ concentration as a key variable influencing the material's structural and functional properties, underscoring its potential for sustainable applications in material science.

Keywords: Graphene Oxide, Carbon, Waste Material, Tire, Hummer Method.

M313A

CHARACTERISTICS OF GRAPHENE OXIDE-DOPED AND *BASELLA RUBRA* LEAVES EXTRACT MEDIATED GREEN SYNTHESIS OF TiO_2 NANOPARTICLES

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Green synthesis is an inexpensive alternative and fully accessible technique to produce nanoparticles. In this work, green synthesis was carried out using *Basella rubra* leaves extracted using several solvent variations and graphene oxide (GO) doping. The extracts were further used as a medium in green synthesizing TiO_2 nanoparticles (NPs) via the sol-gel method using a precursor of titanium isopropoxide (TTIP). The obtained TiO_2 NPs were characterized by employing infrared spectroscopy (FTIR) for the functional group examination, X-ray diffraction (XRD) for the crystal structure and phase formation, ultraviolet-visible spectroscopy (UV-Vis) for the optical characteristics, and field emission scanning electron microscope equipped with energy dispersive X-ray spectroscopy (FESEM/EDX) for surface morphology and composition. The results from X-ray diffraction showed that the green synthesized TiO_2 NPs have a full anatase crystal structure with a smaller average crystalline size as compared to their commercial counterpart. Elemental composition examination using EDX confirmed the successful green synthesis of TiO_2 NPs based on weight fraction of titanium and oxygen. Surface morphology observation using FESEM shows that the nanoparticles consist of at least two types of particles, namely rugged almost sharp-edged shapes and small uniformly distributed shapes. The optical characteristics analyzed using UV-Vis spectroscopy showed that the green synthesized TiO_2 NPs reduce the band gap energy to 2.85 eV as compared to the commercial pure anatase of 3.2 eV. This finding provides understanding and may open the possibility for more novel environmentally friendly methods in synthesizing nanomaterials for many applications with a sustainable future.

***Keywords**:* Basella rubra, Green Synthesis, Perovskite Solar Cell, Power Conversion Efficiency, TiO_2 Nanoparticles,

M314A

OIL PALM (*Elaeis guineensis*) LEAVES EXTRACT MEDIATED GREEN SYNTHESIS OF TiO_2 NANOPARTICLES AND THEIR OPTICAL CHARACTERISTICS

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Currently, there is a trend to use plant extract-based processes in synthesizing nanomaterials for more eco-friendly methods and sustainable future. This trend is driven by the fact that chemical or physical processes usually used to produce nanomaterials are un-ecofriendly and may impose problems on the environment. In the green synthesis, the plant extract will act as a medium and capping agents that can be further used to control the growth of nanomaterials. This work aims to explore the characteristics of TiO_2 NPs green synthesized via environmentally friendly method using oil palm (*Elaeis guineensis*) leaves extract as a medium and capping agent. The green synthesis was performed by utilizing titanium tetra isopropoxide (TTIP) as precursor in oil palm leaves extracted with different solvent concentration variations. The natural extract was characterized using liquid chromatography-mass spectroscopy (LCMS) and infrared spectroscopy for active chemical contents and functional groups, respectively. The obtained TiO_2 NPs were also characterized using infrared spectroscopy (FTIR) for the functional groups, ultraviolet spectroscopy (UV-DRS) for the optical characteristics, and X-ray diffraction (XRD) for the crystallographic properties. More sophisticated equipment including field emission scanning electron microscopy equipped with energy dispersive X-ray spectroscopy (FESEM/EDX), and Raman spectroscopy were employed to reveal the characteristics of the obtained TiO_2 NPs. The results from X-ray diffraction showed that the obtained TiO_2 NPs are in pure anatase crystal structure. There is also a trend that the optical characteristics in the forms of bandgap energy of the synthesized TiO_2 NPs reduced with use of green medium. This finding provides insight and opens the door for more novel environmentally friendly methods in synthesizing nanomaterials for many applications with a sustainable future.

***Keywords**:* Green synthesis, Nanoparticles, Oil palm, Natural plant extract, Titanium dioxide

M315A

EXPLORING THE CHARACTERISTICS OF TiO_2 NANOPARTICLES GREEN SYNTHESIZED USING GAMBIR (*Uncaria gambir*) LEAVES EXTRACTS

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The most used semiconductor in the DSSC photoanode is TiO_2 nanoparticles (NPs), which are usually synthesized using chemical or physical processes. The main problem in these chemical or physical processes is that they are less environmentally friendly. Therefore, there is a need to synthesize TiO_2 NPs in an eco-friendly way via a green method using natural capping agents derived from plant parts extracts. In this study, gambir leaves extract was used as environmentally friendly natural capping agents in the green synthesis of TiO_2 NPs. The process involved extracting the plant part and further used the extract as a medium in green synthesizing TiO_2 NPs via the sol-gel method. The extracts were examined using liquid chromatography-mass spectroscopy (LCMS) and infrared spectroscopy (FTIR) for the active chemicals and functional groups, respectively. The obtained TiO_2 NPs were characterized using ultraviolet spectroscopy (UV-DRS) for the optical characteristics, X-ray diffraction (XRD) for the crystallographic properties, and field emission scanning electron microscopy equipped with energy dispersive X-ray spectroscopy (FESEM/EDS) for the surface morphology and composition, and Raman spectroscopy to further confirm the characteristics of the obtained TiO_2 NPs. The results from X-ray diffraction showed that the obtained TiO_2 NPs are in pure anatase crystal structure. Further, there is a trend in that the optical characteristics of the synthesized TiO_2 NPs in the forms of bandgap energy reduced with use of green medium. The finding and successful method used in the green synthesis of TiO_2 NPs in this work provides insight and opens the door for more novel environmentally friendly green synthesis for nanomaterials development and sustainable future.

