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ABSTRACT

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Leading Towards Innovative Societies

ABSTRACTS

Cluster 1: Science, Technology & Engineering

Session 1

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TECHNO-ECONOMIC FEASIBILITY OF DECENTRALIZED AND CENTRALIZED OFF-GRID SOLAR PV SYSTEMS: A CASE STUDY IN LOK DANGKAAN PITAS SABAH MALAYSIA

Presenter: Muhammad Usman Ibrahim

Rural areas in Sabah, Malaysia, continue to face energy access challenges due to high costs and logistical difficulties in extending the national grid. Off-grid solar photovoltaic (PV) systems offer a viable alternative, but the choice between decentralized (individual household units) and centralized (community-shared) configurations require careful evaluation. This study assesses the techno-economic feasibility of both approaches in the off-grid community of Lok Dangkaan Pitas Sabah Malaysia, where energy demand includes 32 homes (1 kW each), a 3 kW ice production facility, and a 2 kW masjid. Two systems were designed: a decentralized setup totaling 37 kWp and a centralized 44.55 kWp system. Simulations were performed using solar irradiance data, load profiles, and technical specifications to evaluate performance indicators such as energy yield, efficiency, load coverage, storage autonomy, CO2 emissions reduction, capital cost, and lifecycle cost per kWh. Results show that the centralized system achieves better technical performance, with 8.1% higher energy yield, 40% greater load coverage, and higher efficiency (56.7% vs. 41.17%), along with improved storage autonomy (2.5 vs. 2.04 days) and higher annual CO2 avoidance (17.79 t/year vs. 12.59 t/year). However, it requires a significantly higher capital investment (RM522,450 vs. RM127,790) and lifecycle cost (RM1.38/kWh vs. RM0.47/kWh). The findings suggest that centralized systems are suitable for large-scale or community-wide applications where performance and reliability are priorities, while decentralized systems offer a more cost-effective option for phased or household-level deployment. These insights aim to contribute to energy access planning and policy development for off-grid rural communities across Borneo Island in general, and the state of Sabah, Malaysia, in particular.

Keywords: Techno-economic; Decentralized system; Centralized system, Off-grid solar PV; Rural electrification; Sabah Malaysia;

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PARTIAL DISCHARGE DIAGNOSTICS IN TRANSFORMER OIL-PAPER INSULATION SYSTEMS: ADVANCES, CHALLENGES, AND FUTURE PROSPECTS

Presenter: Mohd Asmawi Jali

Transformer oil-paper insulation systems are vital components in power grids, offering thermal stability and dielectric strength necessary for safe transformer operation. However, these systems are susceptible to partial discharges (PD), a major degradation mechanism often caused by defects such as bubbles, copper sulfide deposits, fiber impurities, and moisture ingress. The increasing complexity of modern power systems and the need for grid reliability drive the demand for advanced diagnostics. This review investigates recent progress in PD monitoring technologies for oil-paper insulation, highlighting the integration of optical and ultrasonic sensors, ultrawideband (UWB) antennas, dissolved gas analysis (DGA), and machine learning algorithms. Fiber-optic Fabry-Perot sensors, MoS2-coated fluorescent fibers, and MEMS-based monitoring systems offer enhanced sensitivity and real-time PD detection under harsh conditions. Furthermore, artificial intelligence techniques—particularly InfoGAN-augmented convolutional neural networks—enable near-perfect PD pattern recognition, with reported accuracies exceeding 99%. Complementary modeling efforts using COMSOL Multiphysics, finite-element, and coupled XFEM-FVM approaches reveal the mechanisms of streamer discharge, bubble dynamics, and charge transport. Environmental and aging effects, such as thermal cycling, vibration, and nanoparticle additives, are also discussed for their impact on insulation performance and PD characteristics. Despite significant progress, challenges remain in signal interpretation, sensor miniaturization, and sustainable insulation material development. The paper concludes by emphasizing the need for multiphysics modeling, high-precision sensors, and AI-driven analytics to develop robust, real-time insulation monitoring systems. These advancements are essential for prolonging transformer lifespan, enhancing grid reliability, and supporting sustainable energy infrastructures, particularly in regions like Borneo where resilient power delivery is crucial.

Keywords: Partial discharge diagnostics; Transformer oil-paper insulation; Advanced sensing technologies; Machine learning in condition monitoring; High voltage asset reliability;

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049 **WATER COOLED SOLAR PHOTOVOLTAIC SYSTEM FOR ENHANCED ENERGY HARVESTING**
Presenter: Abdul Ismail Abdul Rani

The increasing environmental challenges posed by greenhouse gases, carbon footprints, and fossil fuel depletion have heightened the urgency for sustainable energy solutions, with solar energy emerging as a key alternative. Solar photovoltaic (PV) panels, commonly used to convert sunlight into electricity, face efficiency limitations due to overheating, especially in hot climates like Malaysia. This research examines the performance of PV systems with and without a water-cooling system to address the overheating issue. The experimental setup, conducted at the University of Technology Sarawak, employed water-based cooling where water was circulated over the panel surface to reduce temperatures and maintain optimal operating conditions. Results showed that water-cooled PV panels significantly improved energy output by reducing surface temperature and enhancing electrical efficiency. For example, the cooled panel exhibited a 15°C lower surface temperature and achieved higher open-circuit voltage of 38.60V compared to 36.65V and short-circuit current of 6.15A compared to 4.40A, resulting in a notable increase in overall power output. The cooled panel's efficiency was measured at 93.58%, compared to 92.96% for the uncooled panel. Although water cooling proved effective, challenges related to uneven water distribution suggest further optimization is needed to maximize efficiency gains. The study concludes that water cooling offers a practical and cost-effective method to improve the performance of solar PV panels, especially in high-temperature environments, thereby enhancing energy harvesting potential in renewable energy systems.

Keywords: Solar photovoltaic (PV); Cooling system; Overheating; Energy efficiency; Renewable energy systems

077 **CONVERSION OF USED PLASTIC TO FILAMENT FOR FUSED FILAMENT FABRICATION PROCESS**
Presenter: Syazwie Adam Sapihi

Malaysia's 28% recycling rate for high-density polyethylene (HDPE) contributes to significant economic and environmental losses, necessitating innovative recycling solutions for sustainable manufacturing. This study focuses on converting used plastic, specifically recycled HDPE (rHDPE) from post-consumer packaging such as detergent bottles, motor oil containers, and shampoo bottles, into filament for fused filament fabrication (FFF). Polytetrafluoroethylene (PTFE) powder was added to improve extrusion flow and print compatibility, aligning with Malaysia's Industry 4.0 framework and United Nations' Sustainable Development Goal 12 for responsible consumption. Post-consumer HDPE bottles were collected, cleaned, cut, dried, and shredded into small pieces. PTFE powder was procured and checked for dryness to ensure quality. The rHDPE and PTFE were blended in weight ratios of 90:10, 80:20, 60:40, 40:60, and 20:80 using a tumbling mixer for uniform dispersion. A preliminary mix-melt process ensured no clogging in the extrusion system, with an automatic feedstock feeding system adjusted for mixing consistency. The mixture was extruded at 200°C through a 3.0 mm nozzle using a custom-built filament extruder, preheated to 200°C for 10 minutes to ensure thermal stability. At least 500g of continuous filament per ratio was wound at 1.75 rpm onto a spool, achieving a consistent diameter of 1.75 ± 0.1 mm, verified using a diameter gauge. Basic printability was confirmed using a desktop FFF printer at 260°C and 10 mm/s, ensuring compatibility with additive manufacturing. This process produces filament from post-consumer waste, reducing plastic pollution and promoting circular economy principles. By enabling scalable filament production, this study addresses Malaysia's plastic waste challenges and supports sustainability goals, offering an eco-friendly solution for additive manufacturing.

Keywords: Recycled HDPE (rHDPE), Fused Filament Fabrication (FFF), Polytetrafluoroethylene (PTFE), Plastic Waste Recycling, Circular Economy

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ADVANCING NET-ZERO GOALS THROUGH BIOCHAR: CHARACTERISATION AND PERFORMANCE IN BINARY BLENDS WITH BIOMASS AND COAL

Presenter: Ahmad Faizal Ahmad Zamli

The valorisation of food waste into biochar offers a sustainable pathway to support Malaysia's net-zero emissions agenda through circular economy practices. This study investigates the potential of blending mixed food waste and its torrefied biochar with sub-bituminous coal and biomass-derived fuels, aiming to enhance fuel properties for co combustion and support coal decarbonization. Five fuel types, mixed food waste (FW), empty fruit bunch biomass (EFB), and their respective biochars (FW biochar and EFB biochar) and sub-bituminous coal (SBC), were analysed using calorific value measurement, proximate and ultimate analyses, scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM EDX), Van Krevelen diagram plotting, and energy density assessment. Torrefaction resulted in marked improvements in fuel characteristics. Calorific values rose from 4 to 18 MJ/kg in raw FW and EFB to 23 to 30 MJ/kg in FW-BC and EFB-BC. Moisture content was reduced from over 50% to below 10%, while fixed carbon content increased from 8% to 38%, enhancing combustion potential. SEM EDX analysis identified an increase in slag-forming elements, with potassium and sodium concentrations rising from 0.36 to 0.61 wt.% in raw biomass to 0.97 to 1.41 wt.% in biochar. The Van Krevelen diagrams reflected a reduction in H/C atomic ratios from 2.7 to 1.2, indicating enhanced carbonisation. Energy density values also improved, with FW/Biomass biochar achieving 7 to 13 GJ/m³, compared to 5 to 7 GJ/m³ in raw FW/Biomass, indicating better compactness and transport efficiency. When benchmarked against sub-bituminous coal (20 to 30 MJ/kg), biochar demonstrated competitive energy performance and enhanced fuel quality, making it a viable alternative to carbon-lean solid fuels. This study provides foundational data for integrating food waste- and biomass-derived biochar into Malaysia's energy mix, enabling co-combustion strategies that reduce greenhouse gas emissions while advancing a low carbon, circular economy.

Keywords: Biochar, Co-Combustion, Binary Fuel Blending, Energy Density, Biomass Characterisation, Circular Economy, Net Zero Emissions

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PERFORMANCE INVESTIGATION OF AN AIR EVAPORATIVE COOLER INTEGRATED WITH AIR DEHUMIDIFIER SYSTEM

Presenter: Mohd Suffian Misaran

The increasing demand for sustainable and energy-efficient cooling solutions, particularly in humid tropical climates, has prompted the exploration of biodegradable materials for evaporative cooling systems. This study investigates the performance of palm fibre pads as an alternative to conventional CELdek pads in an integrated air evaporative cooler and dehumidifier system. The objectives were to evaluate the cooling efficiency, temperature reduction, and energy consumption of palm fibre under various configurations and operating conditions. Experiments were conducted using a custom-built cooling chamber equipped with interchangeable pad materials and a liquid desiccant dehumidifier using $CaCl_2$ solutions at concentrations of 30%, 35%, and 40%. Air velocities of 0.7, 1.1, and 1.5 m/s were tested. Key performance metrics—evaporation efficiency (Ee), cooling capacity (Qc), coefficient of performance (COP), and water evaporation rate (me)—were calculated using standard psychrometric relations. Results showed that standalone palm fibre pads achieved an average evaporation efficiency of 63.05%, outperforming CELdek's 47.45%. This led to an increase in mass flow rate from 0.0710 to 0.0821 kg/s and a slight improvement in COP from 0.000666 to 0.000678. In hybrid configurations, the CP+PF setup reached an Ee of 76.1% and COP of 0.001066, while the PF+PF configuration achieved the highest COP of 0.001272 and cooling capacity of 0.1183 W. In this study, palm fibre demonstrates strong potential as a biodegradable and cost-effective pad material, enhancing system performance by 25–35% in COP and offering substantial energy savings. Its integration into hybrid cooling systems presents a viable solution for sustainable climate control in humid environments.

Keywords : Evaporative Cooling, Air Conditioning, Liquid desiccant, Palm fibre, Celdek Pads

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RENEWABLE HYBRID ENERGY SYSTEM OPTIMIZATION (WIND–PV–GENSET) FOR RURAL TOURISM ELECTRICITY DEMAND USING OEMOF: A CASE STUDY

Presenter: Eva Hertnacahyani Herraprastanti

Rural tourism villages often face challenges in accessing reliable and sustainable electricity, particularly in remote areas with limited grid connectivity. This study presents an optimization of a hybrid renewable energy system composed of wind turbines, photovoltaic (PV) panels, and diesel generators to fulfill the electricity demand of a tourism village. Building upon a previous assessment that revealed wind energy alone could only meet 30% of the demand, this research aims to identify the optimal combination of energy sources to minimize operational costs while ensuring energy reliability. A time-series-based Mixed-Integer Linear Programming (MILP) approach is employed to simulate various hybrid configurations, considering the variability of renewable resources and load profiles. The optimization model is implemented using the Open Energy Modelling Framework (OEMOF), allowing for flexible system modeling and transparent scenario analysis. Results show that a properly sized hybrid system significantly increases renewable energy penetration and reduces dependency on fossil fuels. This study provides practical insights for designing cost-effective, renewable-based power systems for rural tourism development.

Keyword : Renewable Energy, Hybrid Energy System, System Optimization, OEMOF, Mixed-Integer Linear Programming (MILP)

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DRYING EFFICIENCY OF BANANA AND POTATO IN A LOW-COST RAINPROOF SOLAR CHIMNEY

Presenter: Chu Chi Ming

Bananas are a commonly consumed tropical fruit in Malaysia, while potatoes are a common staple in the Malaysian diet. Both are susceptible to swift deterioration owing to their elevated moisture content. This study details the design and assessment of an economical rainproof solar chimney dryer, constructed from galvanized iron sheets for enhanced durability and UV blockage. The drying experiments were conducted under four different climatic conditions, which included sunny and rainy weather, each tested with and without mesh covers and was controlled versus laboratory shade drying. In sunny conditions with mesh, the dryer decreased moisture content from 64.89% to 8.34% (wet basis) in 8 hours, translating to drying efficiency of 95%, with an average solar irradiation of 800–950 W/m2. The dryer successfully eliminated 1.42 kg of moisture per square metre of tray area, attaining safe drying standards within a single day without the use of power. Conversely, rainy conditions diminished efficiency to 39%, and laboratory shade drying exhibited the least effectiveness, characterized by reduced heat flux and moisture extraction, achieving a drying efficiency of 30 to 40%. Results for potato slices showed that the solar chimney significantly improved moisture removal compared to shade drying, achieving a maximum drying efficiency of 97.04% with wire mesh, versus only 46.90% for shade drying. The chimney maintained consistent performance under different levels of solar radiation, confirming its reliability. In contrast to commercial hybrid dryers priced at RM1,100, the passive RM301 system attained similar drying outcomes at a far lower cost and without energy consumption, suitable for small-scale or off-grid customers. In conclusion, the rainproof solar chimney dryer is a viable, cost-effective, and sustainable method for mitigating postharvest losses in bananas and potatoes. It possesses significant potential for implementation in rural off-grid agro-processing, particularly in areas with ample sunlight.

Keywords : Solar chimney, drying, efficiency, agriculture, low cost, wire mesh

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Cluster 2: Medicine And Natural Sciences

Session 2

001

YIELD AND PHYSICOCHEMICAL PROPERTIES OF PILI (CANARIUM OVATUM) PULP OIL
Presenter: Nur Ainani Zuyyin Jinin

This study focused on the properties of oil extracted from pili *(Canarium ovatum)* pulp using petroleum ether as an extraction solvent through Soxhlet extraction method. The yield and physicochemical properties of extracted pili pulp oils were evaluated for physical and chemical analyses. The pili pulp oil was green in colour and existed in liquid form at room temperature. The yield of pili pulp oil was 40.97%, which oleic (69.56%) acids were the most dominant fatty acid followed by palmitic (19.80%). The extracted oil had OOO, POO, OOL and PPO as the major TAG molecules. It had 84.6 g I 2_2/100 g oil, 1.47 and 19°C for iodine value, refractive index and cloud point, respectively. The carotene content of pili nut oil was 158.53 ppm. The free fatty acid content, peroxide value, p-anisidine value and totox value of pili pulp oil was 0.96 mg/g oil, 17.45 meq/kg oil, 14.45 meq/kg oil and 49.23 meq/kg oil, respectively. Pili pulp oil could be further analysed and potentially used in food, cosmeceutical and pharmaceutical production

Keywords: Canarium ovatum, pulp oil, Soxhlet extraction, yield, physicochemical

007

COMPARATIVE PLASTOME ANALYSIS REVEALS GENETIC DIVERSITY IN DURIAN SPECIES
Presenter: Wee Ching Ching

Durian (Durio zibethinus), commonly known as the “King of the Fruits”, is a popular tropical fruit widely cultivated in Southeast Asia countries. Its nutritional value and unique creamy taste have contributed to its consumer popularity and to the economies of these countries through exportation. In addition to commercial durians, numerous local edible durian species, many endemics to Borneo, are also found across the region. However, their evolutionary history remains poorly understood, despite the availability of plastome sequences in the National Center for Biotechnology Information (NCBI) database. To address this knowledge gap, a phylogenetic tree was constructed using plastome data from 14 samples representing seven durian species available in the NCBI database. A total of 71 protein-coding genes commonly found in durian plastomes were concatenated, aligned, and analyzed using maximum likelihood methods. The results revealed that all studied durians are classified under the Malvaceae family. Furthermore, commercial durians were found to cluster closely together, whereas local Borneo durians exhibited greater genetic differentiation. Notably, D. dulcis from Indonesia and Sarawak did not cluster together, suggesting possible genetic differentiation within the species due to geographic isolation. Among the species analyzed, D. testudinarius was identified as the most genetically distinct, forming a separate branch within the phylogenetic tree. Understanding the genetic diversity and evolutionary relationship among durian species, particularly in Borneo, provides valuable insights for biodiversity conservation, sustainable agricultural practices, and the preservation of regional genetic resources critical to long-term food security.

Keywords: Borneo; durian; phylogenomic analysis; plastome

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010 SAGO FIBER MYCELIUM COMPOSITES: TRANSFORMING NATURAL WASTE INTO SUSTAINABLE, BIODEGRADABLE MATERIALS

Presenter: Ann Anthony

The global population is expected to exceed 9.7 billion by 2050, demanding a vital reduction in our reliance on petroleum-derived, non-biodegradable plastics that significantly contribute to environmental pollution and resource depletion. Mycelium-based composites (MBC), which are made from fungal mycelium and lignocellulosic substrates, are better for the environment because they are biodegradable, renewable, and require less energy. Notably, sago waste fiber a byproduct from the sago palm is an effective lignocellulosic substrate for MBC, adding value to agricultural waste and enhancing the composite's sustainability profile. This article previews how sago waste fiber has potential and economic advantages of utilizing mycelium to convert into valuable composite material. Finally, it explores the viability of sago waste fiber as a substrate for mycelium growth, discussing the material properties, manufacturing processes, and suitable mycelium strains for optimal composite production. The study covers the phases of MBC manufacturing, encompassing substrate selection, fungal inoculation, growth conditions, and drying procedures, which influence the materials physical and mechanical properties. Overall, this study shows that MBC are a potential new material that can help solve important environmental problems by lowering carbon footprints and plastic waste. Finally, it explores the viability of sago waste fiber as a substrate for mycelium growth, discussing the material properties, manufacturing processes, and suitable mycelium strains for optimal composite production.

Keywords: agricultural; mycelium-based composite; composite; Sago fibre waste.

036 EMERGING DISEASES IN MESOPREDATOR SHARKS: IMPLICATIONS FOR MARINE CONSERVATION AND ECOSYSTEM RESILIENCE IN BORNEO WATERS

Presenter: B. Mabel Manjaji-Matsumoto

Emerging diseases in open-ocean mesopredator sharks pose a growing threat to marine conservation, especially in biodiversity hotspots like Borneo. In Sabah, these included recent reports of skin lesions in whitetip reef shark Triaenodon obesus at Sipadan Island Park. Elsewhere, recent reports of skin lesions, fungal infections, and behavioural changes in species such as oceanic whitetips Carcharhinus longimanus and scalloped hammerheads Sphyrna lewini have been linked to climate-induced sea temperature rises and pollution. These stressors weaken shark immune responses, reduce mobility, disrupt hunting and reproduction, and increase vulnerability to secondary infections. In Borneo, where shark and ray diversity support both ecological function and sustainable ecotourism, the long-term consequences of unchecked shark disease include biogeographic shifts, and socioeconomic and conservation costs. To address these challenges, integrated strategies are needed. These include enhancing disease surveillance through microbiome monitoring, expanding marine protected areas with climate-resilient thermal refugia, enforcing anti-pollution policies, and promoting sustainable fishing practices.