***Keywords**:* Green synthesis, Nanoparticles, Plant extract, Titanium dioxide, *Uncaria gambir*

M317A

IMPACT OF SOCIAL MARKETING INTO PURCHASING BEHAVIOR OF APPAREL PRODUCTS IN MALAYSIA

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Aims of this study is to investigate the factors that can be considered as important factors of consumer purchase behavior. Besides that, the objective of this research is to identify the most influential determinants of consumer purchasing behavior in Malaysia. The independent variables of this study are UGC, FGC, and eWOM. Moreover, one hundred and fifty (150) respondents were collected from google form. The primary data and secondary data are also used to find information for supporting sampling techniques. Furthermore, the researchers used questionnaires as the method to collect all the information and data from respondents in accomplishing the research objectives. The finding indicated that UGC, FGC, and eWOM significantly influenced consumer purchasing behavior. Lastly, discussion and recommendation have in the last of the research to improve the skill of future researchers, convenience sampling used in the research.

M318A

BUCKLING ANALYSIS AND LAMINATE OPTIMISATION OF COMPOSITE LAMINATES

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Designing composite structures for modern applications, such as aerospace, ships, and F1, is challenging due to their anisotropic and inhomogeneous behaviour. Buckling is a significant event that can cause catastrophic failure and understanding the deformation and buckling behaviour of composite materials under various load conditions is crucial. The failure of composite laminates under buckling influenced by several factors, including laminate thickness, volume fraction, fiber angles, and lamination schemes. This research focuses on analysing the buckling behaviour of composite and hybrid composite laminates using finite element modelling under simply supported boundary conditions. The study investigates the effects of plate thickness, angle orientation, and hybridization volume fraction on the buckling load of composite and hybrid composite laminates. The hybrid composite laminates used are Kevlar/epoxy and Glass/epoxy, and the composite laminates consist of four layers with a symmetric layup. The results were determined using ANSYS APDL and optimized using Design Expert and Response Surface Methodology. The study provides valuable insights into the buckling behaviour of composite and hybrid composite laminates, which can inform the design of more efficient and reliable structures.

M319A

Chromatographic and chemometric approaches for pyrazine analysis in the discrimination of coffee bean varieties and geographic origins

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The roasting process is crucial to developing coffee's characteristic aroma and flavor, as it triggers complex chemical reactions that transform the beans' inherent compounds. One of the primary groups of volatile flavor compounds formed during roasting is pyrazines, which are known for their distinct nutty, earthy, and roasted notes. Pyrazines are highly influential in creating the aromatic profile of roasted coffee. In addition to pyrazines, undesirable acrylamide is also known to be produced during roasting process. In this study, pyrazines were extracted using solid phase microextraction (SPME) and the identification and quantification of pyrazines was done using gas chromatography with flame ionisation detector (GC-FID) to the roasting coffee beans samples from different varieties (Arabica and Robusta) and origins (Asia, Africa and America). The dataset on the amount of pyrazines was subjected to multivariate analysis namely Principal component analysis (PCA), hierarchical cluster analysis (HCA) and discriminant analysis (DA). PCA was able to discriminate between Arabica and Robusta coffee beans with total variance of 91.94%, supported by hierarchical cluster analysis (HCA) showing two distinct clusters and discriminant analysis (DA) with 100% correct classification. PCA revealed two groups whereby coffee beans from Asia were distinctly separated from those of America and Africa with total variance of 92.74%. In accordance, HCA showed 2 clusters, cluster 1 for Asia and cluster 2 for America and Africa. The analysis of pyrazines was applied to commercial coffee samples. Application of PCA and HCA resulted in 5 groups; 2 groups consisting of pure coffee samples and three groups of instant coffee samples. This study highlighted the significant contribution of pyrazines in the production of quality coffee beans and can be a promising parameter in classifying the types and origins of coffee beans.

M320A

Optimization of roasting condition of salak seed (*salacca zalacca*) as coffee substitute and its physicochemical properties

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The interest in utilizing salak seeds as a substitute for coffee has increased due to the presence of caffeine and its health-enhancing properties. This study aimed to determine the optimum roasting conditions for salak seed coffee (SSC) with high total phenolic content (TPC) and desirable lightness (L*) using response surface methodology. Regular SSC was produced at optimal roasting temperature and time of 189.36 ℃ and 39.54 min, respectively. An instant SSC was produced by hot water extraction at 90 ℃ of regular SSC followed by freeze drying. Physico-chemical and antioxidant properties of regular and instant SSC were compared. The moisture, TPC, pH, and solubility of instant SSC were significantly higher ($p<0.05$) than that of regular SSC. Furthermore, instant SSC appeared to be lighter than that of regular SCC. The IC50 of instant SCC was 0.23 mg/mL, indicating higher antioxidant capacity than that of regular SCC (0.37 mg/mL).There was no significant difference ($p>0.05$) in term of caffeine content between regular and instant SCC. The total number of volatile compounds identified in instant SSC and regular SSC was 140 and 65, respectively. The quantitative descriptive analysis (QDA) results showed that the intensity for all the sensorial attributes (e.g. colour, nutty flavour, bitterness, aftertaste and body) tested was higher in instant SCC. The retention of flavour compounds, enhanced solubility and antioxidant capacity of instant SCC indicated that the commercialization of SCC as a coffee substitute is promising.

Keywords: salak seed, coffee substitute, optimization, antioxidant, instant coffee

M321A

Soybean Plant Growth and Production Response (*Glycine max L*) Regarding the Use of Organic Fertilizers and Inorganic P and K

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This research was conducted in the experimental field of the Faculty of Agriculture Islamic University of North Sumatera, on Jalan Sedar, Batang Kuis District, Deli Serdang Regency, North Sumatra. At an altitude of ± 25 m above sea level with flat topography. This research aims to determine the response of growth and production of soybean plants (*Glycine max*) to the use of artificial organic and inorganic P and K fertilizers. This research used a Factorial Randomized Block Design (RBD) with two factors studied, namely: 1. The first factor was Nutrisen Organic Fertilizer consisting of 4 treatment levels, namely: O0 = 0 Control, O1 = 2g/plot, O2 = 4g/plot, O3 = 6g/plot. 2. The second factor is P and K Inorganic Fertilizer which consists of 4 treatment levels, namely: P0 = 0 g control, O1= TSP 20g + KCL 20g/plot, P2= TSP 40g + KCL 30g/plot, P3 = TSP 60g + KCL 40g/plot. The parameters observed were plant height (cm), number of pods, number of seeds, production/plot, total production/hectare (ton). The results of this study show that the effect of nutrient organic fertilizer on edamame soybean plants has a very significant effect on the parameters of average plant height, number of pods, number of seeds, production/plot, and total production/hectare (ton) with O3 treatment (6g/plot) as the average data highest in each parameter. The effect of the interaction of inorganic fertilizers P and K on edamame soybean plants had a very significant effect on each parameter with treatment P3 (TSP 60g+KCL 40g/plot) as the highest data average. However, the interaction effect of the use of nutrient organic fertilizer and inorganic fertilizer P and K had no significant effect on the parameters of average plant height, number of pods, number of seeds, production/plot, total production area/hectare (ton) with the 03P3 treatment (Nutrisen 6g/plot and TSP 60g+KCL 40g/plot) as the highest data average for each parameter.

Keywords: Edamame Soybean Plants, Nutrisen Organic Fertilizer, P and K Organik Fertilizer.

M322A

PHYTOREMEDIATION POTENTIAL OF FOUR PLANTS CONTAMINATED WITH PB AND CD NEAR THE PULP AND PAPER INDUSTRIAL AREA, IN INDONESIA

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Agricultural land around industrial areas has the potential to be contaminated with heavy metals, especially cadmium and lead. One way to reduce metal contaminants in plants is through phytoremediation. The assessment of the effectiveness of phytoremediation in extracting or depositing metals is currently being conducted in Sidoarjo, East Java Province, Indonesia. The study was arranged according to a factorial randomized block design, where Factor 1 was 2 heavy metal contaminated lands, and Factor 2: was four types of phytoremediation plants, including vetiver grass (Chrysopogon zizanioides), paper flower (Zinnia elegans), sunflower (Helianthus annuus), and snake plant (Sansevieria trifasciata), all of which can function as phytoremediator. The parameters observed included soil characteristics at a 0-20 cm depth including soil pH, soil Cd and Pb metal content, and plant growth including Plant height, heavy metal accumulation, reduction, and plant absorption efficiency. The experiment results showed that the soil reaction was alkaline with the final levels of heavy metal Pb between 1.46-1.72 ppm and Cd levels between 0.35-0.48 ppm. During the four-week observation period, Vetiver grass, Zinnia, Sunflower, and Sansevieria showed a proportional decrease in metals over time, with the highest accumulation rate occurring in the first week. Sunflower plants showed high adaptability to contamination, while Vetiver grass showed the highest metal absorption capacity. Ideal phytoremediation plants should have high biomass productivity, short lifespan, tolerance, and high contaminant accumulation capacity.

Keywords: Alkaline, Plants, Phytoremediation, Reduction, Soil

POSTER PRESENTATION ABSTRACT

TRACK 1:

FUNDAMENTAL SCIENCES

T318B

EVALUATION OF PHYSICAL AND CHEMICAL PROPERTIES OF BAMBOO LEAVES AND THEIR POTENTIAL FOR TEA PRODUCTION: IMPACT OF PARTICLE SIZE ON TOTAL PHENOLIC CONTENT

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The leaves of the bamboo plant contain various chemicals, including antioxidants, polyphenols, flavonoids, minerals, and vitamins, supporting the potential health benefits of bamboo leaf tea. This study aims to determine the physical and chemical properties of bamboo leaves. Freshly picked bamboo leaves were subjected to high-temperature steam at 100°C, cut, dried, and ground. The samples were analyzed using UV-Vis, ICP-OES, SEM, and XRD. The total phenolic content (TPC) was 2.275 µg/ml for fine samples and 0.975 µg/ml for coarse samples, and various heavy metals were detected. The study concludes that smaller particle sizes result in higher TPC values, indicating significant potential for producing bamboo leaf tea.