Keywords: shark diseases, marine conservation, Borneo ecosystems, climate change impacts

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045 SUSTAINABLE ALUMINIUM ION REMOVAL USING AGRO-WASTE-DERIVED ACTIVATED CARBON FOR RIVER PRESERVATION: FROM LAB-SCALE TOWARDS UPSCALING STUDY

Presenter: Lee Hui Tze

High heavy metal content in river water has always been a threat to the ecosystem due to bioaccumulation and biomagnification. The Miri River was determined as not suitable for recreational use with body contact while requiring conventional treatment for water supply, attributed to the high aluminium, Al content. This is due to the anthropogenic influences by the industrial areas occupied upstream of the river, whereby the Al could flow into the river due to surface runoff or wastewater discharge. Current study developed an effective adsorbent from recycled agro-waste, coconut shells obtained from local areas for Al removal while considering upscaling application. The feasibility of an upscaling study by a prototype for future field application was determined. O-H, C=O and C-O were observed as the surface functional groups of the adsorbent, where denser peaks were obtained for the activated carbon (AC). Further, the microstructural analysis suggests more porous and well-defined cavities on the AC structure due to the penetration of the activating agent during the activation process, reflecting the improved effectiveness. Larger-scale application was examined by implementing a floating prototype with an adsorbent pack placed on it. Experimental study showed that the adsorbent is able to remove up to 99.85% of Al from the synthetic water in lab-scale. A similar effect was observed when applying the floating prototype for the upscaling adsorption study. Moreover, the thermodynamic study validated that the adsorption of Al by the adsorbent is not limited by temperature. The efficiency remains above 99.83% with a temperature range from 25 °C to 60 °C. Current study shows the technical feasibility of Al removal on a larger scale application by adsorbent derived from recycled waste. Future study is required to focus on the installation of the system on the contaminated river for real-life application.

Keywords: Sustainable Aluminium Removal, Agro-Waste, Activated Carbon, Upscaling Adsorption

051 IN-SITU MEASUREMENT OF FLUORESCENCE YIELD OF SCLERACTINIAN CORALS OF ACROPORA SPP. AT KAPAS ISLAND, TERENGGANU, MALAYSIA

Presenter: Tengku Fara Kamilia Tengku Mohd Kamil

Fluorescence yield in corals plays a pivotal role as an indicator of coral reef health and photosynthetic efficiency, crucial for understanding coral resilience in the face of environmental pressures. This thesis investigates fluorescence yield in Acropora spp. corals at Kapas Island, Malaysia, aiming to identify variations, underlying physiological mechanisms, and implications for coral conservation. Using pulse amplitude modulation (PAM) fluorometry, fluorescence measurements was conducted, revealing a fluorescence yield range from 0.1 to 0.6, indicating different level of healthiness. This study underscores fluorescence measurements as a non-invasive tool for assessing coral health and monitoring responses to environmental changes such as sedimentation, high sea surface temperature, nitrate pollution and other relatable pollutions using instrument of Diving PAM fluorometer in situ, targeted on hard corals of genus Acropora in tourist island of Kapas, situated in Kuala Terengganu, Terengganu, Malaysia. High fluorescence yields correlate closely with healthy coral conditions characterized by efficient photosynthesis and symbiotic relationships with zooxanthellae algae, interrupting their biological system towards energy storage and conversion. Conversely, bleaching events and environmental stressors lead to decreased fluorescence yields, highlighting vulnerability to climate-related pressures. Establishing foundational fluorescence data, this research contributes to conservation strategies aimed at mitigating coral reef degradation. Monitoring fluorescence yields across coral species and environments offers in field can be used as critical early warnings of coral stress and degradation, essential for guiding conservation efforts aimed at mitigating these threats and protecting these vital ecosystems.

Keywords: Fluorescence yield, Coral health, Photosynthetic efficiency, Acropora spp., PAM fluorometry, Environmental stress, Coral conservation

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069 ASSESSMENT OF CHALCONE SYNTHASE GENE (CHS) AS MOLECULAR MARKER FOR LABISIA PUMILA

Presenter: Ahmad Asnawi Mus

Labisia pumila is a small herbaceous plant that are widely used as a traditional medicine and the bioactive compound found such as flavonoids and phenolic compound play critical roles in plant physiology and defence mechanism. The chalcone synthase (CHS) gene is directly involved in the flavonoid's biosynthesis pathway. However, there were lack of study reported in using CHS genes as the biological molecular marker specifically to differentiate the varieties of L. pumila. In this study, DNA was extracted from the stems (S) and leaves(L) of L. pumila of all varieties (pumila (P), alata (A) and lanceolata (L)) and subjected to molecular analysis using gene based molecular marker, CHS1 and CHS2 primer by polymerase chain reaction (PCR). The formation of multiple bands on a single lane of each sample explained the result of polymorphism and genetic variation attributed in that sample where 40% using CHS2 (S) samples and 50% using CHS1 (L). Result from these both primers when combined show that samples extracted from leaves exhibit higher percentage of polymorphism than stems despite higher bands formation in stems than leaves. The pairwise Jaccard index show the highest resemblance between sample LS and PS using CHS1 with 100% similarity while sample LL and AL using CHS2 show 75% similarities. The dendrogram of clustering analysis show samples from extracted stems, AS-PS and AS-LS cluster when using CHS1 and CHS2, respectively. On the other hand, sample extracted from leaves using both primers shows clustering of AL and LL. CHS gene-based primer are able to distinguish genetic variation among varieties in L. pumila based on polymorphic, similarities and clustering analysis as observed. Expanding the sample size by including more varieties and design specific primer based on L. pumila gene sequences would help to amplify more sequence region which increase the successfulness of this study. To our knowledge, this is the first study of using functional gene (CHS) as molecular marker for Labisia pumila variety assessment, which could provide insight into its quality and direct role in flavonoid biosynthesis in each variety.

Keywords: Labisia pumila, variety, bioactive compound, flavonoid, molecular marker, chalcone synthase

070 MITOCHONDRIAL GENE MARKER IDENTIFICATION FOR A TARGETED HORNBILL EDNA ASSAY

Presenter: Thien Choi Yi

The effectiveness of traditional hornbill monitoring through visual and acoustic surveys is often hampered by their cryptic behaviour and habitat preference in dense rainforests. The challenges in hornbill detection have led to insufficient population data, posing a significant challenge to hornbill conservation efforts. Environmental DNA (eDNA) offers a complementary approach that enable non-invasive detection of species from trace genetic material shed into the surrounding environments. Targeted eDNA assay using real-time PCR (qPCR) allows the detection and quantification of low amount of target DNA in complex environmental samples. The design of primers defines the region of target DNA to be amplified from the complex DNA sequences present in environmental samples. Gene marker selection is critical to ensure assay specificity by identifying regions that are conserved enough within target species but variable enough between target and non-target species, used for the design of primers. This study identifies the mitochondrial gene markers for the development of a targeted eDNA assay, using Anthracoceros albirostris as a proof-of-concept study. We compiled mitochondrial DNA (mtDNA) sequences of target and non-target, closely related species from the GenBank nucleotide database. Due to the lack of hornbills' sequence data, we performed Sanger sequencing to generate mtDNA sequences targeting cytochrome c oxidase subunit 1 (COI or COX1), NADH dehydrogenase subunit 2 (ND2), and displacement loop (D-loop) genes using feather samples from four hornbill individuals. Analysis of sequence alignment revealed a high level of sequence similarity (>90%) among the three mtDNA genes. Despite the high similarity, specific regions within the COI and ND2 genes exhibited a sufficient level of sequence variation. This study presents the preliminary development of targeted hornbill eDNA assay, utilizing COI and ND2 as gene markers for primer design. It serves as a foundational step towards the broader application of molecular tools to protect the iconic hornbills in Borneo.

Keywords: hornbill, targeted eDNA assay, gene marker, real-time PCR, qPCR

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085 SURVEY OF FRESHWATER FISH IN LOWLAND FOREST STREAMS OF KINABALU PARK, SABAH

Presenter: Nurfaezah Adam

Freshwater ecosystems are crucial to support biodiversity and provide valuable ecological functions. Kinabalu Park in Sabah, recognized as a UNESCO World Heritage Site known for its rich biodiversity. The lowland forest river streams sheltered diverse species of freshwater fish. Surveying freshwater fish in these streams is a key to understanding their diversity, distribution, conservation status and needs. The aims of this study is to document the freshwater fish species occurrences from selected lowland forest streams in Kinabalu Park and to analyse their connections to selected environmental variables. Fish samples and selected environmental parameters were simultaneously collected from 17 sampling stations, situated at elevations between 191 meters to 914 meters above sea level (m asl). A total of 26 freshwater fish species representing nine families and 17 genera were recorded. Gastromyzontidae stands out as the most dominant family (46.2 %, 12 species) in this research followed by Cyprinidae (23.1%, 6 species) and Danionidae (7.7%, 2 species). Tor tambra is prevalent in Kinabalu Park and present at 13 out of 17 stations surveyed. Anguilla borneensis is the only species listed as Vulnerable (VU) on the IUCN Red List, while Gastromyzon auronigrus, Gastromyzoncornusaccus, Gastromyzon introrsus, and Protomyzon borneensis are listed as Near Threatened (NT). The Non-metric Multidimensional Scaling (NMDS) demonstrated that distribution of fish species across different altitudes in forest streams were related to environmental variables including dissolved oxygen, pH, elevation, and temperature. Establishing consistent, long-term freshwater fish data through regular surveys in Kinabalu Park are essential for advancing research and conservation planning.

Keywords: Freshwater fish, Lowland forest streams, Kinabalu Park, IUCN Red List, water quality

130 ASSESSING PSYCHOSOCIAL RISK: ASSOCIATION BETWEEN OCCUPATIONAL AND SOCIODEMOGRAPHIC FACTORS WITH DEPRESSION, ANXIETY, STRESS AMONG KOTA KINABALU GOVERNMENT TERTIARY HOSPITAL EMPLOYEES

Presenter: Aaron Tsen Siong Fatt

Introduction: Workplace mental health is a growing concern in Malaysia's healthcare sector, yet comprehensive psychosocial risk assessments across both clinical and non-clinical staff remain limited.
Objective: This study aimed to determine the prevalence of depression, anxiety, and stress among employees in four government tertiary hospitals in Kota Kinabalu, namely Hospital Queen Elizabeth, Hospital Queen Elizabeth II, Hospital Wanita dan Kanak-Kanak Sabah, and Hospital Mesra Bukit Padang, and to identify associated sociodemographic, occupational, and psychosocial risk factors.
Methodology: A cross-sectional study was conducted from February to June 2025, involving 233 hospital staff selected through stratified random sampling. Data were collected via self-administered web-based questionnaires, including the 21-item Depression, Anxiety and Stress Scale (DASS-21) and the Likelihood of Environment & Occupational Exposure Scale towards Psychosocial Risk in the Workplace (LEO26), both validated for the study context. Statistical analyses included descriptive statistics, bivariate comparisons, and multivariate logistic regression, performed using SPSS version 29.
Results: Findings showed a high prevalence of mental health issues, with 43.8% of staff reporting anxiety, 37.8% depression, and 27.0% stress. Multivariate analysis identified high psychosocial risk due to job demand (OR 3.94), job control (OR 3.72), and job support (OR 2.87) as significant predictors for depression. For anxiety, high psychosocial risk due to job demand (OR 3.01), job control (OR 2.29), and job support (OR 2.59) were significant. Stress was more closely linked to the younger age group of 20–39 years (OR 3.14), high psychosocial risk in job control (OR 4.45), and job support (OR 2.68).
Conclusion: While the cross-sectional design and reliance on self-reported data may limit causal inference, these findings highlight the value of regular psychosocial assessments and targeted interventions. Strengthening support systems in the workplace is essential to fostering a healthier, more supportive work environment and promoting the mental well-being of Malaysia's hospital workforce.

Keywords: Psychosocial, depression, anxiety, stress, hospital

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Session 2

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ANTIOXIDANT, ANTIMICROBIAL AND PHYTOCHEMICAL COMPOSITION OF ZINGIBERACEAE CASSUMUNAR USED BY PENAN PEOPLE OF ULU JELALONG, SARAWAK.

Presenter: Rachel Nasha Elen

Despite Sarawak gradually advancing, medicinal plants have yet to serve as a primary source of cure for the rural communities. In the rural areas like Ulu Jelalong, Sebauh, the challenging terrains to reach nearby healthcare facilities lead the Penan community to depend majorly on the knowledge from traditional healers. However, the traditional use of Zingiberaceae cassumunar, also known as Levangei, for treating digestive discomfort and hypertension is slowly diminishing due to youth immigration and the increasing death of elders. Therefore, this study aims to scientifically validate the potential of Zingiberaceae cassumunar treating disease in mankind. A vacuum pump technique was applied to extract the rhizome part of plants against three solvents namely ethanol, distilled water and n-hexane. Afterwards, the rhizome extract was subjected to three antioxidant assays: 2,2′-azino-bis(3-ethylbenziothiazoline-6-sulfonic acid) (ABTS), Total Phenolic Content (TPC) and Total Flavonoid Content (TFC); antibacterial disc diffusion assay against three gram-positive and three gram-negative bacteria; and eight phytochemical tests consisting of tannins, saponins, phenols, terpenoids, coumarins, glycosides, flavonoids and alkaloids. The rhizome ethanolic extract exhibited the highest radical scavenging activity, followed by distilled water extract and n-hexane extract. However, high phenolic and flavonoid content was estimated in ethanolic extract and distilled water extract, then preceded by n-hexane extract. Antibacterial assays of the three rhizome extracts revealed selective activities against selected bacteria. Additionally, the abundance of phytochemicals in ethanolic and n-hexane extracts of Z. cassumunar supports its traditional use. This study holds promise for further exploration of Zingiberaceae cassumunar's nutraceutical potential and potential applications in health products.

Keywords: Ulu Jelalong, Zingiberaceae cassumunar, Sarawak, Antioxidant, Antibacterial, ABTS, Phytochemical

ABSTRACTS

Cluster 3: Arts And Social Sciences

Session 3

005

ENVIRONMENTAL THEATRE ELEMENTS IN THE SAWAH PADI MUSICAL UDA DAN DARA
(ANALISIS ELEMEN TEATER ENVIRONMENTAL DALAM LAKONAN PRESENTASI PEMENTASAN TEATER DI SAWAH PADI MUZIKAL UDA DAN DARA)
Presenter: Ismaliza Ishak

Dinsman merupakan dramatis, penulis, pengarah dan pengamal yang berpengalaman dalam perkembangan teater moden di Malaysia serta terkenal dengan pengunaan ruang pementasan yang tidak konvensional (di luar pangung). Persembahan Teater Di Sawah Padi Muzikal Uda dan Dara merupakan salah satu karya Usman Awang dibawah arahan Dinsman yang menjadikan ruang "Environmental"sebagai sebuah ruang pementasan. Artikel ini membincangkan penggunaan elemen environmental theater dan pendekatan lakonan presentasi dalam pementasan teater Sawah Padi Muzikal Uda dan Dara arahan Dinsman. Pendekatan environmental theater yang menolak batasan pentas konvensional dan mengintegrasikan ruang semula jadi sebagai sebahagian daripada pengalaman persembahan, telah membuka ruang interaksi yang lebih organik antara pelakon, penonton, dan persekitaran. Kajian ini menganalisis bagaimana elemen sawah padi sebagai ruangpersembahan yang dimanfaatkan bukan sahaja sebagai latar fizikal, tetapi juga sebagai symbol naratif dan emosi. Di samping itu, lakonan presentasi yang berteraskan kehadiran tubuh, gerakan spontan, dan interaksi langsung dengan elemen persekitaran turut diteliti sebagai satu pendekatan yang memperkukuh makna dan pengalaman teater. Melalui kaedah analisis kualitatif terhadap dokumentasi pementasan dan temubual terpilih, artikel ini mengetengahkan bagaimana Dinsman menggabungkan estetika alam dan tubuh dalam mencipta pengalaman teater kontemporari, reflektif dan imersif. Hasil kajian ini menyumbang kepada pemahaman lebih mendalam terhadap penerokaan bentuk persembahanalternatif dalam landskap teater Malaysia.

Keywords: Environmental theater, lakonan, Teater Muzikal Sawah Padi Uda Dan Dara, Dinsman.

059

PRESERVING CULTURAL IDENTITY THROUGH LOCAL FILM: A PRELIMINARY REVIEW
Presenter: Cyril Modili

Local films serve as a vital medium for preserving and promoting cultural identity by showcasing local traditions, practices and narratives. This preliminary review explores how local film contributes to cultural preservation through cinematic representation, education, and advocacy. Films such as Jogho (1997) and Bunohan (2012) demonstrate the power of cinematic persuasion in reflecting Malay sociocultural life, particularly in regional contexts like the Kelantan-Pattani border. These works employ discursive and visual strategies to educate audiences and cultivate cultural appreciation. Additionally, local films help construct 'social imaginaries,' a concept that refers to a society's shared understandings and representations, such as the representation of 'Sabah-ness,' by offering progressive portrayals of multiethnic identities and challenging elite-driven narratives. Beyond representation, films like Wayang (2007) and Zaleha Ayam Patah (2005) serve educational purposes by reviving forgotten traditional art forms and fostering intergenerational cultural knowledge transmission. Despite these positive roles, local filmmakers face challenges in the form of cultural globalisation, which threatens to marginalise indigenous traditions. Thus, the effective ways to preserve these rich indigenous cultures are through localised, grounded storytelling, as it can combat the homogenising effects of globalisation. Additionally, the stereotyping and cultural distortion often perpetuated by external filmmakers emphasise this need even further. Therefore, local films are not just entertainment tools, but also powerful instruments for fostering cultural continuity. By responsibly engaging with local identities, filmmakers can counteract homogenising forces and ensure that diverse cultural expressions remain dynamic and relevant. This emphasis on continuity is a source of optimism for the future of cultural diversity.

Keywords: local film, cultural identity, cultural preservation, indigenous representation and cultural globalisation

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Session 3

124

EXPLORING LOCAL WISDOM IN COMMUNITY DEVELOPMENT: A PRELIMINARY STUDY IN KAMPUNG DARAU, KOTA KINABALU, SABAH

(MENELUSURI KEARIFAN TEMPATAN DALAM PEMBANGUNAN KOMUNITI: SATU KAJIAN AWAL DI KAMPUNG DARAU, KOTA KINABALU, SABAH)

Presenter: Rahmah Rashid

In the context of globalization and rapid development, traditional communities such as Kampung Darau in Kota Kinabalu, Sabah face significant threats in preserving their cultural heritage and local wisdom. Urbanization and external influences have transformed lifestyles, weakening traditional practices and cultural knowledge. This preliminary study aims to explore the role of local wisdom in community development in Kampung Darau through a qualitative approach. Data was collected through in-depth interviews with ten informants from diverse demographic backgrounds, including youths, adults, community leaders, and government agency representatives. Initial findings reveal that the practice of gotong-royong (mutual cooperation) remains a core pillar of unity within the community, especially in managing communal events, funerals, and environmental conservation efforts in collaboration with the Darau Wetland Community Cooperative. Bajau cultural heritage, such as traditional music (titik), Penjaram, and the traditional barter system (miolon), continues to play a vital role as both an economic system and a symbol of cultural identity. However, elements such as herbal knowledge, the use of the native language, and architectural heritage are increasingly fading, particularly among the younger generation. While youths are actively involved in community groups and traditional sports, interest in traditional knowledge such as oral history and local wisdom remains low. These findings highlight the urgent need for comprehensive cultural preservation efforts, particularly through education, documentation, and intergenerational knowledge transfer. This study concludes that local wisdom holds significant potential as an important asset in the development of the Kampung Darau community. It provides an early empirical foundation for further research into the dynamics of local wisdom in community development in Kampung Darau, Kota Kinabalu, Sabah.

Keywords: Local Wisdom, Community Development, Cultural Heritage, Indigeneous Community, Community Sustainability

31

ECHOES OF GLOBALIZATION IN THE DAYAK HARVEST FESTIVAL: THE TRANSFORMATION OF BELIEF AND COMMODITY INTO THE RESILIENCE OF TRADITION IN RURAL WEST KALIMANTAN

Presenter: Ardana Kusumawanto

This paper explores how globalization has contributed to both the transformation and preservation of traditional practices among Dayak communities in rural West Kalimantan, Indonesia. Focusing on the harvest festival, locally known as Gawai, the study examines how this ritual continues to function as a social system of kinship exchange and community relations. Based on ethnographic research conducted in Sanggau Regency, the study includes several Dayak subgroups living in the area. Historically, the harvest festival was rooted in ancestral beliefs and swidden agriculture, with surplus produce and livestock serving as offerings shared with kin and guests. Villages coordinate festival dates between late May and early July to allow for reciprocal visits between relatives. Despite the introduction of Christianity - particularly Catholicism - during the colonial era, the harvest festival has not only persisted, but in some areas has been revitalized through church involvement. Meanwhile, the transition from subsistence agriculture to commercial rubber and oil palm plantations has changed the material aspects of the celebration, including the nature of the food offerings and the addition of entertainment features, such as night markets, previously limited to weddings. The festive atmosphere encourages schoolchildren and migrant relatives to return to their villages, strengthening social ties. Unlike standardized celebrations such as Christmas and New Year's, the staggered timing of Gawai across villages strengthens inter-community ties and fosters lasting cultural resilience amid socio-economic change.

Keywords : Globalization, Harvest Festival (Gawai), Transformation, Belief, Commodity, Cultural Resilience

ABSTRACTS

Cluster 3: Arts And Social Sciences

Session 3

084 **ACE-ING LEADERSHIP: A STUDY ON HOW LANGUAGE EMPOWERS YOUTH TO LEAD WITH CONFIDENCE AND PURPOSE**

Presenter: Albert anak Bruce

This study explores how informal, English language-based learning can serve as a catalyst for youth leadership development through the Anyone Can English (ACE) camp initiative. Designed and facilitated by undergraduate students, the ACE program targeted secondary school students in rural Malaysia to enhance their communication confidence and leadership potential. Employing a mixed-methods approach—including pre- and post-assessments, facilitator observations, and participant surveys—the study recorded a 70.15% improvement in theoretical communication, a 79.2% success rate in practical application, and a 69.14% increase in self-reported confidence. These results demonstrate that empowering students to "lead with language" can significantly boost both their communicative skills and leadership readiness. The findings support language-driven youth empowerment as an effective educational strategy aligned with Sustainable Development Goal 4 (Quality Education), affirming that purposeful communication fosters inclusive, confident, and future-ready leaders.

Keywords: Youth Empowerment, Language-Driven Leadership, English Communication, Informal Education, Sustainable Development Goals (SDG 4)

053 **ECO-CONSCIOUS VALUES IN INDIAN RELIGIOUS AND CULTURAL PRACTICES**

Presenter: Ratna Singh

The proposed research paper explores eco-conscious values embedded in Indian religious and cultural practices and their relevance in addressing contemporary environmental challenges. Despite India's rich spiritual heritage that promotes harmony with nature, there exists a gap in integrating these traditional values into mainstream environmental discourse and policymaking. Practices from Hinduism, Buddhism, Jainism, Sikhism, and indigenous traditions reflect deep ecological wisdom, yet are often underutilized in formal environmental strategies.
Problem and Gap: Modern environmental policies in India largely focus on technological and legal frameworks, overlooking traditional ecological knowledge and values. There is insufficient academic and policy-level integration of religious-cultural eco-conscious values in environmental action plans.
Objective: The objective is to analyze eco-centric teachings in Indian religious texts and cultural customs, identify their environmental significance, and propose ways to incorporate these into modern environmental education and policy frameworks. Methodology: The study employs a qualitative methodology, including literature review of religious texts (e.g., Vedas, Puranas, Guru Granth Sahib, Jain Agamas), analysis of rituals and festivals (like Van Mahotsav, Pongal, Tulsi Vivah), and interviews with scholars and practitioners of faith. Comparative analysis with modern ecological principles is also undertaken.
Conclusion: The study concludes that Indian religious and cultural practices hold profound eco-conscious values which, if revived and contextualized, can significantly contribute to sustainable development. Integrating these values into environmental education and policy can bridge the gap between tradition and modernity, fostering a culturally-rooted environmental ethics.

Keywords: Buddhism and ecology, Environmental ethics, Indian religions, Indigenous traditions, Nature and spirituality, Rituals and festivals, Sustainable development, Traditional ecological knowledge.

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Cluster 3: Arts And Social Sciences

Session 4

104 **HOW DOES THE DUAL GOVERNANCE MODEL AFFECT VILLAGE FUND POLICY IMPLEMENTATION IN NAGARI?**

Presenter: Jayanti Armida Sari

This study aims to investigate how the dual governance model, integrating formal administrative structures and customary institutions, affects the implementation of the Village Fund policy in Nagari, Indonesia. Employing a qualitative case study design, the research draws on semi-structured interviews with key stakeholders, document analysis, and NVivo-assisted thematic coding. Findings reveal that while Village Funds have contributed to community development, particularly in health services and
economic empowerment, implementation remains constrained by weak institutional accountability, low sustainability of training programs, and underperformance of Nagari-Owned Enterprises. Participatory mechanisms such as the Nagari Deliberation Forums enhance community involvement but occasionally fail to represent broader local needs. The study proposes a cyclical model of implementation that includes consultation, planning, coordination, execution, monitoring, accountability, and evaluation. Policy implications include shifting from grant-based to asset-based support for the Nagari-owned enterprise, enhancing managerial competence through targeted training, institutionalizing performance-based evaluations, and promoting digital reporting systems to improve transparency. These findings highlight the need for culturally sensitive yet performance-oriented policy frameworks to ensure effective rural development and local governance.

Keyword: village fund, policy model, dual governance, customary governance, community participation

152 **YOUTH SUSTAINABLE DEVELOPMENT: INTERLOCKING CRISES OF POVERTY, EDUCATION AND EARLY MARRIAGE IN NORTHEAST BORNEO**

Presenter: Sharifah Rahama Amirul

Sabah, a Northeast Borneo state in Malaysia. Despite the immense natural resources and cultural diversity, it remained shackled as the poorest state for decades. This paper employed a qualitative document analysis to investigate the interlocking crises of poverty, educational deprivation and early marriage (under 18) perpetuating the barriers to youth sustainable development in Sabah. The paper systematically analyses a triangulated corpus of documents, including government reports (Department of Statistics Malaysia, Ministry of Education, Sabah Islamic Religious Affairs Department), non-governmental organization (NGO) publications (UNICEF, UNFPA, PACOS Trust), academic studies, and historical policy documents from the past four decades. The study found that the triple bind of poverty, educational deprivation and early marriage is a self-reinforcing system rooted in decades of marginalization. To secure future talent and sustainable youth development in Sabah, it is at utmost important to break the cycle of this triple bind through context-specific and decentralised policies to priorities inclusion, equity and decent work at the Northeast Borneo.

Keywords: Youth Sustainable Development, Intergenerational Poverty, Human Capital Development, Interlocking Crises: poverty, educational deprivation and early marriage

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Cluster 3: Arts And Social Sciences

Session 4

037 **THE DAYAK BASAP AND THE POLITICS OF SUSTAINABILITY ON THE PERIPHERY**
Presenter: Manarul Hidayat

This article explores how the cultural practices of the Dayak Basap in Kampung Tapian, East Kalimantan, contribute to raising ecological awareness and negotiating sustainability from the periphery of Indonesia's development trajectory. Drawing on 47 days of ethnographic fieldwork and framed through Eric Hobsbawm's concept of the invention of tradition, the study examines how rituals such as Belian, symbolic use of natural resources, and the revitalization of customary knowledge serve as creative forms of environmental engagement. These practices, once marginalized or devalued, are increasingly rearticulated by local actors as living traditions that emphasize human-nature relations, spiritual balance, and environmental stewardship. As destructive industries and religious institutions (particularly Islamic networks associated with Banjar migrants) deepen their presence, Dayak Basap communities find themselves negotiating identity and ecological agency across a cultural divide between customary and religious orientations. Within this contested space, the arts and ritual practices of the Dayak Basap function not only as expressions of cultural identity but as vehicles for communicating sustainability values and asserting rights over ancestral territories. By positioning cultural traditions as both aesthetic and political acts, this paper argues that Dayak Basap cultural expressions constitute a vernacular politics of sustainability, rooted in local cosmology yet responsive to contemporary pressures. Far from being nostalgic residues, these practices represent evolving strategies of cultural resilience that engage with ecological crises and contest the terms of development. Recognizing such traditions is crucial for reframing sustainability not merely as technical management but as a cultural and moral project anchored in lived experience.

Keywords: Dayak Basap, Sustainability, Cultural resilience, Ritual and tradition, Environmental awareness

034 **GROUNDWATER QUALITY AND HUMAN HEALTH IN KAMRUP DISTRICT OF ASSAM**
Presenter: Tirthankar Sarma

Arsenic in water is a vital problem in many countries around the world including Bangladesh, India, and China etc. According to the United Nation, 2006 more than 1 billion people already lack access to fresh drinking water (UNDP, 2006). Global consumption of water is doubling every 20 years, more than twice the rate of human population growth (UNFPA, 2003). Arsenic can be found in the groundwater of Brahmaputra valley in Assam because Assam valley is highly ferrous. Monitoring groundwater quality is a major concern in the rural areas. Many of the villages in rural India have the problem of monitoring groundwater because they are located in remote areas and not accessible.

Keywords: Arsenic, Brahmaputra floodplain, groundwater, water quality and seasonal variation

Cluster 3: Arts And Social Sciences

Session 4

015

LIFE IN THE MIDST OF HARDSHIP: SOCIOECONOMIC DEVELOPMENT OF COMMUNITIES IN SEBATIK ISLAND, NORTH OF BORNEO

Presenter: Ahmad Fauzan Baihaqi.,M.Hum

This paper aims to reveal the socio-economic conditions of an area in northern Kalimantan, the border island between Indonesia and Malaysia, Sebatik Island. Cross-border trade is defined as the flow of goods and services across international land borders within a range of up to thirty kilometres (30 km) and plays an important role in supporting the livelihoods of border communities. The method used in this paper is a qualitative observation method as well as a critical historical method by utilising literature studies that contain different phenomena that occur every day generally in border areas, especially in Sebatik Island, North Kalimantan, Indonesia. By distinguishing socio-economic and local wisdom, it is expected to be able to dissect the current conditions incorporated in cross-border trade. This study is expected to be able to: build a new model of trade in the form of: multidimensional innovation, and multidisciplinary. As a support for sustainable development on the island of Borneo, policies are needed that represent all without destroying the things that interfere with the side of life, in the form of a policy paper that will be planned in the future community.

Keywords: International border trade, Phenomenon of border trade in Sebatik, Local wisdom, Irregular trade

ABSTRACTS

Cluster 1: Science, Technology & Engineering

Session 5

020 **PHOSPHATE AND POTASSIUM SOLUBILIZATION POTENTIAL OF FUNGAL ENDOPHYTES ISOLATED FROM SABAH ORCHID ROOTS**

Presenter: Jerry Junior Rama

Fungal endophytes, which form symbiotic relationships with plants, have been identified for their ability to enhance plant nutrient acquisition, particularly through the solubilization of phosphate and potassium. In soil, phosphate often exists in insoluble forms due to fixation with calcium, iron, or aluminum, while potassium is predominantly found in insoluble minerals (feldspar and mica), limiting its availability to plants. Despite their importance in plant growth, the specific role of fungal endophytes from native orchids in Sabah, remains underexplored. This study aimed to evaluate the phosphate and potassium solubilization potential of fungal endophytes isolated from the roots of Sabah orchids. Root samples were surface-sterilized using sequential treatments and cultured on potato dextrose agar (PDA) supplemented with chloramphenicol to isolate fungal endophytes and inhibit bacterial growth. The ability of these fungi to solubilize phosphate and potassium was assessed using modified Pikovskaya's and Aleksandrov agar, respectively, based on the formation of halo zones around fungal colonies. Solubilization activity was measured by calculating the solubilization index (SI) based on the diameter of the halo zones relative to colony size. Out of 42 fungal isolates, 13 exhibited phosphate solubilization, with SI ranging from 1.13 to 1.78. Additionally, 15 isolates showed potassium solubilization potential, with SI ranging from 1.47 to 3.16. These results indicate that fungal endophytes from Sabah orchids possess the capacity to solubilize essential nutrients, highlighting their role as plant growth promoters in sustainable agriculture.

Keywords: Fungal Endophytes, Phosphate solubilization, Potassium solubilization, Sabah orchids, Plant growth promoters, Solubilization index (SI), Sustainable agriculture

088 **SUSTAINABLE VALORIZATION OF OIL PALM EMPTY FRUIT BUNCHES: ROLE OF TEMPERATURE AND AGING IN BIOCHAR PRODUCTION**

Presenter: Khim Phin Chong

The sustainable management of agricultural waste is crucial for advancing circular bioeconomy practices. This study aims to (i) examine how different pyrolysis temperatures (300 °C, 450 °C, and 600 °C) affect the properties of biochar made from oil palm empty fruit bunches (EFB); (ii) compare the effects of two aging methods: wet-dry cycles and hydrogen peroxide oxidation on the structure and composition of the biochar and (iii) assess how these treatments influence soil nutrients and microbial communities. Results show that higher pyrolysis temperatures improved the structural integrity and aromaticity of biochar but reduced yield and surface acidity. Aging, especially chemical oxidation, altered pore structure and surface chemistry, increasing hydrogen and nitrogen content while reducing carbon and alkalinity. Elemental analysis showed more ash and alkali metals at higher temperatures, with aging promoting sodium and calcium adsorption but reducing phosphate retention. Soil microbial analysis revealed that biochar increased Actinobacteria, while Firmicutes abundance varied with pyrolysis temperature and aging. These findings suggest that optimizing pyrolysis and aging conditions can enhance the performance of EFB-derived biochar, making it a promising strategy for sustainable soil improvement and waste valorization.

Keywords: Oil Palm Empty Fruit Bunches, Biochar, Pyrolysis Temperature, Aging Methods, Sustainable Waste Management

Cluster 1: Science, Technology & Engineering

Session 5

126 BACTERIAL IDENTIFICATION ALONG THE UPSTREAM AND DOWNSTREAM OF MURUM RIVER, SARAWAK

Presenter: Sabrina Rancang

This study investigates the bacterial community structure in water samples collected from five stations along the Murum River, Sarawak, Malaysia. Bacteria were isolated and analyzed using colony-forming unit (CFU) enumeration, GTG 5 -PCR fingerprinting, and 16S rRNA gene sequencing. Total Viable Count (TVC) ranged from 6.00 × 10^2 to 4.40 × 10^3 CFU/mL, while Heterotrophic Viable Count (HVC) ranged from 10 to 2.53 × 10^3 CFU/mL. Stations 1 and 3 showed significantly higher bacterial loads (p < 0.05). All stations exceeded the WHO limit of 1.0 × 10^2 CFU/mL for drinking water, though no fecal coliforms were detected. AMR analysis revealed that eight isolates had AMR indices greater than 0.2, suggesting potential multi-drug resistance. Gram-negative bacteria were resistant to beta-lactams (piperacillin, cefotaxime) and aminoglycosides (streptomycin), while Gram-positive isolates were generally susceptible to vancomycin and linezolid but showed partial resistance to tetracycline and nalidixic acid. GTG 5 -PCR analysis grouped the isolates into three major clusters, indicating genetic diversity across sampling sites. This variation may reflect differences in environmental conditions along the river. Preliminary 16S rRNA sequencing identified key genera including Bordetella sp., Providencia sp., Bacillus sp., and Bacillus cereus. These bacteria are common in aquatic environments and may contribute to nutrient cycling and organic matter degradation. The findings highlight the presence of diverse and abundant bacterial populations in the Murum River and underscore the importance of microbial monitoring to assess ecosystem health and water quality in freshwater systems.

Keywords: bacteria, diversity, river, water

138 VARIATION IN DIPTEROCARP FLOWERING ACROSS THREE FOREST TYPES DURING THE 2019 GENERAL FLOWERING EVENT IN KABILI-SEPILOK FOREST RESERVE

Presenter: Sasikumar

The occurrence of flowering during general flowering (GF) events in Southeast Asian lowland rainforests varies across forest types, influenced by differences in biophysical and chemical properties, including topography, forest structure, vegetation composition, and soil conditions. GF events, typically linked to El Niño Southern Oscillation (ENSO) cycles, occur irregularly every 2 to 10 years and may also occur in consecutive years. This study investigated the 2019 GF event in Kabili-Sepilok Forest Reserve (KSFR), Sabah, Malaysia, focusing on three forest types: Sandstone, Kerangas, and Alluvial Forests. Using a 160-hectare permanent sampling plot established in 2010, flowering data were collected from 5,777 individual dipterocarp trees representing 42 species, surveyed between April and May 2019. A high overall percentage of flowering individuals was recorded, with 78.0% of trees observed in flower. Among all species, Richetia acuminatissima (Seraya Kuning Runcing) had the highest percentage of flowering individuals, with 88 out of 94 individuals flowering (93.8%). Across forest types, Sandstone Forest recorded the highest percentage of flowering individuals (81.7%), followed by Kerangas Forest (78.8%) and Alluvial Forest (76.1%). This variation was statistically significant ($\chi^2 = 14.37$, $p = 0.00076$). These results demonstrate that flowering among dipterocarp trees varied significantly across forest types during the 2019 GF event, with the highest flowering recorded in Sandstone Forest.

Keywords: General Flowering, Dipterocarpaceae, Forest Type, Kabili-Sepilok, Borneo.

Cluster 1: Science, Technology & Engineering

Session 5

071 CRISPR/CAS9-MEDIATED INHIBITION OF MALAYSIAN CYTOMEGALOVIRUS USING PLASMID AND RNP DELIVERY SYSTEMS

Presenter: Krishnan Nair Balakrishnan

Background: Cytomegalovirus (CMV) remains the leading cause of congenital viral infections, and current anti-CMV drugs exhibit toxicity, resistance and side effects in patients. As an alternative approach to eradicate CMV infection, this study utilized plasmid and ribonucleoprotein (RNP) CRISPR/Cas9 to inhibit viral replication and gene expression of novel transplacental rat CMV (RCMV ALL-03), which mimics infection in humans. Methods: Guide RNAs (gRNA) were designed to target immediate early 2 (IE2) and DNA polymerase genes of RCMV ALL-03. The efficacy of the CRISPR-mediated CMV inhibition was evaluated using an in vitro cleavage assay, intracellular viral genome load, relative expression of viral RNA, virus induced cytopathic effect (CPE) and degree of apoptosis in CRISPR-treated cells.
Results: The results demonstrated presence of indels at the target site, with RNP showing a higher cleavage efficiency (>80%). There was also a significant reduction for intracellular viral DNA load with both CRISPR systems (>90%). The gene expression analysis revealed a significant down regulation of the targeted viral DNA polymerase gene (88% and 95% for RNP-dpg1 and RNP-dpg2, respectively) and IE2 gene (77% and 75% for plasmid-ie2g2 and RNP-ie2g2, respectively). At day 14 p.i. changes in CPE indicated higher protective efficacy against CMV infection with than plasmid CRISPR system and positive control ganciclovir (GCV). Flow cytometry analysis showed a greater percentage of cells viability and early apoptosis in both plasmid and RNP CRISPR-treated cells compared to control group.
Conclusions: The results of this study suggest that targeting IE2 and DNA polymerase genes with CRISPR/Cas9 successfully inhibited viral replication and gene expression, with the RNP CRISPR system being more efficient compared to the plasmid CRISPR system. The findings from this study are a stepping stone to potential therapeutic applications of CMV infection.

Keywords: CMV, CRISPR/Cas9, genome editing, virus replication, gene expression

089 N-DOPED GRAPHENE NANOPLATELET/ REDUCED GRAPHENE OXIDE (GNP/RGO) AEROGEL FOR ENHANCED ANTIBIOTICS ADSORPTION

Presenter: Alvin Lim Teik Zheng

Three-dimensional N-doped graphene nanoplatelet/reduced graphene oxide (GNP/rGO) were synthesized via a solvothermal reduction method using N,N-dimethylformamide (DMF) as the nitrogen source. The incorporation of GNPs at varying concentrations (20–60 mg) into the rGO matrix significantly enhanced the structural, thermal, and adsorption properties of the aerogels. The adsorption performance was evaluated for emerging contaminants tetracycline (TC) and levofloxacin (LVX). The 60-GNP/rGO exhibited the highest adsorption capacity, achieving 98.2% removal of TC within 1000 minutes and 100% removal of LVX within 500 minutes. This performance was attributed to the synergistic effects of N doping, increased surface area, and retained oxygen functional groups, which enabled strong π-π interactions, hydrogen bonding, and electrostatic interactions with the contaminants. Raman spectroscopy revealed an increase in the ID/IG from 0.86 to 1.01, indicating more active defect sites. XRD analysis showed a reduction in interlayer spacing from 0.369 nm to 0.350 nm, confirming improved graphitic ordering. TGA demonstrated excellent thermal stability, with the 60-GNP/rGO composite retaining 90.7% weight at 600°C, while XPS analysis verified successful N doping and increased graphitic character. Overall, the 60-GNP/rGO proved to be a highly efficient and reusable adsorbent for antibiotic removal, highlighting its potential as a sustainable solution for addressing water pollution caused by emerging pharmaceutical contaminants.