***Keywords**:* Bamboo leaf tea, Total phenolic content (TPC), Particle size

T319B

THERMAL CONDUCTIVITY OF AL_2O_3 NANOFLUID UTILIZING CROSS-LINKED POLYACRYLIC ACID (PAA) AS THE BASE FLUID: AN EXPERIMENTAL STUDY

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Thermal conductivity was measured for Al_2O_3 nanofluid using a newly developed polymeric base fluid. The novel base fluid of cross-linked polyacrylic acid (PAA) solutions was synthesized *via* radical polymerization using a distinct deep eutectic solvent (DES). Five weight concentrations of Al_2O_3 nanoparticles, 0.05, 0.10, 0.15, 0.20, and 0.25 wt.%, were dispersed in the polymeric fluid *via* two dispersing techniques. In the first step, the nanoparticles were stirred using magnetic stirring for 1 h, followed by the sonication technique for another hour to ensure the nanoparticles were well suspended in the base fluid. A KD2 Pro thermal analyzer measured the thermal conductivity of each concentration for the temperature from 30 to 70 °C. The experimental data demonstrated a correlation between thermal conductivity and nanoparticle weight fraction. The results showed that the thermal conductivity increased with the increment of Al_2O_3 concentration for all set temperatures. The study revealed that the polymeric base fluid could replace the conventional base fluid since the thermal conductivity results were comparable with those reported in the literature.

T322B

OPTICAL, MORPHOLOGY, AND STRUCTURAL CHARACTERIZATION OF SYNTHESIZED ECO-FRIENDLY SILVER NANOPARTICLES FOR POTENTIAL ANTIBACTERIAL APPLICATIONS

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Abstract

In this study, we investigated the synthesis and characterization of silver nanoparticles (AgNPs) using a green approach involving plant extracts. The synthesized AgNPs were characterized using UV-visible spectroscopy, Fourier Transform Infrared (FTIR) spectroscopy, and Scanning Electron Microscopy (SEM). UV-vis spectral analysis of AgNPs revealed strong peaks at approximately 972 nm, which is an optical characteristic of AgNPs. FTIR analysis confirmed the involvement of biomolecules in the reduction and stabilization of the AgNPs. SEM analysis revealed the morphology and size distribution of the nanoparticles. The images of the AgNP clusters demonstrate a spherical morphology with a size range of 50–200 nm. The synthesized AgNPs exhibited significant antibacterial activity against both Gram-positive and Gram-negative bacteria. These findings suggest that green synthesis of AgNPs using plant extracts offers a sustainable and eco-friendly approach for producing nanomaterials with potential applications in various fields, including environmental science and medicine.

Keywords: Optical Properties, Silver Nanoparticles, Eco-Friendly, Plant Extract, Biosynthesis.

T327B

Hyrtiosulawesine: An Efficient Synthesis and Molecular Docking Studies

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Hyrtiosulawesine is an alkaloid compound characterized by a β-carboline structure with hydroxy groups at the C-6 and C-5' positions. It has been isolated from the marine sponges *Hyrtios erectus* and *Hyrtios reticulatus*, as well as the plant *Alocasia macrorrhiza*. Hyrtiosulawesine exhibits significant biological activities, including antioxidants, antimalarial, anticancer, cytotoxic, antidiabetic, anti-inflammatory, and anti-phospholipase A_2 properties. Notably, it demonstrates strong antimalarial activity, with an effective concentration of 1 μM against the *P. falciparum* strain 3D7. Due to its compelling bioactivity, researchers attempted to synthesize this compound in 2010, though the process was lengthy and yielded a low overall output. In this study, we developed a short and efficient synthetic route for hyrtiosulawesine. Starting from 5-methoxyindole, the initial Friedel-Crafts acylation was followed by a multicoupled domino reaction and subsequent demethylation, resulting in a 20% overall yield of the target compound. Additionally, hyrtiosulawesine was virtually screened to assess its antimalarial activity and drug-likeness properties through molecular docking and ADME profiling. The results showed that hyrtiosulawesine bound strongly to the target protein with a binding energy of -7.2 kcal/mol. ADME profiling indicated that hyrtiosulawesine has favorable drug-likeness properties and complies with Lipinski's rule of five (Ro5).

T333B

Deflection Performance of Composite Panels Comparing Particleboard, Blockboard and Sandwich Board

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Composite panels are layered materials composed to enhanced strength and performance, which are crucial in various industries. For built-in furniture application, study on their deflection is critical to ensure safety, durability and optimal material use under load. This study investigated the deflection performance of particleboard, blockboard and sandwich panels across various spans (A: 400384, B: 560350, C: 760330, D: 800380, E: 910390). The deflection tests were conducted in three-week period, according to standards – BS 4875-7:2006, BS EN 16122:2012 and BS EN 16121:2013. The findings revealed that sandwich panels exhibited the lowest deflection for significantly longer spans (C, D and E), with deflection values ranging from 1.83-5.20 mm, followed by blockboard (2.56-5.58 mm) and particleboard (1.92-9.04 mm). Comparative analysis showed that the deflection of particleboard was about twice of both blockboard and sandwich board, while the differences between blockboard and sandwich board were minimal. Meanwhile, short spans (A and B) showed similar performance across all panels, suggesting particleboard as built-in material is appropriate at these spans. Overall, these results demonstrated that sandwich panels possess superior structural strength and greater durability for load bearing, supporting weights up until 88.7 kg. This study offers valuable insight for optimal material selection in built-in furniture application.

Keywords: Deflection, Particleboard, Blockboard, Sandwich board, Composite panels.