Keywords: 3D graphene; N-doping, aerogel; solvothermal; physicochemical; adsorption

Cluster 1: Science, Technology & Engineering

Session 5

047 **IMMORTALIZING STROMAL CELLS FOR SUSTAINABLE IN VITRO GASTRIC RESEARCH**

Presenter: Carlos Silvester

Introduction: Gastric stromal cells play a crucial role in regulating gastric stem cells (GSCs) through the secretion of growth factors, cytokines, and extracellular matrix components. This crosstalk is vital for maintaining homeostasis and stomach tissue repair. While GSCs possess the ability to self-renew and proliferate indefinitely, primary stromal cells have a limited lifespan in culture, restricting their use in long-term in vitro studies. Objective: To address this limitation, this study aims to immortalize mouse gastric stromal cells, ensuring sustained proliferation while preserving their functional characteristics. Methodology: Gastric stromal cells were isolated from mouse stomach tissue through enzymatic digestion using 2.5 mg/mL collagenase type II. The harvested cells were then cultured in a six-well plate containing low-glucose DMEM, supplemented with 10% FBS and 1% penicillin/streptomycin, and maintained at 37°C under 5% CO_2 conditions. After 24 hours of culture, a retroviral suspension containing pCMSCVpuro-hTERT and pCLXSN-16E6E7, along with 8 µg/mL polybrene, was introduced and subsequently centrifuged at 1,600 rpm at 35°C for 45 minutes. The pCMSCVpuro vector encodes the puromycin resistance gene, while the pCLXSN vector carries G418 resistance genes. Therefore, after 48 hours of culture, the medium was renewed with puromycin- and G418-containing selection media. Single-cell clones were obtained via limiting dilution.
Results: Stromal cell immortalization was achieved by inactivating cell cycle regulators Rb/p16 and p53 via retroviral transduction with the pCLXSN vector containing human papillomavirus-16 E6/E7 oncogenes. Additionally, the pCMSCVpuro vector encodes human telomerase reverse transcriptase (hTERT), preventing telomere shortening and ensuring stable cell division. Immunofluorescence staining assay of immortalized stromal cell clones demonstrated expression of the stromal cell marker smooth muscle actin (SMA). Real-time PCR analysis confirmed Sma expression, corroborating the immunofluorescence findings.
Conclusion: This study provides a sustainable approach to in vitro gastric research by immortalizing stromal cells, reducing reliance on animal models while enhancing experimental consistency and reproducibility.

Keywords: stem cell, stromal, stomach, mouse, immortalization, telomerase, HPV16

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Cluster 1: Science, Technology & Engineering

Session 6

095 **RECOVERY OF OIL AND GREASE FROM PALM OIL MILL EFFLUENT USING FOAM-BASED ADSORBENT**
Presenter: Nur Fahtin Nabilah Rosman

The recovery of residual oil from Palm Oil Mill Effluent (POME) offers significant environmental and economic benefits to the palm oil industry. However, existing methods often rely on expensive commercial polymers, organic solvents, and are limited by scalability and operational complexity. This study proposes a more practical, cost-effective solution using readily available foams polyurethane (PU) with different densities (PU25, PU35, PU50) and melamine foam as sorbents for oil recovery. Pre-oiling treatment significantly enhanced oil sorption capacity, increasing from 8.635 g/g to 31.252 g/g. In refined palm oil tests, melamine showed the highest capacity (109.28 g/g), followed by PU25 (31.91 g/g), PU35 (25.26 g/g), and PU50 (13.82 g/g). All foams reached saturation within 30 minutes. Sorption efficiency decreased with increasing temperature. In oil-in-water emulsions (0.6%–2.0% v/v), PU25 and PU35 retained high removal efficiency (79.14% and 81.59%, respectively) over five reuse cycles. Isotherm analysis revealed melamine followed the Langmuir model (R^2 = 0.954), while PU foams fit the Freundlich model (R^2 = 0.802–0.939). Real POME tests confirmed melamine's highest initial adsorption (104.04g/g) and oil recovery (77%), but reusability declined due to fouling. Characterization via FTIR, SEM, and CHNS indicated structural and chemical changes post-adsorption. PU25 and PU35 were identified as the most promising materials for practical application due to their efficiency, durability, and economic feasibility.

Polyurethane; melamine; foam; POME; adsorbent

104 **WASTEWATER TREATMENT THROUGH WATER HYACINTH PHYTOREMEDIATATION FOR IRRIGATION WATER SOURCE**
Presenter: Siti Nurfadilah Jaini

Irrigation utilized vast amount of water for crop production. Climate change, upsurged population and demand, and polluted water resource impacting the stability of clean water source for irrigation. Hence, various approaches were investigated for wastewater treatment to sustain clean water reserve for crop production. Wastewater treatment through phytoremediation is an emerging green approach for removing effluent and pollutants. This approach utilized hyperaccumulator plant to extract, eliminate, and accumulate effluent and pollutants from the wastewater, naturally. Water hyacinth is investigated as the main hyperaccumulator plant during phytoremediation process because it grew in abundance, at Sabah. The existed studies heavily focused on heavy metal removal from wastewater bodies without thoroughly examining the water quality mainly for irrigation water source. Thus, this study investigated the ability of water hyacinth for treating blackwater, greywater, greywater with grease, and water comprising heavy metal. These wastewaters were collected either from sewage, or drain, or synthesize in the laboratory. Each wastewater was undergone water hyacinth phytoremediation treatment within 15 days. Water quality includes pH, electrical conductivity (EC), salinity, dissolved oxygen, total suspended solid (TTS), oil and grease content, sulphate, magnesium, and sodium content, were the main parameters measured before and after 15 days of water treatment. Initially, pHs of all wastewaters were in the range of 7.3 – 8.3 except for water comprising heavy metal which was slightly acidic with pH 5.3. Moreover, both salinity and TTS level significantly reduced after 15 days of treatment. Besides, water hyacinth survived within 15 days of treatment for both blackwater and greywater with grease. In contrast, water hyacinth wilt after 15 days of phytoremediation in both greywater and water comprising heavy metal. Wastewater treatment through water hyacinth phytoremediation was able to improve water quality for various types of wastewaters. However, greywater and water with heavy metal required longer duration of treatment.

Keywords: Phytoremediation, water hyacinth, wastewater treatment, irrigation, phytoextraction

Cluster 1: Science, Technology & Engineering

Session 6

107 EFFECT OF SLOW VACUUM PYROLYSED PALM KERNEL SHELL WOOD VINEGAR FORMULATIONS ON REPELLING MOSQUITOES

Presenter: Rachel Fran Mansa

This study explores the use of wood vinegar derived from palm kernel shell through slow vacuum pyrolysis as a natural fogging solution for mosquito control. Aimed at replacing conventional chemical-based fogging agents, which pose environmental and health risks, this research also supports circular economy practices by utilizing palm oil industry waste biomass. The experimental methodology involved capturing five mosquitoes and conducting fogging trials in a controlled 90-liter enclosure during peak mosquito activity hours. Several wood vinegar-based formulations—pure, and mixtures with glycerin and lemongrass oil—were tested. The study examined how varying formulation influenced mosquito repellence ability. Findings revealed that for pure formulations, the effectiveness was increased as the volume to volume percentage concentration was increased. Further increase was observed for all tested formulations, which demonstrated adequate and uniform spread under controlled conditions. Optimization of the formulation resulted in 100% mosquito mortality, outperforming other formulations in both coverage and efficacy. The results suggest that wood vinegar-based fogging solutions, particularly when blended with natural additives, are promising alternatives to conventional fogging agents. This environmentally friendly approach offers an effective method for mosquito control while promoting sustainable use of agro-industrial waste materials.

Keywords: Wood vinegar; mosquito; fogging; lemongrass oil; mosquito repellent

113 IMPACT OF TEMPERATURE AND VOLUME CONCENTRATION OF NANOPARTICLE IN ELECTROLYTE SOLUTION ON HYDROGEN YIELD RATE OF A PVT BASED HYDROGEN PRODUCTION SYSTEM – AN EXPERIMENTAL STUDY

Presenter: S.Senthil Raja

Hydrogen is a significant alternative energy source to satisfy energy demands and address the challenges associated with fossil fuels. The generation of hydrogen by the electrolysis of water with a Photovoltaic-Thermal (PVT) solar collector presents a significant difficulty due to intermittent solar radiation and insufficient solar panel performance. This paper involves an experimental investigation to examine the impacts of temperature and volume concentrations of nanoparticle-dispersed electrolyte solutions. The required electrolyte solutions were synthesised by using a two-step technique, including 0.05, 0.1, and 0.2 vol.% of CuO nanoparticles into deionised water. The thermophysical characteristics, including thermal conductivity, viscosity, and stability, of the nanoparticle-dispersed electrolyte solution were measured at various temperatures. The findings indicated that the thermal conductivity and viscosity of the electrolyte solution were directly affected by temperature and the concentration of nanoparticles in the base deionized water. The zeta potential measurements indicated a significant electrostatic repulsive force between the particles, resulting in reduced particle agglomeration. The substantial improvement in hydrogen production rate was observed, ranging from 0.83±10% to 2.28±10% for 0.05 vol.%, 1.45±10% to 2.85±10% for 0.1 vol.%, and 2.07±10% to 3.56±10% for 0.2 vol.% of CuO nanoparticles incorporated into the base electrolyte solution, achieved by adjusting the temperature from 35°C to 55°C. This significant enhancement was achieved mainly owing to the improved electrochemical and catalytic characteristics of the system.

Keywords: Hydrogen Yield rate, Photovoltaic - Thermal (PVT) system, Electrolyte solution, Nanofluid

Cluster 1: Science, Technology & Engineering

Session 6

124 PREPARATION OF ALUMINA HOLLOW FIBER MEMBRANE COATED SILICONE FOR MICROPLASTIC SEPARATION

Presenter: Norfazliana Abdullah

Microplastic contamination in wastewater is a growing environmental concern, with current removal techniques often proving inefficient or unsustainable. Thus, this research aims to develop a prototype utilizing an alumina hollow fiber membrane to separate microplastics from wastewater effectively. The primary objectives of this research are to prepare an alumina hollow fiber membrane coated with silicone by varying drying temperatures, to study the effect of the surface area of alumina hollow fiber membranes on microplastic/water separation, and to investigate the effectiveness of microplastic/water separation by adjusting the flow rate in the alumina hollow fiber membrane module. The project involves coating alumina hollow fiber membranes with silicone as an outer layer and characterizing them using contact angle analysis to evaluate surface wettability and hydrophilicity. A module with varying numbers of membranes and flow rates (5 mL/min, 10 mL/min and 1 5mL/min) was tested. The silicone coating significantly influenced the membrane's hydrophilic properties, with Sample C (coated at 70°C) exhibiting a contact angle of 100.39°. This lowest contact angle suggests that Sample C is the most effective for applications requiring fast water interaction, making Sample C the best sample for this experiment. Despite a higher standard deviation, Sample C's faster water interaction and absorption capabilities would provide the best performance for microplastic separation processes. After the separation activity, the amount of water collected ranged from 6.88 L/m 2 .h 1 to 7.99 L/m 2 .h 1 , with the best performance observed at a high flow rate (15 mL/min). The results show that flow rate has a significant impact on separation efficiency. Higher flow rates allow more water to pass through the membrane, which indicates that increasing both the flow rate and the surface area of membranes improves water recovery. This study concludes that silicone-coated alumina hollow fiber membranes effectively remove microplastics from wastewater.

Keywords : alumina, membrane, silicone, separation, microplastic

030 HYBRID CULTIVATION OF IMMOBILISED MICROALGAE IN RECIRCULATING AQUACULTURE SYSTEM

Presenter: Jessica Ling Siew Kiong

Microalgae biomass holds significant potential for biofuel production, pharmaceutical and nutraceutical applications, and bioremediation. To enhance the economic viability of microalgae production, aquaculture wastewater is a good alternative for commercial nutrients to thrive microalgae growth. This project involved hybrid cultivation of microalgae in a recirculating aquaculture system (RAS). Meanwhile, bioremediation was achieved as the excessive nutrients generated in RAS were assimilated by microalgae. Microalgae species of Monoraphidium contortum and Chlorella sp. were selected as they are rich in carbohydrates and lipids. To ease biomass harvesting, microalgae was immobilised in different composites of alginate and chitosan beads. FTIR showed successful immobilisation of microalgae in the beads. Immobilised microalgae grew well in RAS and demonstrated efficient nitrate-nitrogen removal, which highlighted the mutual benefits of hybrid cultivation in sustainable wastewater valorisation, wastewater treatment, and biomass and aquaculture productions.

Keywords: Microalgae, Immobilisation, Alginate, Chitosan, Bioremediation

ABSTRACTS

Cluster 2: Medicine And Natural Sciences

Session 7

003

PREVALENCE OF MEDICATION ERRORS AND ITS ASSSOCIATED FACTOR IN DISTRICT HOSPITAL IN SABAH

Presenter: Dhinagar Selgal Raddy

Introduction: Medication errors (MEs) remain a critical concern in healthcare delivery, significantly endangering patient safety and quality of care. Among these, near-missed medication errors (events intercepted before reaching the patient)—represent valuable opportunities for system-level improvements. However, data on the prevalence and contributing factors of such incidents, particularly in district hospitals, remain limited.
Objectives: This study aimed to determine the prevalence of near-missed medication errors and identify associated factors among healthcare settings in a district hospital in Sabah.
Methodology: A cross-sectional study was conducted using secondary data from the Pharmacy Information System for the year 2023. This was complemented by a structured questionnaire distributed to healthcare workers involved in medication handling. Data analysis was performed using SPSS version 29. Descriptive statistics were used to determine prevalence, and logistic regression analysis was conducted to identify predictors of near-missed medication errors.
Results: The overall prevalence of near-missed medication errors was 3.6%, with significant variations by patient care setting: 2.6% in outpatient departments and 8.8% in inpatient wards. Multivariable logistic regression analysis revealed that a high patient-to-staff ratio was a significant predictor, with an adjusted odds ratio (aOR) of 26.7 (95% CI: 1.987–358.8, p = 0.013), indicating a markedly increased likelihood of errors in understaffed settings.
Conclusion: Near-missed medication errors are more prevalent in inpatient settings and are significantly associated with staffing ratios. These findings underscore the need for targeted interventions, such as workload redistribution and continuous monitoring systems, to strengthen medication safety practices. The implementation of proactive strategies can help mitigate risks and enhance overall patient safety in district-level hospitals.

Keywords: district hospital, medication error, near-missed, patient safety, sabah.

006

BENEFITS OF TARGETED HEALTHCARE SUBSIDIES: A SCOPING REVIEW

Presenter: Nik Dewi Delina Nik Mohd Kamil

Introduction: Targeted healthcare subsidies can enhance the utilisation of underutilised services, particularly among populations with limited access to healthcare. However, data inconsistency and a lack of comprehensive synthesis present a significant challenge for policymakers and healthcare providers contemplating implementing or modifying healthcare voucher schemes.
Objectives: This study aims to determine the benefits of implementing specific healthcare subsidies.
Methodology: This study used a methodological framework developed by Arksey and O'Malley and refined by the Joanna Briggs Institute and Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).
Results: The search strategy resulted in 534 citations from PubMed and Scopus. Out of the total, 187 instances were found to be duplications, while 347 were identified as unique study references. Furthermore, we found and analysed 43 pertinent references and full texts. Consequently, 30 studies were excluded, leaving 12 that satisfied the inclusion criteria for the review—targeted healthcare subsidies benefit by promoting the use of healthcare services, addressing vulnerable groups, encouraging private and public care, providing continuous care, relieving financial burdens, reducing carers' stress, and decreasing waiting time for subsidised homes for the elderly.
Conclusion: Tailored subsidy distribution addresses healthcare needs, improves accessibility, and reduces disparities in the system. By directing financial assistance towards identified areas of concern, policymakers can optimise resource allocation and enhance the overall efficiency of healthcare interventions.

Keywords: Targeted healthcare subsidies, healthcare utilisation, healthcare accessibility

ABSTRACTS

Cluster 2: Medicine And Natural Sciences

Session 7

009

PREVALENCE OF LIVER COMPLICATIONS AND ITS ASSOCIATED FACTORS AMONG HEPATITIS B-INFECTED ADULTS IN SABAH

Presenter: Zainib Amirah Anwar

Hepatitis B infection is a silent and growing global public health issue. The cost of treatment of liver complications due to chronic hepatitis B will further stretch the burden of our nation's healthcare system financially. This study's main objective was to determine the factors associated with liver complications among hepatitis B-infected adults in Sabah (N = 3,110). Sociodemographic factors, behavioral factors, and comorbidities were studied to determine their associations with liver complications. This cross-sectional study utilized e-Notification data on hepatitis B from year 2016 until 2023 obtained from the Sabah State Health Department. The prevalence of liver complications among hepatitis B-infected adults in this study is 6.7% (95% CI: 6.5,6.9). Chi-square analysis found that age, gender, and nationality are associated with liver complications. Comorbidities like diabetes, hypertension, and pulmonary tuberculosis were found to be significantly associated with liver complications. The analysis also found that high-risk behaviors like heavy alcohol consumption and sharing of personal hygiene tools were significantly associated with hepatitis B liver complications. Further analysis using multiple logistic regression revealed that adults over 35 years have a significantly higher risk of liver complications compared to those aged 18-35 (adjusted OR = 2.899, 95% CI: 1.92, 4.37). Female gender is protective, reducing the likelihood of liver complications (adjusted OR = 0.489, 95% CI: 0.35, 0.67). Non-Malaysians have a lower risk compared to Malaysians (adjusted OR = 0.306, 95% CI: 0.19, 0.47). Alcohol intake is linked to a higher risk of liver complications (adjusted OR = 2.173 95% CI: 1.15,4.10), while sharing personal hygiene tools reduces the risk (adjusted OR = 0.368, 95% CI: 0.21, 0.66). Hypertension is also associated with an increased risk of liver complications in Hepatitis B patients (adjusted OR = 3.801, 95% CI: 2.04, 7.07). This study contributes to the literature pertaining to factors associated with hepatitis B-related liver complications in Sabah to tailor prevention programs targeting populations at risk and manage resource allocation for treatment.

Keywords : Liver complications, hepatitis B

016

THE ACUTE EFFECTS OF RESISTED SLED TRAINING (RST) ON MUSCLE RECRUITMENT

Presenter: Jumain Taepe

This study aimed to examine the acute effects of Post-Activation Potentiation (PAP) induced by Resisted Sled Training (RST) using 10% body weight resistance on the muscle recruitment of eight major muscle groups.
Methods: Fifteen trained athletes (M = 16.0 years, SD = 1.9) participated. Electromyographic (EMG) activity was recorded for the right gluteal muscle (RGM), biceps femoris (RBFM), medial gastrocnemius (RMGM), rectus femoris (RRFM), soleus (RSM), thoracic (RTM), vastus lateralis (RVLM), and vastus medialis (RVMM) at five intervals: pre-test, and 1, 4, 7, and 10 minutes post-RST. Repeated measures ANOVA and pairwise comparisons were conducted.
Results: None of the eight muscles showed statistically significant differences ($p > .05$) in EMG activity across all post-test time points. Specifically, the p-values for each muscle were: RGM ($p = 1.000$ to $.677$), RBFM ($p = .215$ to $.408$), RMGM ($p = .127$ to 1.000), RRFM ($p = .532$ to 1.000), RSM ($p = .351$ to 1.000), RTM ($p = .272$ to 1.000), RVLM ($p = 1.000$), and RVMM ($p = 1.000$).
Conclusion: RST using 10% body weight resistance does not significantly influence acute muscle recruitment across the gluteal, hamstring, quadriceps, calf, or thoracic muscles. While RST may enhance sprint performance through other mechanisms, coaches aiming to stimulate neuromuscular activation should consider higher resistance loads or complementary strength exercises.

Keywords: Post-Activation Potentiation, resisted sled training, muscle recruitment, electromyography, sprint performance

Cluster 2: Medicine And Natural Sciences

Session 7

021

URBAN GARDENS AS A HEALTH PROMOTION STRATEGY: EVALUATING FOOD SECURITY, WELL-BEING, AND SUSTAINABILITY IN KOTA KINABALU, SABAH

Presenter: S Muhammad Izuddin Rabbani Mohd Zali

Urbanisation and income inequality in Malaysian cities exacerbate food insecurity, particularly in low-income urban areas. Urban gardening (UG) has gained traction as a solution, driven by motivations such as environmental concerns, health benefits, and the desire for self-sufficiency. However, challenges like limited space, financial constraints, and a lack of knowledge hinder widespread adoption. Despite these obstacles, successful UG programs can alleviate food insecurity, improve air quality, and provide economic opportunities, especially in impoverished urban communities. However, the impacts of UG on food security, health, and community resilience remain underexplored.
Objectives and Methodology: This study evaluates the effects of a hydroponic UG intervention in Taman Kuala Manggatal, Kota Kinabalu, Sabah, assessing its influence on food security, dietary behaviour, and social determinants of health (SDOH). A mixed-methods approach was employed to collect data, including the Household Food Insecurity Access Scale (HFIAS), pre- and post-intervention surveys, and stakeholder interviews. The intervention, conducted in June 2023, aimed to address food insecurity and promote community well-being. A purposive sample of 112 participants was selected.
Results and Conclusions: Results showed that 95.5% of households experienced food insecurity, with 36.6% moderately and 33% severely affected. Key challenges included limited food variety (10.7%) and skipped meals (7.1%). All participants increased their fruit and vegetable consumption post-intervention, 87.5% reported improved problem-solving skills, and 56.2% gained gardening knowledge. Community engagement was strong, with 90.3% of participants rating cooking demonstrations highly relevant. Key barriers included high setup costs and knowledge gaps, indicating the need for scalable solutions. In conclusion, UG represents a promising solution to urban Malaysia's food insecurity, health disparities, and environmental challenges. The Taman Kuala Manggatal project highlights the potential of UG to foster resilience, sustainability, and community empowerment. Future efforts should focus on scaling interventions and promoting multi-sectoral collaboration.

Keywords: Urban gardening, food security, health promotion, hydroponics, community engagement, collaboration.

023

PROTEOMICS OF BOX JELLYFISH, CHIRONEX YAMAGUCHII, FROM SABAH

Presenter: Muhamad Na'im Ab Razak

Multi-tentacled box jellyfish endemic to Sabah, Malaysia, have been implicated in at least six pediatric fatalities from 2006 to 2022. A recent study confirmed this species as Chironex yamaguchii. Despite its medical significance, comprehensive venom profiling has not been undertaken, and specific lethal toxins remain unidentified. Understanding venom components and their clinical implications is essential to address public health concerns effectively.
Objective: This study aimed to characterize the venom proteome of C. yamaguchii, employing a protein decomplexation approach to elucidate its venom composition and identify specific toxins implicated in severe human envenomation.
Methodology: Specimens of C. yamaguchii were collected from Lahad Datu coastal waters and identified morphologically according to established taxonomic guidelines. Venom was extracted via nematocyst autolysis, sonication, and centrifugation. Protein concentrations were quantified using a Nanodrop spectrophotometer. Proteomic profiling was conducted through sodium dodecyl sulphate–polyacrylamide gel electrophoresis (SDS-PAGE) and chromatographically separated via reverse phase high-performance liquid chromatography (rpHPLC). Subsequently, toxin identification was accomplished using tandem mass spectrometry (LC-MS/MS).
Results: Proteomic analysis via LC-MS/MS identified 35 unique protein groups in the venom of C. yamaguchii. Six distinct toxins were confirmed: CqTX-A, CfTX-1, CfTX-2, CfTX-A, CfTX-B, and a TX-like toxin fragment. These toxins are known for potent biological effects and are likely responsible for the lethality observed in human envenomation incidents.
Conclusion: This pioneering study provides critical insights into the venom profile of C. yamaguchii, highlighting several potent toxins potentially contributing to lethal outcomes. Future studies involving targeted lethality assays are recommended to definitively identify principal lethal toxins. A comprehensive understanding of these venom constituents will aid in developing targeted medical interventions and antivenoms, improving clinical management and outcomes for victims of box jellyfish envenomation.

Keywords: Box Jellyfish, Chironex yamaguchii, shotgun proteomics, tandem mass spectrometry; toxin identification.

ABSTRACTS

Cluster 2: Medicine And Natural Sciences

Session 7

035 **CASE STUDIES ON TRADITIONAL MEDICINAL SYSTEMS IN NORTHEAST INDIA**
Presenter: Shraddha Basu

Case studies on the use and integration of Ayurveda, Homoeopathy, and tribal remedies across selected states in Northeast India, including Assam, Nagaland, Meghalaya, and Arunachal Pradesh, are presented in this paper. Northeast India is known for its rich ethnic diversity and ecological wealth, and it is home to a variety of traditional medicinal systems that continue to play a crucial role in primary healthcare, especially in rural and tribal communities. According to the case studies, tribal remedies are still firmly anchored in oral traditions, regional biodiversity, and indigenous knowledge systems, even though Ayurveda and homeopathy have received official recognition in government healthcare programs. Ayurvedic pharmacies are being used more and more in Assam and Meghalaya to treat long-term conditions like digestive issues, asthma, and arthritis. Homoeopathy, widely accepted for its affordability and gentle approach, is practiced in both urban clinics and rural outreach programs, with positive patient outcomes in treating skin diseases, respiratory issues, and psychosomatic conditions. Traditional healers treat common ailments, bone fractures, and mental distress in tribal areas of Arunachal Pradesh and Nagaland using locally sourced herbs, roots, and spiritual rituals. These customs are inherited and modified to fit the ecological and cultural conditions of the local area. Nevertheless, the survival of these native systems is threatened by modernization, environmental deterioration, and a lack of documentation. The study makes the case for the urgent need to record and authenticate traditional healing methods in Northeast India while advancing community involvement, ethical bioprospecting, and intellectual property rights. Integrating traditional knowledge with contemporary public health initiatives could improve the region's sustainable and culturally sensitive healthcare systems.

Keywords: Traditional medicine, Northeast India, Ayurveda, Homoeopathy, tribal remedies, indigenous knowledge, ethnomedicine, medicinal plants, rural healthcare, cultural heritage

054 **GEOMETRIC MORPHOMETRIC OF FRONTAL SINUS: A DIGITAL APPROACH TO SEX ESTIMATION AMONG MALAYSIANS**
Presenter: Nur Damia Iwani Zulkiflee

Sex estimation plays a crucial role in forensic anthropological investigations, particularly in establishing the biological profile of unidentified human skeletal remains. In cases involving fragmented skeletons, the frontal sinus structure, known for its resilience, offers promising potential for identification. Traditional osteometry method involves direct analysis on skeletal remains. This approach may pose health and safety risks when handling potentially contaminated remains. In contrast, this study employs a geometric morphometric approach, a morphological analysis technique applied to digitised radiographs, thereby minimizing direct contact with biological materials. Despite its advantages, the application of frontal sinus for sex estimation in the Malaysian population remains underexplored.
Objective: This study aims to evaluate sexual dimorphism in the frontal sinus among Malaysians using geometric morphometric.
Methodology: Samples of 453 Malaysian lateral skull radiographs Malaysian, comprising 228 males and 225 females, were retrieved. Eight 2D landmarks were applied to the digitised radiographs, outlining the frontal sinus shape using TPSDig2 software. Geometric morphometric analysis, including Procrustes ANOVA and discriminant function analysis (DFA), were performed using MorphoJ software.
Results: Procrustes ANOVA indicated statistically significant differences in frontal sinus shape between sexes. DFA after cross-validation further demonstrated significant sex-based variation achieving an overall classification accuracy of 80.6%, correctly identifying 78.5% of males and 82.7% of females.
Conclusion: The sexual dimorphism observed in frontal sinus shape using geometric morphometric highlights its potential as a valuable alternative tool in forensic investigations and underscores the importance of developing a population-specific database of frontal sinus morphology for Malaysians.

Keywords: Frontal Sinus, Forensic Anthropology, Geometric Morphometric, Malaysian, Sex Estimation,

Cluster 2: Medicine And Natural Sciences

Session 7

093 ANTIMYCOBACTERIAL POTENTIAL OF HEXANE AND ETHYL ACETATE EXTRACTS FROM MANGROVE SPECIES AGAINST A CLINICAL MYCOBACTERIUM TUBERCULOSIS STRAIN FROM SABAH

Presenter: Tamar Kansil

The high tuberculosis (TB) mortality rate remains a significant global health concern. In Sabah, Malaysia, social deprivation and the emergence of drug-resistant Mycobacterium tuberculosis (MTB) strains such as the locally isolated SBH257 pose ongoing challenges. Mangrove plants, known for their rich bioactive compounds with antimicrobial and immunomodulatory potential, offer promising therapeutic prospects. This study investigated the antimycobacterial activity, total phenolic content (TPC), and antioxidant activity of hexane and ethyl acetate extracts from six mangrove species: Avicennia marina, Bruguiera gymnorrhiza, Ceriops tagal, Rhizophora apiculata, Rhizophora mucronata, and Xylocarpus granatum. Twenty-six plant part samples were collected from Sulaman Lake Mangrove Forest, Tuaran, Sabah. Extracts were prepared using hexane and ethyl acetate, then analyzed for TPC using the Folin-Ciocalteu method and antioxidant activity using the DPPH assay. Antimycobacterial activity was assessed through broth microdilution and resazurin microtiter assays at concentrations ranging from 0.0195 to 5 mg/mL. All extracts demonstrated antimycobacterial activity, with the ethyl acetate extract of Ceriops tagal leaves showing the strongest effect (MIC = 0.039 mg/mL). The weakest activity was observed in the hexane extracts of R. apiculata root and R. mucronata stem (MIC = 2.5 mg/mL). Notably, although the C. tagal leaf extract exhibited only moderate TPC (129.59 mg GAE/g) and antioxidant activity (778.89 µg/mL), its strong antimycobacterial effect suggests the involvement of non-phenolic, non-antioxidant compounds in MTB inhibition. These findings underscore the potential of mangrove-derived extracts especially the ethyl acetate extract of C. tagal leaves as a source of novel anti-TB agents. Further studies are warranted to isolate and characterize the active constituents and evaluate their therapeutic efficacy in preclinical models.

Keywords: Antimycobacterial activity, hexane extracts, ethyl acetate extracts, mangrove plants, Mycobacterium tuberculosis

ABSTRACTS

Cluster 3: Arts And Social Sciences

Session 8

018

REFINING KOTA KINABALU TOURISM TRAIL AND URBAN CONNECTIVITY
Presenter: Nurakmal Abdullah @ Goh Tuo Ho

Kota Kinabalu, the capital of Sabah, Malaysia, is a rapidly growing tourism hub renowned for its natural attractions, cultural heritage, and vibrant urban life. With increasing tourist arrivals, strategic planning is essential to enhance visitor experiences while ensuring sustainable development. This study explores strategies to refine KK's tourism offerings and urban connectivity by (1) improving tourist facilities and pedestrian safety, (2) optimizing urban mobility through integrated transport solutions, and (3) fostering economic growth by extending tourist stays and increasing local spending. A key proposal includes the development of a Tourist Map and Urban Connectivity Plan, which integrates multi-modal transport networks, walkable trails, and digital tools to create a seamless visitor experience. By prioritizing sustainability, inclusivity, and smart city principles, this framework aims to position KK as a leading destination for eco-tourism and urban exploration. The findings provide actionable insights for policymakers, urban planners, and tourism stakeholders to balance growth with environmental and social considerations.

Keywords: Kota Kinabalu, sustainable tourism, urban connectivity, pedestrian mobility, smart city, economic development

025

SOCIAL MEDIA, SUSTAINABLE TOURISM, AND CROSS-CULTURAL COMMUNICATION
Presenter: Melly Ridaryanthi

Traveling across borders and immersing oneself in a new culture has become a popular choice for spending leisure time, vacations, or as a reward for personal achievements. The remarkable experience is shared through social media as flexing or source of information that advocate travel decisions among social media users. Social media undoubtedly contribute influence in shaping tourism experiences, cross-cultural communication, and sustainability discourse. This article presents a preliminary literature review on the intersection of these key concepts which focus on Indonesia and Malaysia. Social media has emerged as showcase for cultural representation for both countries as tourism destinations. The literature review draws from interdisciplinary studies related to tourism, media and communication, tourism, and environmental sustainability. The categorisations will identify social media (i) as platform for shaping tourist imaginaries from related tourism information, (ii) intercultural interaction sphere, and (iii) tool for sustainability information, where social media users engage in discourse. This preliminary literature review highlights gaps in empirical research topic, conceptual framework and methods employed. The result recommends further studies that explore how digital narratives on social media platforms influence tourist behaviours and perceptions in deciding their travel destination. Furthermore, this paper contributes to a nuanced understanding of social media roles in mediating cultural encounters and sustainability values in contemporary tourism.

Keywords: Social Media, Sustainability, Tourism, Cross-cultural Communication, Indonesia, Malaysia

Cluster 3: Arts And Social Sciences

Session 8

101 LIMESTONE ECOSYSTEM CONSERVATION VIA A SUSTAINABLE TOURISM FRAMEWORK IN KINTA VALLEY, PERAK

Presenter: Shaelza Shaca Shalmon

This research explores the environmental and socio-economic impacts of limestone quarrying and tourism in Lembah Kinta Perak, Malaysia, focusing on how sustainable practices can balance conservation, tourism and community development. Known for its limestone hills, caves and historical significance from its tin mining past, Kinta Valley is a vital geotourism destination now facing increasing threats from urban development and uncontrolled mining. The study aims to develop an integrated framework that identifies important biodiversity and ecosystem services valued by local community, assesses habitat and biodiversity changes, and supports limestone conservation while promoting sustainable tourism and improving community livelihoods. A mixed-methods approach is used, combining quantitative surveys with qualitative interviews to understand both measurable impacts and local perspectives. Early findings show that although quarrying and tourism provide economic benefits, issues like underemployment and lack of local participation in mining persist. Local community surveys in Lembah Kinta recorded diverse wildlife including desert goats, hornbills, cave bats, tapirs and limestone eagles (have been proven exist in literature review) highlighting the ecological value of limestone habitats. However, over the past decade, habitat degradation from intensive quarrying has weakened conservation efforts and caused significant environmental damage. However, there is growing awareness among stakeholders about the importance of sustainable development. The study's outcomes aim to guide policies that support responsible tourism, protect natural resources and empower communities in one of Malaysia's most unique ecological and cultural areas.

Keywords: Limestone, tourism, sustainable development, community, conservation, ecosystem services, biodiversity

122 ADVOCATING FOR FUNGAL CONSERVATION AND COMMUNITY EMPOWERMENT: INSIGHTS FROM THE LENGGONG VALLEY

Presenter: Sanjeef Kumr Subramaniam

Fungi are ubiquitous and well known their ecological importance and cultural value. However, given the limited number of professional mycologists and funding resources, data on fungal biodiversity remains scarce. Furthermore, fungal conservation efforts involving local communities and amateur mycologists in biodiversity hotspots of Malaysia are also lacking. Therefore, this project addresses the urgent need to conserve fungal biodiversity by integrating citizen science tools and community-based approaches. The project was piloted at the Lenggong Valley, recognized for its UNESCO World Heritage Site. Firstly, a group of local residents and amateur mycologists (N=16) were trained to document and identify fungal species across diverse habitats through the use of iNaturalist. Secondly, community workshops and awareness programs were also conducted to educate locals on the ecological roles and biocultural significance of fungi, encouraging a sense of pride and identity rooted in their natural heritage. From the participatory approach, a total of 145 fungal observation belonging to 27 taxa were made by the citizen scientists. The citizen science approach not only contributed to valuable biodiversity data but also fostered scientific curiosity and environmental stewardship. Through socioeconomic exploration, we found strong potential of gastronomic tourism and biocultural storytelling to support community development. This provided sustainable economic alternatives and education opportunities for the younger generation aligned with fungal conservation values. By centering fungi within broader biodiversity efforts, this project highlighted how community-driven conservation and digital platforms can be powerful tools in preserving underrepresented species groups. This method is also replicate to other biodiversity hotspots in Malaysia, particularly the tropical rainforests of Borneo, thus serving as a model for integrating environmental, cultural, and economic sustainability in Bornean landscapes.

Keywords: citizen science, iNaturalist, gastroeconomy, fungi, community-based conservation

Cluster 3: Arts And Social Sciences

Session 8

052 IN-SITU MEASUREMENT OF FLUORESCENCE YIELD OF SCLERACTINIAN CORALS OF ACROPORA SPP. AT KAPAS ISLAND, TERENGGANU, MALAYSIA

Presenter: Tengku Fara Kamilia Tengku Mohd Kamil

Fluorescence yield in corals plays a pivotal role as an indicator of coral reef health and photosynthetic efficiency, crucial for understanding coral resilience in the face of environmental pressures. This thesis investigates fluorescence yield in Acropora spp. corals at Kapas Island, Malaysia, aiming to identify variations, underlying physiological mechanisms, and implications for coral conservation. Using pulse amplitude modulation (PAM) fluorometry, fluorescence measurements was conducted, revealing a fluorescence yield range from 0.1 to 0.6, indicating different level of healthiness. This study underscores fluorescence measurements as a non-invasive tool for assessing coral health and monitoring responses to environmental changes such as sedimentation, high sea surface temperature, nitrate pollution and other relatable pollutions using instrument of Diving PAM fluorometer in situ, targeted on hard corals of genus Acropora in tourist island of Kapas, situated in Kuala Terengganu, Terengganu, Malaysia. High fluorescence yields correlate closely with healthy coral conditions characterized by efficient photosynthesis and symbiotic relationships with zooxanthellae algae, interrupting their biological system towards energy storage and conversion. Conversely, bleaching events and environmental stressors lead to decreased fluorescence yields, highlighting vulnerability to climate-related pressures. Establishing foundational fluorescence data, this research contributes to conservation strategies aimed at mitigating coral reef degradation. Monitoring fluorescence yields across coral species and environments offers in field can be used as critical early warnings of coral stress and degradation, essential for guiding conservation efforts aimed at mitigating these threats and protecting these vital ecosystems.

Keywords: Fluorescence yield, Coral health, Photosynthetic efficiency, Acropora spp., PAM fluorometry, Environmental stress, Coral conservation

087 COMPARATIVE ANALYSIS OF DIPTEROCARP FLOWERING INTENSITY DURING THE 2019 GENERAL FLOWERING EVENT ACROSS MULTIPLE FOREST TYPES IN KABILI-SEPILOK FOREST RESERVE

Presenter: Sasikumar A/L Tanggaraju

Flowering intensity during general flowering (GF) events in Southeast Asian lowland rainforests often varies across forest types, largely influenced by differences in bio-physicochemical properties such as topography, forest structure, vegetation composition, and soil conditions. GF events, typically associated with El Niño Southern Oscillation (ENSO) cycles, occur irregularly every 2 to 10 years and can sometimes occur in consecutive years. Despite this, studies comparing flowering intensity among different forest types within a single GF event and at the same study site remain limited.This study examined the 2019 GF event in the Kabili-Sepilok Forest Reserve (KSFR) in Sabah, Malaysia, focusing on three distinct forest types: Sandstone, Kerangas, and Alluvial Forests. Utilizing a 160-hectare permanent sampling plot established in 2010, flowering data were collected from 5,777 individual dipterocarp trees representing 42 species, surveyed between April and May 2019. A high overall flowering intensity was observed, with 78.0% of the monitored trees flowering. Among the 42 species, Shorea acuminatissima (Seraya Kuning Runcing) exhibited the highest flowering intensity, with 88 out of 94 individuals flowering (93.8%). Among the forest types, Sandstone Forest showed the highest flowering intensity (81.7%), followed by Kerangas Forest (78.8%), while Alluvial Forest had the lowest (76.1%). This difference was statistically significant ($\chi^2 = 14.37$, $p = 0.00076$). Contrast with earlier studies suggesting highest flowering intensity in Alluvial Forests, followed by Sandstone and then Kerangas Forests, corresponding to a gradient of decreasing soil resource availability. This discrepancy indicates that specific abiotic and biotic factors reflecting the bio-physiochemical properties and seasonal weather conditions (rainfall and temperature) may play a significant role in influencing flowering intensity across these three forest types. These findings underscore the importance of examining local-scale environmental drivers that shape reproductive investment in dipterocarp trees during GF events.