T334B

Perfomance of Kitchen Cabinet as Built-in Furniture

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Built-in furniture offers a practical solution for maximizing space efficiency and enhancing aesthetic appeal in modern homes, particularly in kitchen spaces. By seamlessly integrating into the architectural structure, built-in kitchen cabinets eliminate the need for bulky freestanding pieces, creating a clutter-free and visually pleasing environment. This study examined various composite panels for built-in kitchen cabinets, assessing their performance concerning sizes and attachment methods to walls. Referring to the BS EN standards, all panels demonstrated exceptional performance, meeting safety and durability criteria without any failure on the requirement properties as per the relevant standard. While the initial investment and limited flexibility may be considerations, the long-term benefits of durability, customization, and increased property value make built-in kitchen cabinets a worthwhile investment for homeowners seeking both style and functionality.

Keywords: Built-in furniture, kitchen cabinets, performance, durability

T336B

Application Of Asparaginase Enzyme In Reducing Acrylamide Formation In Roasted Coffee Beans

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Acrylamide is formed from amino acid L-asparagine and reducing saccharides via Maillard reaction, elimination of one of these precursors by L- asparaginase enzyme in green beans has led to the suppression of acrylamide content in the final product. L- asparaginase enzyme is claimed to reduce acrylamide levels by up to 90% by converting asparagine into aspartic acid without altering the appearance or taste of the final products Therefore, the effect of asparaginase in reducing acrylamide formation without sacrificing the number of pyrazines in roasted coffee beans was investigated in this study. The present study aimed to establish the relationship between methods of asparaginase application, concentration of asparaginase and incubation temperature on the development of acrylamide in roasted coffee beans. Fermented and dried Indonesian arabica coffee beans and asparaginase enzyme was used in this study. Prior to roasting and analysis, samples were analysed for moisture content and pH. The variation of asparaginase application methods (soaking and spraying) in reducing acrylamide formation in roasted coffee beans were compared. For this, 4000U/g of enzyme was used and the green coffee beans (200g) (single) were soaked immediately in enzyme solution for 5 minutes, while for spraying method; the solution was sprayed onto green beans thoroughly for 5 minutes. After soaking and spraying, the beans were incubated in a water bath at 40 °C for 30 minutes and then dried at 60 ˚C until it reached the desired moisture content (11 – 11.12%). Thereafter, untreated and enzyme-treated samples were analysed for amino acids (asparagines and aspartic acid), pyrazines, acrylamide and pH. Furthermore, different asparaginase concentration and incubation conditions were studied. 2000 U/g, 3000 U/g and 5000 U/g enzyme concentrations were used. The green coffee beans were soaked in enzymes for 5 minutes and incubated at 40, 50 and 60°C for 30 minutes and then dried at 60°C until the desired moisture content was attained. It was then roasted at 167°C for 22 minutes and further analysed (triplicate) for pH, pyrazines, acrylamide and amino acids (asparagine and aspartic acid) In this research, asparaginase was able to hydrolysed amino acid asparagine into aspartic acid. The best method for acrylamide reduction was by soaking green coffee beans into 3000U/g enzyme solution, and incubated at temperature of 50°C for 30 minutes.

Keywords: Enzymes; coffee bean; asparaginase; amino acids; pyrazines; acrylamide.

T337B

Structural Properties of Barium (Ba) Substitution at A-Site on SrBaMnRuO6 Double-Perovskite Material

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The effect of Ba substitution at the A-site of Sr2-xBaxMnRuO6 (x=1) double perovskites has been prepared using solid state reaction method and characterized by X-ray powder diffraction (XRD) and Fourier transforms infrared (FTIR). Using Rietveld refinement analysis at room temperature, the crystal structure of SrBaMnRuO6 is tetragonal I 4/m space groups with the a=b=5.45 Å, c = 7.934 Å. The unit cell volume calculated from the analysis V =236.06 Å3. In this study, the Mn-O bond in the FTIR result confirms the perovskite structure of SrBaMnRuO6.

T338B

Green Synthesis, Characterization and Anticancer Activity of Poly acetal /Chitosan doped with Gold Nanoparticles

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In this research, poly acetal has been prepared from the reaction of poly vinyl alcohol with salicyladehyde. The solution casting process was used to create the polymer blends of poly acetal and Chitosan. Using onion peel extract as a reducing agent, the gold nanoparticles (AuNPs) were created. Nanocomposites were prepared by mixing poly acetal /Chitosan /Au,nano particles with different ratios. The AuNPs were characterized through XRD analysis and FESEM microscopy. The poly acetal/Chitosan, polymer blends and nano composites were characterized by FTIR, FESEM, DSC and TGA. FTIR has been used to analyze poly acetal, which confirms its production by displaying a new band of absorption at 1105 cm-1 due to the (O-C-O). The thermal stability of the generated polymer blends and nanocomposites is confirmed by DSC and TGA; in comparison to blends, nanocomposites have demonstrated good performance in suppressing prostate cancer cell line.

Keywords: Anti-cancer cell line, PVA, Chitosan, Polyacetal, Nanocomposite.