Keywords: General Flowering, Dipterocarpaceae, Forest Type, Kabili-Sepilok, Borneo.

Cluster 3: Arts And Social Sciences

Session 8

054

BUILDING A SUSTAINABLE BORNEO: A COMPARATIVE STUDY OF THE SABAH AND SARAWAK DEVELOPMENT CORRIDORS

Presenter: Audrina Shirley Norbert

Borneo is home to two of Malaysia's major regional development corridors which are the Sabah Development Corridor (SDC) and the Sarawak Corridor of Renewable Energy (SCORE). While both initiatives aim to stimulate economic growth, questions remain about how deeply sustainability is integrated into their actual planning and execution. This study explores how SDC and SCORE interpret and apply sustainability principles as well as to suggest strategies for improving sustainable outcomes in Borneo. To achieve this, a qualitative research design is employed based on extensive secondary source analysis which includes reviewing policy documents, government reports, academic literature, NGO publications, and credible media sources related to the SDC and SCORE. Preliminary findings show that although both SDC and SCORE mention sustainability in their official frameworks, in practice, their implementation often prioritizes economic outcomes over environmental and social considerations. Notably, SDC exhibits more localized, tourism-driven strategies, whereas SCORE focuses on energy-intensive industrialization. In both cases, lack of regular environmental assessment and limited indigenous participation were identified as significant policy gaps. This research concludes that to achieve sustainable development in Borneo, both SDC and SCORE need to improve their planning, implementation, and project monitoring. Strengthening coordination and collaboration between agencies, embedding environmental safeguards in project design, and more inclusive planning that centers local voices are essential in ensuring that development in both corridors benefits both people and the environment.

Keywords: Sabah Development Corridor (SDC); Sarawak Corridor of Renewable Energy (SCORE); Sustainable Development; Policy Analysis; Environment; Borneo

Cluster 3: Arts And Social Sciences

Session 9

058 FACTORS INFLUENCING UNIVERSITY STUDENTS' PURCHASE INTENTIONS TOWARD GREEN COSMETICS IN KLANG VALLEY

Presenter: Zuroni Md Jusoh

Air pollution, waste generation, climate change, and the depletion of natural resources are among the most pressing environmental challenges faced by society today. In response, consumer demand for natural and environmentally friendly products, such as green cosmetics, has grown. This trend is driven by increasing environmental awareness and the belief that using green cosmetics can enhance personal well-being and self-esteem. This study aims to examine the influence of attitude, subjective norms, and perceived behavioural control on university students' purchase intentions toward green cosmetics in Klang Valley. A random sampling method was used to gather data from 384 respondents across four selected universities: Universiti Malaya (UM), Universiti Putra Malaysia (UPM), Sunway University, and Taylor's University. An online questionnaire was used for data collection via Google Forms. The Pearson Correlation analysis revealed significant positive relationships between purchase intention and attitude ($r = 0.433$), subjective norms ($r = 0.447$), and perceived behavioural control ($r = 0.570$), with all variables showing significance at $p = 0.001$. However, Multiple Linear Regression analysis indicated that only subjective norms and perceived behavioural control significantly influenced purchase intention (both $p = 0.001$), while attitude ($p = 0.332$) had a weaker effect. Perceived behavioural control emerged as the most influential predictor with a beta value of 0.437. The model explains 38.0% of the variation in purchase intention, suggesting that other unexamined factors contribute to the remaining 62.0%. These findings offer important implications for businesses, policymakers, and educators. Businesses should improve access and affordability of green cosmetics near universities and online. Policymakers can encourage sustainable practices through incentives. Educational institutions should foster sustainability through green campaigns, environmental education, and student-led eco initiatives.

Keywords: Green cosmetics; Purchase intention; University students; Perceived behavioural control; Attitude; Subjective norms

068 FOOD WASTE REDUCTION INTENTION AMONG UPM STUDENTS (ONLINE DELIVERY CASE)

Presenter: Norzalina Zainudin

This study investigated factors influencing food waste reduction intention among UPM students using online food delivery services. Employing a quantitative approach, data were collected from 250 students via simple random sampling. Statistical analyses, including descriptive statistics, Pearson correlation, and multiple regression, revealed a generally high intention to reduce food waste. Attitude emerged as a significant primary factor, while price consciousness exhibited a negative correlation, highlighting a need for targeted communication strategies addressing cost concerns. The robust model fit validates the identified factors. While limited in exploring external influences like culture or policy, this research provides practical implications for fostering mindful consumption: leveraging positive attitudes, subjective norms, and perceived behavioral control. Future research should examine the complex link between intentions and actual behavior. This study contributes a comprehensive understanding of food waste reduction intentions in the context of online food delivery.

Keywords: Sustainable consumption, food waste reduction, online food delivery, intention, students.

Cluster 3: Arts And Social Sciences

Session 9

104 DOES RENEWABLE ENERGY AND TECHNOLOGICAL INNOVATION IMPACT ENERGY SECURITY? EMPIRICAL EVIDENCE FROM SEVEN BIG ECONOMIES.

Presenter: Farhana Hoque Urmy

Promoting the development of renewable energy sources is crucial for sustainability. This paper explores the impact of renewable energy and technological innovation on ensuring energy security, accounting for trade openness and economic growth for the big seven energy consumers. The period of observations spans from 2000 to 2017. The study was conducted using panel quantile regression methods with fixed effects. The empirical outcomes indicate that economic complexity has a significant negative effect on renewable energy at low quantiles but a positive effect at medium to high quantiles. Furthermore, economic complexity has a greater impact on middle-income countries than on high-income countries. Renewable energy positively and significantly impacts energy security. However, for middle-income countries, the impact of energy security risks on renewable energy is unstable. The impact is at its peak between the 60th and 70th quantiles and then declines to its lowest level between the 80th and 90th quantiles. The robustness tests confirm the earlier findings. Based on empirical outcomes, policy prescriptions are suggested to address renewable energy deployment against the backdrop of sustainable development concerns. The policy implications suggest that the government should actively promote trade openness and increase economic complexity. Greater energy security risk index shocks increase the use of renewable energy.

098 PERCEPTION ON FOOD SECURITY: THE ROLE OF SELF-EFFICACY, AWARENESS, AND ALTRUISM IN SHAPING ATTITUDES AND CONSUMPTION BEHAVIOR

Presenter: Teck Weng Jee

Food security has evolved from a purely economic and logistical issue to a multidimensional challenge that includes behavioral and psychological components. While Malaysia has implemented numerous awareness campaigns and support mechanisms, gaps remain in understanding how individuals process these external stimuli and translate them into food-responsible behaviors. Anchored in the Stimulus–Organism–Response (SOR) framework, this study examines the influence of food security awareness and altruistic orientation (stimuli) on self-efficacy and attitude (organismic states), and their subsequent effect on willingness to comply and pro-food security behavior (responses). Data was collected from 258 Sarawakian adults responsible for household food decisions using a structured, self-administered questionnaire. Preliminary analyses were conducted using SPSS 26.0 to examine demographic characteristics of the sample. Descriptive statistics were calculated for gender, age, income level, education, and occupation. Structural equation modelling (PLS-SEM) was employed to test hypothesized relationships, for indicator reliability, internal consistency, convergent validity, and discriminant validity. The findings reveal that both food security awareness and altruistic orientation significantly enhance self-efficacy and attitude, which in turn positively influence willingness to comply and behavioral outcomes. Willingness to comply was found to play a mediating role, bridging the psychological intention with behavioural action. This study contributes to the behavioural literature on food security by offering a validated model that integrates cognitive, motivational, and attitudinal drivers. The findings provide practical insights for policymakers, NGOs, and campaign designers to develop more effective interventions that go beyond knowledge dissemination by addressing internal enablers to promote sustainable and responsible food practices among consumers.

Keywords: Food Security, Stimulus–Organism–Response Model, Self-Efficacy, Behavioral Consumption, Sarawak

ABSTRACTS

Cluster 1: Science, Technology & Engineering

Session 10

024 **THE SUCCESS KEY FACTORS FOR GREEN INFRASTRUCTURE STRATEGIES IN MITIGATING URBAN HEAT ISLANDS: A COMPARATIVE CASE STUDY OF COPENHAGEN, SINGAPORE, AND PORTLAND**

Presenter: Mark Cyril Francis

As urban areas face increasing challenges from climate change, integrating green technology and infrastructure into urban planning has become essential for enhancing climate resilience. This review paper examines (1) various strategies that incorporate green technology and infrastructure to create sustainable and resilient urban environments. It synthesizes recent research on the (2) effectiveness of green infrastructure, such as green roofs, urban forests, and permeable pavements, in mitigating urban heat islands and enhancing urban green spaces. The paper also explores the (3) role of smart technologies, including IoT sensors and geographic information systems, in monitoring and managing these green infrastructures. Case studies of cities that have successfully implemented these strategies, such as Singapore's "City in Nature" initiative, are analysed to highlight best practices and lessons learned. The review identifies key challenges and opportunities in integrating green technology and infrastructure into urban planning, emphasizing the importance of interdisciplinary approaches that combine environmental science, technology, and policy. The paper concludes with policy recommendations for urban planners and policymakers to promote the adoption of green technology and infrastructure as a strategy for climate change adaptation and mitigation.

Keywords: Green technology innovation, Green Infrastructure, Smart Technologies, urban planning, urban green space, climate change,

048 **TOWARDS NEARLY ZERO ENERGY BUILDING (NZEB) FOR SUSTAINABLE CAMPUS: A BIM-DRIVEN APPROACH TO ENERGY EFFICIENCT AND CARBON REDUCTION**

Presenter: Siti Kartini Ali Ashgar

Driving the transition towards Near Zero Energy Buildings (nZEB) within higher education institutions, which is crucial for mitigating environmental impact and fostering sustainable campus development, this research pioneers the application of Building Information Modelling (BIM) to optimize energy performance and significantly reduce the carbon footprint of campus buildings in Borneo. Focusing on two high energy consumption and operationally complex facilities at Universiti Malaysia Sabah, the Faculty of Science and Technology (FST) and the Library, this study leverages Autodesk Revit for detailed modelling and Autodesk Insight 360 for advanced cloud-based energy simulation. By optimizing lighting systems, plug loads, and HVAC configurations, the study demonstrates substantial reductions in Energy Use Intensity (EUI), from 203 to 119 kWh/m²/year (41.8 percent decrease) for the FST and from 167 to 79.5 kWh/m²/year (52.4 percent decrease) for the Library. These energy savings translate to considerable estimated carbon emission reductions of 44.78 kg CO_2/m²/year for the FST and 45.94 kg CO_2/m²/year for the Library, based on Sabah's regional grid emission factor of 0.525 kg CO_2/kWh. These compelling findings underscore the transformative potential of BIM driven digital workflows in facilitating low carbon design, directly aligning with the Sabah Energy Roadmap and Master Plan 2040 and contributing significantly to Malaysia's broader national low carbon ambitions.

Keywords: Near Zero Energy Buildings, Building Information Modelling (BIM), Energy Optimization, Carbon Footprint, Sustainable Campus

Cluster 1: Science, Technology & Engineering

Session 10

145 EARTHQUAKE-DRIVEN DISTURBANCE IN RIVER WATER QUALITY: A PRESSURE–STATE–RESPONSE EARLY WARNING CONCEPT FOR RANAU, SABAH

Presenter: Nor Aslina Abd Jalil

Earthquakes can alter river systems through landslides, bank collapses and sediment waves. These geomorphic changes are often expressed as variations in turbidity, suspended solids, conductivity and nutrients, with downstream impacts on drinking water treatment and river use for community surrounding it. This paper introduces a simple early warning concept for rivers in the Ranau and Kinabalu area of Sabah, following the earthquake event on 5 June 2015. Using the Stress-State-Response (PSR) framework, it connects seismic stresses to measurable water quality signals and practical response measures. This research identifies turbidity, total suspended solids (TSS), conductivity (major ions) and ammonia-nitrogen (NH_3-N) as sentinel indicators and proposes month-specific baselines with two alert tiers: Watch (z-score > 2 sustained over two scheduled samples or one-class drop in INWQS status) and Warning (z-score > 3 sustained, two-class drop, or composite index > 2.5). It also outlines an operational checklist for authorities and agencies, a simple station alert diagram for communicating alerts and a plan to back-test the rule in 2010–2020 records. The concept is designed for quick adoption and later strengthening with interrupted time-series modelling. The contribution is a clear pathway from hazard to action that supports safe water supply and river management in seismically active catchments.

Keywords: earthquake, river water quality, turbidity, electrical conductivity, ammonia-nitrogen (NH_3-N).

147 ENHANCING WATER SECURITY AND SUSTAINABILITY THROUGH HYDRAULIC MODELING: UMS CAMPUS CASE STUDY

Presenter: Siti Kartini Ali Ashgar

Sustainable and reliable water distribution is vital for institutional resilience, particularly in university campuses where supply interruptions affect both daily life and academic operations. This study investigates water supply challenges at Universiti Malaysia Sabah (UMS), focusing on frequent shortages and low-pressure events in the residential zones of Kolej Kediaman Tun Mustapha (KKTM) and Kolej Kediaman Tun Fuad (KKTF). A hydraulic model of the UMS water network was developed using EPANET 2.2 to simulate existing conditions and assess key parameters. Baseline results showed severe deficiencies, with pressures at critical junctions as low as 0.15 m compared to the minimum recommended 15 m. To improve performance, several pressure management strategies were evaluated, including booster pumps, Pressure Reducing Valves (PRVs), and demand time patterns. The optimized configuration 200 kW booster pump between nodes N2 and N3 - achieved up to a 60% increase in pressure, improved flow velocities within optimal ranges, and reduced headloss by 18%. The findings demonstrate the potential of data-driven hydraulic modeling in formulating targeted engineering solutions that enhance water security and operational sustainability. Beyond UMS, this approach provides a replicable framework for sustainable water management in institutional and community systems across Borneo, supporting broader regional goals of resource efficiency and climate resilience.

Keywords - EPANET; Hydraulic Modelling; Water Distribution Reliability; Pressure Analysis; Campus Water Network

Cluster 1: Science, Technology & Engineering

Session 11

105 RECENT WATER QUALITY OF UMS LAKE AND ITS POTENTIAL APPLICATION FOR PLANT WATERING

Presenter: Nurul Fhatul Said

The UMS Lake located next to Faculty of Science and Technology is a free water surface constructed wetland that was designed to treat stormwater in the University Malaysia Sabah campus during its construction period in the 90's. This study was intended to investigate some recent basic water quality parameters. Strategic sampling points which included the main inlet (S1), benchmarked points (S2 – S6) and outlet (S7) was sampled during dry days to reduce interference from on-the-spot precipitation. Each water sample was analysed for its pH, dissolved oxygen (DO), total suspended solids (TSS), 5-day biochemical oxygen demand (BOD 5), chemical oxygen demand (COD) and ammoniacal nitrogen (AN) contents using standard methods for wastewater and water analyses as well as Hach procedural manual. The pH, DO, TSS, BOD 5 , COD and AN were in the range of 6.47 – 7.05, 5.29 – 7.36, 18.27 – 44.87, 0.4 –2.67, 4 – 20.25 and 0.39 – 3.31 mg/L, respectively. These results indicated that the water in the manmade lake met the Class IV National Water Quality Standard which implied that its water can be used for plant watering. Thus, this water can serve as a free water resource for landscaping purposes in the campus.

Keywords: UMS Lake; basic water quality parameters; National Water Quality Standard; plant watering

114 EFFECT OF CERIUM OXIDES LOADED NITRIC ACID-TREATED PALM KERNEL SHELL BIOCHAR ON PYROLYSIS OF HIGH-DENSITY POLYETHYLENE

Presenter: Vekes Balasundram

The rising global energy demand, reliance on limited fossil fuels, and increasing production of plastic waste have intensified the need for sustainable solutions. Pyrolysis offers a promising pathway for plastic waste valorisation, but the limitations of conventional catalysts in terms of efficiency and sustainability remain unresolved. Therefore, this study aims to evaluate the physicochemical properties of cerium oxides loaded nitric acid-treated palm kernel shell biochar (Ce/NA-PKSBC) and examine their catalytic performance in the pyrolysis of high-density polyethene (HDPE). NA-PKSBC was prepared using the pyrolysis and incipient wetness impregnation method and characterised for surface morphology and textural properties. Pyrolysis was conducted at 500°C in a fixed-bed horizontal reactor, with oil product analysis performed using gas chromatography/mass spectrometry (GC/MS). For comparison, the non-catalytic, raw PKSBC, HZSM-5, and NA-PKSBC catalysts were also pyrolysed under the same conditions. The results indicate that the Ce/NA-PKSBC exhibited improved surface morphology and significantly enhanced textural properties compared to PKSBC, NA-PKSBC, and HZSM-5. Ce/NA-PKSBC has the highest surface area at 369.62 m2/g compared to other synthesized catalysts. For pyrolysis results, the non-catalytic achieved the highest pyrolysis oil + wax at 91% followed by HZSM-5 (73%), NA-PKSBC (68%), PKSBC (60%), and Ce/NA-PKSBC (46%). Ce/NA-PKSBC achieved notable yields of light hydrocarbons (C6-C9) at 44%. These findings suggest that Ce-modified NA-PKSBC represent a viable and sustainable alternative to conventional catalysts, offering high efficiency and environmental compatibility for converting plastic waste into fuel.

Keywords: Plastic waste; Pyrolysis; Biochar; Bimetallic; Fuel; Hydrocarbons

Cluster 1: Science, Technology & Engineering

Session 11

115 ELECTRON BEAM IRRADIATION EFFECTS ON GRAPHENE OXIDE THIN FILMS

Presenter: Chee Fuei Pien

Electron beam irradiation (EBI) has become an effective method for altering the atomic level of material characteristics, with great potential for advanced material science and nanotechnology applications. This work explores the deposition and electron beam irradiation effects on reduced graphene oxide (rGO) thin films synthesized via the modified Hummers method (MHM). rGO films were fabricated using drop casting onto 200 0 C preheated glass substrates. The fabricated rGO thin films were exposed to electron beam irradiation at doses ranging from 50 to 200 kGy at an energy of 3 MeV. Structural and chemical characterizations were carried out using x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Scanning electron microscopy with energy dispersive x-ray (SEM-EDX), and x-ray photoelectron spectroscopy (XPS) to evaluate reduction levels and morphological changes. XRD analysis revealed a gradual disappearance of the GO peak at 10.19°, replaced by a broad diffraction peak centered at 26.63°, confirming the successful reduction and partial graphitization of GO, particularly after drop casting onto preheated substrates. This structural transition is further supported by FTIR spectra, which exhibit a significant decline in oxygen-containing functional groups, notably the O–H and C=O bands, indicating effective deoxygenation during the reduction process. At 200 kGy, the XRD pattern of the rGO thin film retained crystallinity with a grain size of 13.31 nm. At higher doses, FTIR shows a disappearance of the 1717.43 cm^{-1} peak in GO after irradiation indicating successful carbonyl group removal, suggesting deeper deoxygenation. SEM analysis confirmed a layered structure with reduced oxygen functional groups, supported by elemental analysis (EDX), which showed oxygen content dropping from 8.53% to 6.58% after 150 kGy exposure. This decrease suggests an effective deoxygenation process, likely resulting from removing oxygen-containing functional groups during the electron-beam-induced reduction of rGO. XPS shows a clear reduction control shown by the specific peak C-O/C-O-C decreasing from 56.30% to 43.37%. According to these findings, there is a good chance that highly effective and cutting-edge EBI technology will be used to produce rGO on a massive scale while precisely controlling the oxygen level.

Keywords: electron beam, graphene oxide, reduced graphene oxide (rGO), modified hummers method (MHM)

118 MIL-125-NH2/MIL-88-NH2 COMPOSITE AS THE PHOTO-FENTON-LIKE CATALYST FOR THE REMOVAL OF METHYLENE BLUE IN WATER

Presenter: Pak Yan Moh

Metal-organic frameworks are nanoporous materials extensively studied for post-synthesis modification due to their exceptional adsorption and photocatalytic properties. However, their practical application is often limited by rapid electron-hole recombination, suboptimal band gap energies and poor chemical and physical stability, limiting their reusability as adsorbents or photocatalysts. In this study, a novel Z-scheme MIL-125-NH2/MIL-88-NH2 composite was synthesized via reflux heating method. The composite demonstrated improved thermal stability compared to MIL-125-NH2 and a higher surface area than MIL-88-NH2, improving the physical and chemical properties. Photocatalytic degradation of MB under visible and UV-A light irradiation reached 61% (k1 of 0.0067 min-1) and 69% (0.0087 min-1), respectively. The addition of 1 mM hydrogen peroxide (H2O2), tripling MB removal to 89% removal (k1=0.0155 min-1) under visible light and 94% removal (k1=0.0217 min-1) under UV-A light. The synergistic effect of MIL-125-NH2/MIL-88-NH2 composite surpassed MIL-125/H2O2/UV-A (k1=0.0024 min-1) and MIL-88/H2O2/UV-A (k1=0.0150 min-1). Scavenger experiments identified hole (h+) and electron (e-) were the primary active species while hydroxyl radical (•OH) and superoxide (•O2-) also played key roles, with their generation further amplified by H2O2. These findings demonstrate the enhanced photocatalytic performance of the MIL-125-NH2/MIL-88-NH2 composite, attributed to its Z-scheme heterojunction structure and photo-Fenton-like behaviour. The composite exhibits promising stability and capability in advanced water treatment applications.

Keywords: MIL-125-NH2; MIL-88-NH2; Heterogeneous catalysis; Photo-Fenton-like reaction.

Cluster 1: Science, Technology & Engineering

Session 11

133 MOF-DERIVED 3D POROUS CATALYSTS FOR HYDRODEOXYGENATION OF PALM FATTY ACID DISTILLATE: OPTIMIZATION VIA RESPONSE SURFACE METHODOLOGY

Presenter: Sivasangar Seenivasagam

Green diesel production from renewable, non-edible feedstocks via hydrodeoxygenation (HDO) offers a sustainable route to reducing dependence on petroleum-based transportation fuels. Various catalysts have been reported for the HDO reaction, and optimizing reaction parameters is crucial to maximizing the efficiency of the developed catalysts. In this study, a MOF-derived three-dimensional porous catalyst was employed for the conversion of palm fatty acid distillate (PFAD) into green diesel. The process was optimized using a central composite design (CCD) within the framework of response surface methodology (RSM) to evaluate three key operating parameters: temperature, reaction time, and catalyst loading. Under the optimal conditions of a reaction temperature of 385.06 °C, a reaction time of 118.81 minutes, a catalyst loading of 4.49 wt%, and a hydrogen pressure of 3 MPa, the green diesel yield reached 94.41%. Notably, the interaction between reaction temperature and catalyst loading had a significant influence on the yield.

Keywords : Green Diesel, Pyrolyzed MIL-101, Porous Material, Ni, Biofuel

140 DOPING EFFECTS ON ZNO, MGZNO, AND GZO THIN FILMS UNDER ELECTRON BEAM IRRADIATION

Presenter: Mivolil Duinong

In this study, the effects of doping semiconductor ZnO with the metal cations Gallium (Ga) and Magnesium (Mg) on its radiation response towards, structural, morphological, and optical properties, were investigated. Subjected to electron beam irradiation with increasing total ionzing dose, ZnO doped with Ga proved to be the most resilient to degradation, displaying the smallest reduction in grain size (from 32.6 nm to 27.6 nm), a lattice strain reduction from 1.7 x 10-3 to 1.4 x 10-3, decreased transmittance (from 92% to 84%), a reduced optical bandgap (from 3.28 eV to 3.20 eV), the least increase in surface roughness (from 1.8 nm to 3.1 nm), and higher particle density (from 4.8 x 109 cm-2 to 8.1 x 109 cm-2) at a maximum dose of 300 kGy with an energy beam of 3 MeV. Conversely, undoped ZnO was the most susceptible to degradation, with the most substantial parameter changes, while ZnO doped with Mg displayed intermediate characteristics. Based on the data obtained, study suggests that dopants can serve as defect traps or recombination centers, reducing radiation-induced defects and charge accumulation in the respective semiconductor material. This study therefore suggests that, the addition of dopant improves the radiation mitigation of existing ZnO, where ZnO doped with Ga shows to be the most radiation resilience, which could potentially be applied for harsh radiation environments applications.

Keywords: Thin Film Semiconductors, Electron Beam Irradiation, Radiation-Induced Effects, Radiation Resistance, Optical Properties

ABSTRACTS

Cluster 2: Medicine And Natural Sciences

Session 12

057 CLIMATE CHANGE AND FOOD SECURITY IN RURAL ASIA: EXPLORING GOVERNANCE SYSTEMS AND LIVELIHOOD ADAPTATIONS

Presenter: Mohd Faizal Madrim

Background: Climate change is increasingly impacting food security, especially in rural regions reliant on agriculture. In Asia, where over half of the global hunger-affected population resides, variability in temperature, precipitation, and extreme weather events exacerbate agricultural productivity challenges and food accessibility, disproportionately affecting vulnerable rural communities.
Objective: To systematically assess the direct and indirect effects of climate change on rural food security in Asia and explore adaptation strategies implemented by rural communities.
Method: A systematic review was conducted following PRISMA guidelines. Databases searched included ProQuest, Semantic Scholar, and PubMed. Eligibility criteria focused on studies of Asian rural populations, qualitative methodologies, and food security-related outcomes. Quality appraisal was performed using Joanna Briggs Institute (JBI) tools.
Result: Five studies met the inclusion criteria.
Conclusion: Climate change poses a multifaceted threat to food security in rural Asia. Adaptation strategies and targeted interventions are critical to mitigating its impacts. Strengthening governance, promoting climate-smart agriculture, and addressing gender disparities are essential for enhancing resilience and ensuring sustainable food security.

Keywords: Climate change, food security, rural Asia, adaptation strategies, health impacts

062 DRIVERS AND CONSEQUENCES OF INTERNATIONAL FORCED MIGRATION: A NARRATIVE REVIEW

Presenter: Farida Nazahiya Mohd Salleh

International forced migrants consist mainly of refugees and asylum seekers. They are forced to flee from their homelands to seek safety and protection in other countries.
Objectives: The objectives of this narrative review were to determine the drivers of international forced migration, its effects on the migrants and to the host countries, and measures taken to aid the forced migrants in adaptation and assimilation in their host countries.
Methodology: Two databases, PubMed and Scopus were searched in May 2024 for relevant articles complying to the eligibility criteria developed, and complemented by Google Search for related documents, guidelines, and web pages related to the topic of the narrative review.
Results: The results of the search found that there were four major drivers for international forced migration: War and armed conflicts, unmet basic needs, in search for a better future, and climate change. Consequences of international forced migration on the migrants consist of a wide range of post-migration stressors and health effects. As for the host countries, both negative and positive effects are experienced, such as strain on resources, sharing of facilities, and gain of professional workforce. As less than one million refugees were able to return to their home countries in 2022, adaptation and assimilation of the forced migrants in the countries which host them are essential. To help with the process, measures include ease of asylum-seeking process, provision of humanitarian service, improvement of sociocultural skills, education and employment opportunities, and management of the forced migrants' health issues.
Conclusion: The humanitarian efforts given by the host countries, despite lack of resources faced by several of them to the forced migrants are valuable.

Keywords: Push and pull factors, global, involuntary migration, refugees, asylum seekers

Cluster 2: Medicine And Natural Sciences

Session 12

081

PRESERVING TRADITION: A STUDY OF INDIGENOUS HILL PADDY (KERAWING VARIETY) CULTIVATION AND ITS CULTURAL SIGNIFICANCE

Presenter: Samantha Natalie Anak Dadi

This study examines traditional hill paddy (Kerawing variety) production, emphasizing indigenous rice varieties, their ecological needs, and cultural importance. Kerawing paddy is cultivated in Data Kakus, Belaga, Sarawak, a highland region known for its challenging terrain. This indigenous variety is well-suited to upland environments, making it highly adaptable to local conditions such as limited water availability, varied soil types, and steep slopes. This research aims to investigate the characteristics, distinctiveness, and significance of Kerawing variety, particularly concerning sustainable agriculture, food security, and the conservation of traditional ecological knowledge. Kerawing paddy have unique characteristics, including scent, grain color, flavor, and pest resistance, showcasing the diversity and inventiveness of local farming methods. In numerous villages, every phase of the cultivation process, from land preparation to harvesting, is designated by a specific local term, signifying profound cultural connections and a robust identity linked to rice growing. These names frequently incorporate significances that represent the local environment, history, and traditions. Despite the advancement of contemporary agricultural techniques, hill paddy agriculture persists in significance due to its suitability for steep terrains and its contribution to the preservation of biodiversity and cultural heritage. Preserving and advancing this traditional method is crucial for sustaining local economies, preserving biodiversity, and transmitting important indigenous knowledge to subsequent generations.

Keywords: Kerawing paddy; indigeneous knowledge; rice production; food security; cultural heritage

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LIMESTONE ECOSYSTEM CONSERVATION VIA A SUSTAINABLE TOURISM FRAMEWORK IN KINTA VALLEY, PERAK

Presenter: Shaelza Shaca Shalmon

This research explores the environmental and socio-economic impacts of limestone quarrying and tourism in Lembah Kinta Perak, Malaysia, focusing on how sustainable practices can balance conservation, tourism and community development. Known for its limestone hills, caves and historical significance from its tin mining past, Kinta Valley is a vital geotourism destination now facing increasing threats from urban development and uncontrolled mining. The study aims to develop an integrated framework that identifies important biodiversity and ecosystem services valued by local community, assesses habitat and biodiversity changes, and supports limestone conservation while promoting sustainable tourism and improving community livelihoods. A mixed-methods approach is used, combining quantitative surveys with qualitative interviews to understand both measurable impacts and local perspectives. Early findings show that although quarrying and tourism provide economic benefits, issues like underemployment and lack of local participation in mining persist. Local community surveys in Lembah Kinta recorded diverse wildlife including desert goats, hornbills, cave bats, tapirs and limestone eagles (have been proven exist in literature review) highlighting the ecological value of limestone habitats. However, over the past decade, habitat degradation from intensive quarrying has weakened conservation efforts and caused significant environmental damage. However, there is growing awareness among stakeholders about the importance of sustainable development. The study's outcomes aim to guide policies that support responsible tourism, protect natural resources and empower communities in one of Malaysia's most unique ecological and cultural areas.

Keywords: Limestone, tourism, sustainable development, community, conservation, ecosystem services, biodiversity

Cluster 2: Medicine And Natural Sciences

Session 12

109 STATUS OF KNOWLEDGE, ATTITUDES AND PRACTICES OF FOOD HANDLERS IN THE CBD AREA, KOTA KINABALU

Presenter: Suriana Salasan

Food handlers play a very significant role in food safety for consumers. Safe food served requires competent and knowledgeable operators in hygiene and food safety. Food preparation at food premises must be ensured in safe conditions to avoid contamination and food poisoning. However, there are challenges that prevent food handlers from adhering to proper food handling practices. This study aims to determine the status of knowledge, attitudes and practices of food handlers at food premises licensed by local authorities around the Central Business District (CBD) area, Kota Kinabalu, which is a high-density area with most activities carried out here including the sale of food. The quantitative survey method using a distributed survey form (n=351) and the findings of data analysis using SPSS version 29.0 showed that the level of knowledge, attitude and practice of food handlers was good and positive with the respective findings of (4.41± 0.49), (4.58±0.44) and (4.58±0.43). Next, the highest score showed that the practice of preparing food on the table was a good practice, which was (4.73±0.45) while the lowest score, but still at a good level, was about food handlers understanding that taking anti-typhoid injections was actually intended to prevent typhoid fever, which was (4.25±0.78). There is a positive and significant relationship between knowledge and attitude (r_p=0.752, $p < 0.01$), knowledge and practice (r_p = 0.569, $p < 0.01$) and practice and attitude (r_p = 0.595, $p < 0.01$). Referring to the correlation between factors motivating food handlers with handling practices, there is a significant increase in positive (r_p = 0.595, $p < 0.01$) and this is an indicator for policymakers to review and improve law enforcement and improve food safety as well as help food premises plan food safety training selectively based on the KAP of food handlers.

Keywords: Knowledge, Attitude, Practice, Food safety, City Business Center (CBD)

128 BACTERIAL IDENTIFICATION ALONG THE UPSTREAM AND DOWNSTREAM OF MURUM RIVER, SARAWAK

Presenter: Sabrina Rancang Khairul

This study investigates the bacterial community structure in water samples collected from five stations along the Murum River, Sarawak, Malaysia. Bacteria were isolated and analyzed using colony-forming unit (CFU) enumeration, GTG 5 -PCR fingerprinting, and 16S rRNA gene sequencing. Total Viable Count (TVC) ranged from 6.00×10^2 to 4.40×10^3 CFU/mL, while Heterotrophic Viable Count (HVC) ranged from 10 to 2.53×10^3 CFU/mL. Stations 1 and 3 showed significantly higher bacterial loads ($p < 0.05$). All stations exceeded the WHO limit of 1.0×10^2 CFU/mL for drinking water, though no fecal coliforms were detected. AMR analysis revealed that eight isolates had AMR indices greater than 0.2, suggesting potential multi-drug resistance. Gram-negative bacteria were resistant to beta-lactams (piperacillin, cefotaxime) and aminoglycosides (streptomycin), while Gram-positive isolates were generally susceptible to vancomycin and linezolid but showed partial resistance to tetracycline and nalidixic acid. GTG 5 -PCR analysis grouped the isolates into three major clusters, indicating genetic diversity across sampling sites. This variation may reflect differences in environmental conditions along the river. Preliminary 16S rRNA sequencing identified key genera including Bordetella sp., Providencia sp., Bacillus sp., and Bacillus cereus. These bacteria are common in aquatic environments and may contribute to nutrient cycling and organic matter degradation. The findings highlight the presence of diverse and abundant bacterial populations in the Murum River and underscore the importance of microbial monitoring to assess ecosystem health and water quality in freshwater systems.

Keywords: bacteria, diversity, river, water

Cluster 2: Medicine And Natural Sciences

Session 12

151 THE EFFICACY OF LONG POOLS AS FIRE BREAKS TO PROTECT PEAT SWAMP FOREST ECOSYSTEMS: A CASE STUDY IN BINSULUK FOREST RESERVE, SABAH, MALAYSIA

Presenter: Rebecca Mishallyne Afat

Peat swamp forests are vital for carbon sinks but increasingly threatened by underground smouldering fires and often referred to as holdover fires. It is difficult to extinguish and can smouldered for days, weeks or months. It leads to release a massive amounts of greenhouse gases such as carbon dioxide. To mitigate this threat, one of fire management method was implemented which is the construction of "long pools" with size of 10 m to 20 m wide and a strategic crossover points in every 100 m. This study aims to analyze the efficacy of a long pool as a fire break to protect the peat swamp forest. The method use to analyse the effectiveness is to do a comparative geospatial analysis of fire incidents in 2016 (pre-long pools) and 2024 (post-long pools) and a qualitative study of interviews from the perspective of Initial Attack Crew (IAC) on the effectivess of the long pool as a fire break. The results show a significant reduction of burnt area in 2024 compared to 2016, indicating a success attributed to the long pool ability to maintain the peat moisture and provide water sources for fire suppression. The findings of this case study offer effective fire management and peat land conservation efforts.

Keywords: Peat swamp forest, Forest fire management, Forest protection, Fire-break, Long pool

014 PREVALENCE AND CHARACTERISTICS OF UNDIAGNOSED HEMOGLOBINOPATHIES AMONG ADOLESCENTS IN A HIGH BETA THALASSEMIA PREVALENCE AREA: A CROSS-SECTIONAL STUDY

Presenter: Tin Tin Thein

Research on hemoglobinopathies mainly targets school-aged and adult groups, underscoring a lack of studies on adolescents nearing reproductive age.
Objectives: The primary objective was to determine the prevalence of hemoglobinopathies among adolescents who had not been previously screened. Additional objectives were to explore possible associations between undiagnosed hemoglobinopathies, socio-demographic factors, and specific characteristics of these disorders.
Methodology: This cross-sectional observational study included 149 adolescents aged 10 to 24. All participants underwent physical examinations and hematological analyses. The collected data were analyzed using established statistical methods.
Results: Among the 149 adolescents studied, 8.7% (13 individuals) had hemoglobinopathies, with the majority being Kadazandusun (92.3%). Specific findings included two cases of hemoglobin-E trait and eleven of beta-thalassemia trait. Those with hemoglobinopathies were typically 1.5 years younger than those without. Statistically, they had a higher prevalence of microcytes (61.5% vs. 27.2%, p=0.024) and hypochromic red cells (61.5% vs. 27.9%, p=0.028), increased red cell counts (mean difference of 0.92, p<0.01), decreased hemoglobin levels (mean difference of -1.3, p=0.016), and elevated platelet counts (mean difference of 54.28, p=0.01). Hemoglobin electrophoresis showed higher hemoglobin A2 (mean difference of 9.47%, p=0.004) and fetal hemoglobin levels (mean difference of 1.16%, p=0.009).
Conclusion: Even in a highly prevalent area with thalassemia, where the true prevalence of undiagnosed hemoglobinopathies in adolescent age groups was unknown, the actual prevalence was high at 8.7% thus proving the need to increase more screening in this group of apparently healthy adolescents to prevent potential development of new cases of beta thalassemia major.

Keywords: Hemoglobinopathies; Thalassemia; Prevalence; Disease Attributes; Adolescent

Cluster 3: Arts And Social Sciences

Session 13

017 A SYSTEMATIC REVIEW OF FACILITY DESIGN FACTORS FOR EARLY CHILDHOOD EDUCATION IN TADIKA KEMAS, MALAYSIA

Presenter: Azilah Baddiri

Early childhood education environments play a critical role in children's cognitive, social, and physical development. Therefore, well-designed educational facilities are essential to support effective learning and well-being. However, in Malaysia, there is limited comprehensive research that consolidates and evaluates the specific design factors that contribute to the effectiveness of Taman Didikan Kanak-Kanak (Tadika) facilities under the Community Development Department (KEMAS). Many existing facilities face challenges related to safety, accessibility, and functionality, which may impact the quality of early childhood education delivered. This study presents a systematic review to identify and analyze the key design factors influencing the Tadika KEMAS facilities. A comprehensive literature search was conducted using academic databases such as Scopus, Web of Science, and Google Scholar, focusing on studies published between 2010 and 2024. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was employed to ensure a structured and transparent review process. Out of an initial pool of 126 studies, a total of 32 articles met the inclusion criteria and were thoroughly analyzed. The findings reveal that five major design factors consistently influence the quality and effectiveness of Tadika KEMAS facilities: child-friendly spatial design, safety and security measures, accessibility, inclusiveness, indoor and outdoor learning environments, and compliance with regulatory guidelines. The review highlights gaps in current design practices and proposes a framework to guide future improvements in Tadika KEMAS facility planning. Thoroughly, this study contributes to improving early childhood education infrastructure to guide the design of a conducive learning environment.

Keywords: Tadika KEMAS, facility design, early childhood education, systematic review, PRISMA, learning environment

064 CHILD-FRIENDLY URBAN NEIGHBOURHOODS: INSIGHTS FROM CHILDREN'S VOICES

Presenter: Mariatul Liza Meor Gheda

Rapid urbanisation has transformed the environments where children live, raising significant concerns about their health, safety, and overall well-being. Environmental risks such as air pollution, noise exposure, and limited access to safe play spaces have become pressing issues, impacting children's physical, mental, and social development. These challenges are further amplified by reduced opportunities for outdoor activities and heightened safety concerns in urban neighbourhoods. This study investigates children's perceptions of their neighbourhood environments in Selangor, focusing on how environmental quality and safety influence their daily experiences. It also explores the features they associate with an ideal child-friendly neighbourhood to guide future urban planning efforts. A participatory workshop involving 25 purposively selected 10-year-old children was conducted at a government primary school in Selangor, Malaysia. During the workshop, children participated in focus group interviews, produced drawings mapping their neighbourhoods based on their observations, and contributed to discussions. Audio recordings of these sessions were transcribed and analysed using thematic analysis to identify recurring themes and patterns in the children's narratives. The findings revealed four key constructs shaping children's perceptions of a child-friendly neighbourhood: physical environment, safety and security, suitability, and enjoyability. The physical environment includes green spaces, play areas, and recreational facilities, while safety concerns highlight the need for protection from traffic, crime, and other hazards. Suitability reflects how well the neighbourhood meets children's developmental needs, offering accessibility and age-appropriate design. Enjoyability captures how engaging the neighbourhood is in fostering play, social interactions, and happiness. These insights underscore the urgent need for urban spaces that prioritise children's well-being by addressing safety, environmental quality, and recreation, while incorporating their perspectives to create inclusive and supportive neighbourhoods.