T339B

Mentha Piperita Ethanolic Extract Attenuates the Growth Of Oral Pathogenic Bacteria

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The emergence of bacterial antimicrobial resistance (AMR) is a major public health concern. To combat AMR, there is a need to search for other alternatives. A study stated that distilled quantities of Mentha piperita essential oils can have effects similar to those of the antibiotic gentamycin in preventing the growth of bacteria. The plant extract has demonstrated antimicrobial activity against prevalent human pathogenic bacterial and fungal strains. This study aims to evaluate the effectiveness of M. piperita ethanolic extract (MPEE) against oral pathogenic bacteria (Streptococcus mutans, Streptococcus sanguinis & Enterococcus faecalis). The leaves of M. piperita were ground into a powder and soaked in ethanol for 24 h to extract their essence. The Kirby-Bauer disc diffusion assay, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) were used to evaluate the extract's antibacterial properties. 6mm discs were soaked in various extract concentrations (ranging from 50 to 400 mg/mL) and then placed on Mueller-Hinton Agar streaked with the bacteria inoculum. Different dilutions of the extract were dispensed into microtiter plates containing a standardized number of bacteria. The MIC and MBC were then determined using a resazurin-based method. Disc diffusion assay showed that the extract of Pudina showed higher antimicrobial activity against the S. mutans strain specifically ATCC 25175 and DSM 20523 than other clinical strains. The MBC to MIC ratio for the ATCC 25175, DSM 20523, and S. sanguinis was 4, and for S. mutans clinical isolate (CI) and E. faecalis, was 2, classifying it as bactericidal. This study revealed that the ethanolic extract of M. piperita demonstrates a broad-spectrum antibacterial activity, effectively killing a wide range of oral pathogenic bacteria. The observed MIC and MBC values indicate that the ethanolic extract of M. piperita displays bactericidal properties, with an MBC/MIC ratio of less than or equal to 4. This study has confirmed that the MPEE contains an antibacterial compound. This compound has the potential to serve as an antibacterial agent and is effective in inhibiting the growth of oral pathogenic bacteria.

Keywords: Mentha piperita ethanolic extract, Oral pathogenic bacteria, Kirby-Bauer disc diffusion assay, Minimum inhibitory concentration (MIC), Minimum bactericidal concentration (MBC)

POSTER PRESENTATION ABSTRACT

TRACK 2:

ADVANCED TECHNOLOGY

T310A

ADSORPTION OF REACTIVE ORANGE 16 USING SURFACTANT-MODIFIED BANANA STEM: BATCH AND COLUMN STUDIES

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Reactive Orange 16 (RO16), a reactive azo dye, poses challenges in wastewater treatment due to its complex structure and resistance to biodegradation. The hazardous intermediates formed during its breakdown raise concerns for health and the environment. Effective removal of RO16 is essential. This study explores using surfactant-modified banana stem, an agricultural waste, as an adsorbent for RO16 removal from wastewater.The adsorption capacity of raw banana stem was initially tested and found ineffective against RO16. To improve affinity for anionic dyes, surface modification with Cetyltrimethylammoiumbromide (CTAB) was proposed. Physicochemical properties of Raw Banana Stem (RBS), Surfactant Modified Banana Stem (SMBS), and NaOH-treated Banana Stem (NaOH-BS) were analyzed using SEM, FTIR, and pHpzc characterization. Desorption efficiency at varying pH levels for spent SMBS was also evaluated.Batch sorption experiments examined the influence of pH on RO16 removal, utilizing Langmuir and Freundlich isotherms to characterize adsorption. SMBS's adsorption capacity was further tested under various column operational parameters using an acrylic column, with data fitting using the Yoon-Nelson model. SEM analysis revealed a rougher surface for SMBS compared to NaOH-BS, enhancing its dye ion adsorption capacity. FTIR spectra confirmed effective lignin removal and successful surfactant impregnation. pHpzc values indicated a positive surface charge for SMBS. Desorption studies showed low efficiency across pH levels. Maximum adsorption in batch studies occurred at pH 3, with a peak removal percentage of 98% and an adsorption capacity of 19.83 mg/g from the Langmuir isotherm. The adsorption data aligned more closely with the Freundlich model, with an R^2 of above 0.99 . Kinetic studies showed rapid adsorption, reaching equilibrium within 180 minutes, and better fit with the pseudo-second-order model (R^2 > 0.99). Fixed-bed column studies demonstrated longer breakthrough times at lower flow rates and concentrations, with the Yoon-Nelson model fitting well (R^2 > 0.95). Surfactant Modified Banana Stem (SMBS) effectively removes Reactive Orange 16 from wastewater.

***Keywords**:* Reactive Orange 16, surfactant-modified banana stem, adsorption, wastewater treatment

T311A

MECHANICAL PROPERTIES OF HYBRID WOVEN GLASS CLOTH AND RECYCLED POLYPROPYLENE SHEET OF POLYESTER LAMINATE COMPOSITE

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The growing emphasis on sustainability has prompted the development of hybrid composites incorporating recycled materials. This study explores the mechanical properties of a hybrid composite made from recycled woven polypropylene sheets combined with woven glass cloth, focusing on tensile, flexural, and impact properties. The hand lay-up method was used to fabricate the material. Laying plies in accordance of alternating symmetrical stacking sequences of both woven recycled polypropylene sheet and woven glass cloth for laminate stacking, which are $[0°/90°]_4$, $[\pm45°]_4$, $[0°/90°, \pm45°]_2$ and $[\pm45°, 0°/90°]_2$. All laminate composite samples are compared with plain polyester matrix.To evaluate these properties, tensile, flexural, and impact tests were performed under standard conditions. The results reveal that the hybrid composite exhibits a notable increased in tensile strength and flexural rigidity compared to the recycled polypropylene alone. The hybridization of woven glass and polypropylene fabric enhances mechanical properties through strengthening the bonding between polyester resins and hybrid reinforcement. The hybrid polyester composites which $[\pm45°,0°/90°]_2$ orientation, the results showed a highest tensile strength of 109.45MPa while flexural strength of 70.85 MPa compared to others orientation angle and plain polyester. Meanwhile, impact strength reveals that the hybrid polyester composites with $[0°/90°, \pm45°]_2$ orientation with value of 2030 kJ/m^2. The presence of woven glass fibers within the recycled polypropylene matrix helps distribute applied loads more effectively. The glass fibers act as reinforcements that enhance the load-carrying capacity of the composite by improving its resistance to deformation under stress. This leads to better tensile and flexural properties, as the fibers are aligned to carry the majority of the applied loads. In this study, the polypropylene matrix provides impact resistance and flexibility, while the woven glass cloth fibers contribute high tensile strength and stiffness. This synergy can result in improved mechanical properties compared to individual components used alone. Hybrid composites offered a balanced combination of mechanical properties such as strength, stiffness, and toughness. While recycled polypropylene alone might offer good impact resistance and flexibility, adding woven glass cloth fibers can significantly enhance tensile and flexural strengths without compromising impact resistance. This balance is beneficial for applications requiring both high strength and durability. In conclusion, the combination of materials in a hybrid composite can lead to improvement of mechanical characteristics of hybrid laminate composite of recycled polypropylene sheet and woven glass cloth reinforced polyester matrix.

Keywords: Mechanical properties, hybrid polyester composite, laminae orientations.

T313A

ANTIMICROBIAL SHAPE MEMORY POLYURETHANE FROM WASTE COOKING PALM OIL

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This study addresses the environmental issues associated with the improper disposal of waste cooking oil by modifying shape memory polyurethane (SMPU) using residual palm cooking oil. The primary objectives were to synthesize SMPU via an esterification process and to evaluate its shape memory and antimicrobial properties. Characterization was performed using Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), and shape memory property tests. The FTIR spectrum confirmed the successful synthesis of the polymer with urethane formation at 1686 cm^{-1}. The shape memory tests showed that the SMPU had a shape fixity of 96.67% and a shape recovery of 95.56%. Although the SMPU did not exhibit clear inhibition zones in antibacterial tests, it demonstrated intrinsic antimicrobial activity against *Staphylococcus aureus* (*S. aureus*) and *Escherichia coli* (*E. coli*). The SMPU inhibited bacterial growth directly on its surface but did not exhibit antimicrobial properties in its surroundings. The successful synthesis of SMPU from waste palm cooking oil provides a sustainable raw material for polyurethane production and helps mitigate environmental issues related to waste disposal. The findings highlight the potential applications of SMPU, particularly where shape memory and antimicrobial properties are desirable, contributing to the development of environmentally friendly materials and addressing waste management challenges.

***Keywords**:* Polyurethane, waste cooking oil, shape memory, antimicrobial

T314A

DEVELOPMENT AND CHARACTERIZATION OF MECHANICAL, PHYSICAL AND BIODEGRADABILITY PROPERTIES OF BANANA PEEL-BASED BIOPLASTIC

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The conventional types of plastics are widely used and their negative impact to the environment is caused by their inability to easily biodegrade. In response, more focus has been placed on creating eco-friendly products such as bioplastics derived from renewable resources. Banana peel is one of the most promising and easily available agro-industrial residues containing a high level of cellulose and starch suitable to produce bioplastics. However, future issues persist in the quest for good mechanical, physical properties and biodegradability. This paper examines the process of developing bioplastics from banana peels with particular emphasis to the use of glycerin as a plasticizer to improve the mechanical, physical and biodegradable nature of the bioplastics. The specific objectives that the research seeks to achieve is to identify the appropriate volume of 70% glycerin solution (70g/mL) as a plasticizer for bioplastics derived from peels of Musa acuminata × balbisiana to affect tensile strength, transparency, and biodegradability at 3 mL, 6 mL, 9 mL, 12 mL and 15 mL. This research aims to explore bioplastics with better mechanical strength and appropriate physical attributes through the maximization of glycerin volume. Apart from that, the findings are expected to reveal the plasticizer enhanced bioplastics last much shorter time as compared to normal plastics, which provides a solution to the ever-increasing problem of plastic pollution. The result of the study will give an indication on banana peel bioplastics as an effective and environmentally friendly plastic substitute for plastic products meant for industrial and commercial use. This research is in line with the current sustainable development agenda because it opens a way of avoiding the continued use of fossil fuels and further pollute the environment.

***Keywords**: Bioplastics, Green Materials, Fruits waste, Mechanical Properties, Biodegradation*.

T315A

COMPARATIVE STUDY OF PLA/KENAF CORE AND PLA/KENAF BAST FLEXURAL PROPERTIES

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Numerous research studies have been done to further the development of kenaf fibre reinforced composites, particularly by utilizing the bast of kenaf stem because of its high yield of fibres. In this study, both kenaf fibres from bast and core were used as reinforcement to polylactic acid (PLA). Kenaf fibres were chemically treated to enhance the fibre-matrix interaction and were cryo-crushed to reduce the fibre size. The composites were characterized for their flexural properties. Kenaf bast composite (KBC) shows higher flexural modulus and strength with 7.9% and 0.7% improvement respectively, as compared with kenaf core composite (KCC). However, t-test has proven that increment shows no significant difference which is an advantage for kenaf core utilization. It is a promising finding, as the core (in the stem) was rarely used as an addition in the composite as the bast, and the comparable properties between those two parts of kenaf makes the potential use of the core inevitable.

***Keywords**:* Polylactic acid; Kenaf fibre; Mechanical properties; Chemical treatment

T316A

ADVANCING WOOD COATING EFFICIENCY THROUGH NANOTECHNOLOGY APPLICATIONS

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Nanotechnology in wood coatings provides a significant step forward in improving the durability, performance, and sustainability of coatings applied to wooden surfaces. Wood coatings can provide unsurpassed levels of protection against wear, weathering, and environmental degradation by leveraging the unique features of nanomaterials such as nanoparticles, nanotubes, and nanofibers. The revolutionary potential of nanotechnology to innovation of wood coatings can open opportunities to superior quality characteristics of wood coatings that satisfy the needs of industry and can give good impact to environment. Next, the problem that occurs behind this research is the need for better, more durable, and environmentally friendly coatings in the coating industry, which traditional coatings rarely last and might be harmful to the environment. By using nanotechnology, it can assist by utilizing the materials to make innovative coatings. Nanotechnology can make coatings more beneficials to industry and the environment. More than that, exploring applications of nanotechnology on wood coatings for enhanced wood coating performance, environmental and health impact including study the challenges and limitations. From this research, we want to know how can applications of nanotechnology enhance and improve the performance of nanotechnology in wood coatings and what are the challenges and limitations of nanotechnology on wood coating also what are the environmental and health impacts of nanotechnology in wood coating which is toxicity of nanomaterials, disposal and degradation also consumer safety. Thus, the expected outcomes that can we expect from this critical review is to sustainability practices in coating industries and reduce carbon footprint of wood coatings. Futhermore, is the potential applications of nanotechnology in wood coatings and the innovation in wood coatings that are environmental friendly and have an excellant performance.

Keywords: *Nanotechnology, Wood Coatings, Nanoparticles, Sustainability, Green Nanomaterials,*

T317A

FE_3O_4/NIO/GRAPHENE COMPOSITES: ENHANCING HUMIDITY ENERGY HARVESTING THROUGH TEMPERATURE VARIATIONS

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Harvesting energy from humidity is a new approach that has emerged as a potential renewable energy source. However, existing humidity-based energy-harvesting technologies have limitations, including the lack of a sustained conversion mechanism in hygroscopic materials. In this study, we developed iron oxide/nickel oxide/graphene (Fe_3O_4/NiO/Gr) on a cellulose-based substrate as the hygroscopic material for humidity-to-energy applications. We successfully synthesized a unique Fe_3O_4/NiO/Gr using a cost-effective sonicated solution immersion method at different synthesis temperatures. Results indicated that the prepared hygroscopic material is hydrophilic, with a water contact angle of 67.83°. The fabricated humidity-to-energy device utilizing these hygroscopic materials yielded an output voltage of 3.52 mV and a current density of 0.2816 nA/cm^2. This research highlights the potential of cellulose-based Fe_3O_4/NiO/Gr composites as promising hygroscopic materials that could be utilized in future large-scale green energy technologies.

Keywords: Cellulose-based; Fe_3O_4/NiO/Graphene composite; Humidity-to-energy; Hygroscopic.

T320A

ANTI-ODOUR AND COLOUR PROPERTIES OF COTTON FABRIC DYED WITH SPENT GROUND COFFEE

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This study explores the application of spent coffee grounds as a sustainable natural dye for cotton fabrics, investigates its potential to enhance both anti-odour functionality and colour fastness properties. Given the high consumption of coffee and the significant volume of coffee waste generated, spent coffee grounds offer an environmentally favorable dye source, particularly due to their inherent odour-neutralizing properties attributed to nitrogen compounds, such as those found in caffeine. Anti-odour fabrics is crucial for promoting hygiene, maintaining prolonged freshness, and ensuring wearer comfort, particularly in activewear and healthcare applications. Additionally, anti-odour fabric may enhance its durability and provides users with increased confidence, making it especially valuable for active individuals and professionals in settings where sustained freshness is essential. Thereby, this research aimed to examine the anti-odour efficacy of coffee-dyed fabrics by using human olfactory evaluation. Also, the study assessed the colour fastness when subjected to pre-mordanting with alum and dye extraction via boiling. Results demonstrated substantial anti-odour effectiveness and satisfactory color fastness, with minimal colour loss observed after repeated laundering cycles. Statistical analysis confirms the dual effectiveness of coffee grounds as both a colorant and deodorizing agent. The findings indicated that spent coffee grounds have potential as a viable, eco-friendly alternative to synthetic dyes, offering both aesthetic qualities and functional benefits, thus supporting more sustainable practices in textile production.

T335A

Preliminary Study On The Carbon Footprint Of Rubberwood Primary School Chair

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This study evaluates the carbon footprint of a primary school chair manufactured by Impressive Transforms Sdn Bhd, using rubberwood (Hevea brasiliensis) as the primary raw material. The assessment adopts a gate-to-gate approach, covering the material acquisition, production, and packaging phases of the chair's lifecycle. The total carbon footprint is calculated at 5.21 kg CO2e per chair, with material acquisition—encompassing the harvesting and transportation of rubberwood—accounting for the highest proportion of emissions. Production activities, such as machining, assembly, and packaging, also contribute to the carbon footprint, though to a lesser degree. These findings highlight the critical need for sustainable material sourcing and enhanced production efficiency to minimize environmental impacts. The study offers practical insights for manufacturers seeking to adopt eco-friendly practices, lower carbon emissions, and promote sustainable production methods.

Keywords: carbon footprint, rubberwood school chair

THANK YOU FOR PARTICIPATING IN

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