Keywords: child-friendly neighbourhoods, children's perceptions, environments, urban planning

Cluster 3: Arts And Social Sciences

Session 13

112 CONSTRUCTING TEACHER ETHICS EVALUATION SYSTEMS IN HIGHER VOCATIONAL COLLEGES: EVIDENCE FROM CHONGQING, CHINA

Presenter: Ji Dongli

As China's vocational education system undergoes continuous reform in the new era, the ethical development of teachers in higher vocational colleges has become a critical component influencing not only the quality of education but also the holistic development of students. Teachers in vocational institutions are expected to fulfill a variety of roles—not only as educators but also as technical mentors, career guides, and contributors to social development—placing greater emphasis on their ethical and professional standards. This study focuses on vocational colleges in Chongqing, China, and adopts a mixed-method approach that combines field investigations with literature analysis. Teacher ethics are examined through four core dimensions: political integrity, personal morality, professional conduct, and social responsibility. The study identifies several key limitations in the current evaluation systems, including a lack of regional relevance, overly homogenized indicators, and a disconnect between theoretical frameworks and practical application. These shortcomings reduce the effectiveness of teacher ethics evaluation in capturing the diverse roles and contextual demands of vocational educators. In response, the paper proposes a regionally adapted, scientifically grounded evaluation framework that reflects the integrated nature of "moral-technical" education in vocational settings. This framework emphasizes fairness, practicality, and developmental orientation, incorporating dimensions such as enterprise feedback, student internship assessments, and ethical behavior in applied teaching scenarios. Ultimately, the study aims to provide both theoretical insights and institutional guidance to support the high-quality development of China's vocational education and the professional growth of its teaching workforce.

Keywords: Teacher Ethics. Vocational Education. Evaluation System. Higher Vocational Colleges. Regional Education Reform

111 GRAMMAR AUCTIONS AS A SUSTAINABLE PEDAGOGICAL STRATEGY: REVITALIZING STUDENTS' INTEREST AND UNDERSTANDING IN GRAMMAR AMID THE ERA OF AI

Presenter: Wan Safuraa Wan Osman

In the age of AI-assisted writing tools, many students increasingly rely on automated grammar correction, potentially reducing their engagement with explicit grammar learning. This shift raises concerns about declining motivation to master foundational language skills, especially in contexts where English is a second language. This paper explores the implementation of grammar auctions as a sustainable, interactive pedagogical strategy aimed at revitalizing students' interest and motivation in learning grammar. Drawing on classroom-based action research conducted among undergraduates in a Malaysian technical university, the study demonstrates how grammar auctions transform grammar lessons from passive, textbook-driven sessions into dynamic, participatory experiences. Students described the activity as fun and enjoyable, highlighted improved understanding, and found grammar concepts easier to remember, indicating a strong positive emotional and cognitive impact. In addition, performance outcomes show that out of 38 students, 26 (68%) scored at least 3 out of 5, 16 (42%) scored above 4, and 6 (16%) achieved a perfect score, further underscoring the effectiveness of this approach. By reframing grammar learning as an active and enjoyable process, grammar auctions contribute to educational sustainability, supporting long-term language competence and learner confidence. While this study focuses on Peninsular Malaysia, the approach offers insights adaptable to East Malaysian and Bornean educational contexts, where fostering student motivation remains crucial for sustainable language education. These findings highlight the potential of grammar auctions as a scalable and adaptable strategy for sustaining student motivation and deepening grammar competence, aligning with goals of Education for Sustainable Development and Community Development.

Keywords: Grammar auction, grammar learning, sustainable pedagogy, student motivation, English language learning, education for sustainable development

ABSTRACTS

Cluster 3: Arts And Social Sciences

Session 13

134

CULTURAL NORMS AND LEADERSHIP DYNAMICS IN SHAPING TEACHING EFFECTIVENESS: A STUDY OF YOUNG FACULTY IN CHINESE PRIVATE UNIVERSITIES

Presenter: Liang Mingyu

Teacher effectiveness is a critical factor in ensuring the quality of higher education, particularly within the context of Chinese private universities where faculty diversity and institutional culture present unique challenges. This study examines how cultural norms and leadership dynamics—specifically transformational and transactional leadership styles—influence the teaching effectiveness of young faculty members. Conducted in Shandong Province, China, the research employed a quantitative methodology involving 416 respondents selected through a stratified and random sampling strategy. Data were collected via a structured questionnaire adapted from established instruments, including the Multifactor Leadership Questionnaire and the School Culture Survey. The findings reveal that both transformational and transactional leadership styles are positively associated with teacher effectiveness, with transactional leadership—especially the contingent reward dimension—demonstrating the strongest predictive power. Cultural norms also emerged as significant contributors, suggesting that institutional expectations, shared values, and workplace culture play a vital role in shaping effective teaching. Furthermore, differences based on gender and teaching experience highlight the importance of aligning leadership approaches and cultural practices with faculty needs. These insights contribute to a deeper understanding of how internal organizational factors can foster more sustainable and effective teaching practices. The study offers practical implications for university administrators and policymakers seeking to enhance educational outcomes by cultivating leadership strategies and cultural environments that support early-career educators.

Keywords: Cultural Norms, Leadership, Teaching Effectiveness, Young Faculty, Chinese Private Universities

090

MY PERSEVERANCE TREE: A SELF-NARRATIVE APPROACH TO STRENGTHENING RESILIENCE AMONG PRE-SERVICE TEACHERS

Presenter: Siti Nurulhida Abdul Rahman

This study explores the effectiveness of Pohon Ketabahan Ku (My Tree of Resilience), an expressive arts-based intervention adapted from the Tree of Life approach, in fostering psychological resilience among pre-service teachers in Malaysian teacher education institutes. The study aims to: (1) examine the utility of Pohon Ketabahan Ku as a reflective narrative tool to help pre-service teachers articulate their experiences of resilience, and (2) identify the theoretical underpinnings and implementation methods derived from the original Tree of Life framework. A purposive sample of nine participants was selected based on their visual artworks, and data were qualitatively analyzed through thematic interpretation of both visual and narrative components. Findings suggest that the intervention facilitates self-expression, enhances awareness of internal strengths and support systems, and promotes coping strategies and future-oriented thinking. Furthermore, the activity offers a psychologically safe space for identity exploration and emotional insight. The implications highlight Pohon Ketabahan Ku as a structured and theoretically grounded creative intervention with the potential to strengthen resilience within teacher training contexts.

Keywords: resilience, pre-service teachers, expressive arts, Tree of Life, narrative reflection, creative intervention

Cluster 1: Science, Technology & Engineering

Session 14

013 CUO/ZNO NANOFLOWER COMPOSITES FOR THE PHOTOCATALYTIC DEGRADATION OF CIPROFLOXACIN RESIDUE IN AQUEOUS MEDIA

Presenter: K S D Premarathna

Metallic oxide nanoparticles have been widely used for the photocatalytic degradation of organic contaminants. High energy gap and fast recombination rate are the main drawbacks associated with metal oxide nanoparticles. Hence, modification was done to overcome the negative properties of photocatalysts on photocatalytic degradation and expand the properties of metal oxide-based photocatalysts. Combining two metallic oxides is one of the widely used modification techniques. However, the photocatalytic degradation efficiencies of combined metallic oxides have been studied less frequently. Hence, the research aimed to test the catalytic potential of CuO/ZnO composite for the removal of Ciprofloxacin antibiotic residue present in aqueous media. Firstly, CuO nanoflowers (CuO_NF) were produced via hydrothermal synthesis. Then, it was combined with ZnO via precipitation to form CuO/ZnO NF. Morphological features of materials were observed via X-Ray Diffraction, photoluminescence analysis, UV-Vis NIR spectrometer, and Zetasizer. Formation of CuO and ZnO was confirmed by the presence of peaks representing CuO and ZnO in the X-ray diffraction pattern of CuO/ZnO_NF, and the band-gap energy was 2.97 eV. The zeta potential of CuO/ZnO composite was positive between pH 6 and 9. Low photoluminescence intensity indicates a low recombination rate, which facilitates degradation. A central composite design (CCD) based on response surface methodology (RSM) was developed to determine the optimal conditions for maximum degradation of Ciprofloxacin (CIP) using CuO/ZnO NF composite. Input parameters were given to the system based on the preliminary degradation tests, catalyst dose 0.25-1.00 g/L, pH 6-9, and initial concentration 1-10 mg/L. Their synergetic effect was observed by studying their 2-D and 3-D contour plots, and it was found that the initial CIP concentration and pH exhibit the most significant synergetic effect on CIP degradation. Therefore, finding the optimum catalyst dose, pH, and initial CIP concentration is necessary to achieve maximum degradation efficiency.

Keywords: Antibiotics, Catalysis, Metallic oxides, Nanoparticles, Semiconductors

026 SILICON-RICH BIOCHAR AND COMPOST REDUCE CO2/N2O EMISSION AND ENHANCE PLANT STRESS TOLERANCE

Presenter: Daljit Singh Karam

The dual challenges of mitigating greenhouse gas (GHG) emissions and enhancing plant stress tolerance are central to sustainable agriculture. This study aimed to evaluate the effectiveness of silicon-rich rice husk biochar, in combination with compost, in reducing soil CO2 and N2O emissions, and to compare the role of rice husk biochar and wood biochar in improving plant resilience under abiotic stress. Two complementary experiments were conducted. The first was a soil incubation study designed to assess CO2 and N2O emissions following the application of rice husk biochar, compost, and their combination. Treatments included control (no amendment), rice husk biochar alone, compost alone, and a biochar-compost blend. Gas fluxes were measured periodically using a closed-chamber method and gas chromatography. The second experiment was a pot trial evaluating the impact of rice husk and wood-derived biochar on plant performance under drought and salinity stress. Biochars were incorporated into the soil, and physiological responses such as chlorophyll content, antioxidant enzyme activity, and biomass accumulation were measured in test plants. Results showed that the combination of rice husk biochar and compost significantly reduced CO2 and N2O emissions, likely due to improved nutrient retention, enhanced microbial efficiency, and inhibited denitrification. In the stress tolerance study, rice husk biochar outperformed wood biochar, enhancing plant water-use efficiency, photosynthetic capacity, and stress enzyme activity—attributed to its high silicon content. In conclusion, silicon-rich rice husk biochar, particularly when combined with compost, offers a promising strategy for reducing GHG emissions and boosting plant resilience to environmental stress. These findings support its use in climate-smart soil management practices. Further field validation is recommended to confirm scalability and long-term effects.

Keywords: Rice husk biochar; compost; greenhouse gas emissions; CO2 & N2O mitigation; plant stress tolerance

ABSTRACTS

Cluster 1: Science, Technology & Engineering

Session 14

074 **PHOTODEGRADATION OF CAFFEIC ACID USING CDS/TIO2 PHOTOCATALYST**
Presenter: Nur Mutheerah Antal

Phenolic compounds like caffeic acid (CA) are common and persistent pollutants in agricultural and industrial wastewater, such as in palm oil mill effluent (POME). Their resistance to conventional treatment methods poses environmental and health concerns. While TiO_2 is widely used in photocatalysis, its limited visible-light activity restricts its effectiveness. Combining TiO_2 with narrow-bandgap semiconductors like CdS offers a promising strategy to overcome this limitation. This study aims to synthesize a CdS/TiO_2 nanocomposite photocatalyst and investigate its performance in degrading caffeic acid under visible light, while also exploring degradation kinetics and potential mechanisms. TiO_2 was synthesized via the sol–gel method and modified with CdS by impregnation at different molar ratios (1:3, 1:1, and 3:1). The composites were characterized using XRD, XPS, UV-Vis DRS, and electrochemical techniques (EIS, LSV, chronoamperometry, and Mott-Schottky). Photodegradation experiments were conducted under visible light, with variables such as catalyst loading (0.01–0.1 g) and initial CA concentration (30–80 ppm) systematically optimized. Radical scavenging studies were also performed to determine the active species. The 3:1 $CdS:TiO_2$ composite demonstrated superior photocatalytic efficiency, achieving complete degradation of 30 ppm caffeic acid within 140 minutes. Electrochemical data confirmed enhanced charge separation and improved visible light response due to heterojunction formation. Scavenger experiments identified hydroxyl radicals and superoxide species as the main active agents in the photodegradation process. This study indicates that CdS/TiO_2 is a promising photocatalyst for degrading phenolic pollutants like caffeic acid under visible light and also addresses a research gap in the photocatalytic treatment of caffeic acid using CdS/TiO_2, demonstrating the potential of this composite for sustainable wastewater remediation, contributing to global efforts aligned with SDG-6 and SDG-14.

Keywords: Photodegradation, CdS/TiO 2 , Caffeic Acid, Phenolic compound, Visible light

148 **ELECTRICAL AND STRUCTURAL STUDIES OF CARBOXYMETHYL CELLULOSE DERIVED FROM PALM OIL EMPTY FRUIT BUNCH FIBRE DOPED WITH MAGNESIUM IODIDE BIOPOLYMER ELECTROLYTE**
Presenter: Mohd Saiful Asmal Rani

As global demand for lithium continues to rise, concerns regarding the long-term sustainability of lithium supplies have intensified, prompting the search for alternative energy storage materials. In this work, biodegradable carboxymethyl cellulose (CMC), extracted from empty fruit bunches of palm oil, was employed to produce biopolymer electrolytes (BPE) using magnesium iodide (MgI 2) as the dopant salt. The electrolytes were prepared via solution casting with varying ratios of MgI 2 . Their structural, electrical, and electrochemical properties were investigated using X-Ray Diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, electrochemical impedance spectroscopy (EIS), transference number measurements (TNM), and linear sweep voltammetry (LSV). According to the X-Ray Diffraction (XRD) results, all the samples were primarily amorphous. The addition of 30 wt% MgI 2 yielded the highest ionic conductivity of 5.22 × 10- 5 S cm^{-1} at ambient temperature. FTIR confirmed the interactions between CMC and MgI 2 . The biosourced polymer electrolytes exhibited an electrochemical stability window exceeding 2 V, while TNM results indicated that ion transport dominated the conduction process.

Keywords: solid biopolymer electrolytes, carboxymethyl cellulose, magnesium iodide, solution casting technique, ionic conductivity

Cluster 1: Science, Technology & Engineering

Session 14

151

VALORIZATION OF NON-EDIBLE SEAWEED (SARGASSUM POLYCYSTUM) EXTRACT AS A SUSTAINABLE BIOSTIMULANT FOR UPLAND TADONG RICE OF SABAH

Presenter: Noumie Surugau

Seaweed and its derivatives are natural sources of bioactive compounds widely used as biostimulants to enhance plant growth and productivity. Tadong rice, a pigmented upland rice variety, is increasingly favoured by Malaysian consumers for its perceived health benefits. However, its commercialization remains limited due to low grain yield. This study aims to address this issue by utilizing biostimulants derived from seaweed as an environmentally friendly alternative. Extracts from the brown seaweed Sargassum polycystum were applied to Tadong rice plants at different concentrations (20, 40, 60, and 80%) via foliar application, in combination with the recommended dose of fertilizer, under insect-proof net house conditions. One commercial liquid biofertilizer and a control treatment (distilled water) were included for comparison. Growth and yield parameters of Tadong rice were assessed across treatments. Results showed that S. polycystum extract at 20% concentration produced the most positive effects on growth and yield. Significant improvements were observed in plant height, flag leaf length and width, tiller number, panicle number per plant, 1000-grain weight, and overall yield per plant, with increases ranging from 5.73% to 44.11% compared with untreated controls. This study demonstrates that foliar application of S. polycystum extract can substantially improve the performance of pigmented upland rice, offering benefits for upland rice farmers while reducing reliance on synthetic inputs. The findings align with the United Nations Sustainable Development Goals, specifically SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), and SDG 15 (Life on Land), by promoting sustainable agriculture, strengthening local food security, and supporting biodiversity-friendly practices. Beyond agronomic gains, this work underscores the value of underutilized non-edible seaweeds as sustainable resources and highlights their potential role in preserving Borneo's agricultural resilience and cultural heritage through the revitalization of traditional rice varieties such as Tadong.

Keywords: Seaweed biostimulant, Sargassum polycystum, rice, growth, yield

Cluster 1: Science, Technology & Engineering

Session 15

028 OBJECT-BASED IMAGE ANALYSIS OF UAV IMAGERY FOR SEAGRASS MAPPING: A CASE STUDY IN SEPANGGAR BAY, SABAH

Presenter: Imelus Nius

Accurate mapping of seagrass habitat is crucial for the effective coastal ecosystem monitoring and conservation. However, selecting an appropriate classification method remains a key challenge, especially when working with UAV imagery that has high resolution image compare to the satellite image. This study will evaluate the accuracy and effectiveness of the three types of object-based image classifiers that are (a) Maximum Likelihood (ML), (b) Support Vector Machine (SVM), and (c) Random Forest (RF), for seagrass habitat mapping in Sabah Port Sdn. Bhd., that located at Sepanggar Bay, Kota Kinabalu, Sabah. UAV data were collected under controlled conditions using standardized flight parameters to ensure consistence image quality. Object-based image analysis (OBIA) was used to segment and classify seagrass habitats by combining colour, shape, and texture information. All three classifiers were trained using the same dataset and assessed based on the overall accuracy, user's and producer's accuracy, and the Kappa and Tau coefficient. Among them, the RF classifiers delivered the best results, with higher accuracy (>85%), clearer habitat boundaries, and fewer classification errors. MLC showed lower accuracy (80%) compared to the SVM (75%), especially in areas with mixed features. These results show the importance of choosing the right classification method for UAV-based seagrass mapping and suggest that RF is the most suitable classifier algorithm for accurate mapping in Sepanggar Bay.

Keywords: Machine learning, seagrass detection, drone, Sabah, OBIA.

029 ASSESSING CORAL DIVERSITY AND CORAL CONDITION USING VIDEO TRANSECTS AND UAV MAPPING IN PULAU MANTANANI BESAR, SABAH

Presenter: Muhammad Aiman Mohd Azseri

Pulau Mantanani Besar is renowned for its rich marine biodiversity and its importance to local livelihoods. This study evaluates coral conditions and assesses diversity and abundance patterns at seven reef sites around the island using Unmanned Aerial Vehicle (UAV) mapping and Video Transect (VT) techniques. High-resolution UAV imagery was processed using Agisoft Metashape and ENVI Classic, classifying benthic cover into live coral and non-coral categories, with further classification into seven detailed types: branching coral, patch coral, massive coral, sand, coral rubble, submerged rock, and deep water. VT data were analyzed using Coral Point Count Extension software, classifying benthos into hard corals, soft corals, dead corals, bleached corals, algae, other invertebrates, and abiotic elements. UAV analysis revealed that approximately 42.25% (525.17 ha) of the reef area is covered by live coral, while 57.75% (717.80 ha) consists of non-coral substrate. VT analysis indicated a mean live coral cover of 43.03%, categorizing the reefs in 'Fair' condition. A total of 167 coral species from 89 genera and 24 families were identified, including hard and soft corals. Dominant genera include Acropora, Porites, and Lobophyllia. The surveys also documented 21 vulnerable species, four rare species, and one endangered species, underscoring the ecological significance of these reefs. Despite pressures from both natural and anthropogenic threats, Pulau Mantanani's reefs remain a biodiversity hotspot. The combined application of UAV mapping and VT methods proved effective for monitoring reef conditions, offering comprehensive insights into coral cover and species richness. These findings emphasize the urgent need for conservation and management interventions to protect and restore Pulau Mantanani Besar's coral reef ecosystems.

Keywords: Coral mapping, UAV, coral conditions, coral diversity, Sabah.

Cluster 1: Science, Technology & Engineering

Session 15

032 THE SIGNIFICANCE OF DIGITAL LITERACY FOR ACADEMIC ACHIEVEMENT

Presenter: Pranjal Bhuyan

Digital literacy is becoming a crucial skill for academic performance at all educational levels in the digital age. The ability to locate, assess, produce, and share information using digital technology is known as digital literacy. This study investigates the connection between students'; academic performance and their level of digital literacy, emphasizing how mastery of digital tools and platforms enhances learning objectives, research skills, and general academic task participation. Students are expected to use learning management systems, interact with multimedia content, and navigate digital learning environments as educational institutions incorporate more and more information and communication technology (ICT) into their courses. The study examines high school and college students'; proficiency with digital technologies for learning, teamwork, and assignment submission. It does this by utilizing both quantitative and qualitative data gathered via surveys and interviews. Results show that pupils with greater digital literacy typically do better academically, exhibiting enhanced time management, critical thinking, and access to a variety of learning materials. Additionally, especially in online and hybrid learning environments, digital literacy increases students'; independence and self-assurance in self-directed learning. The report does, however, also draw attention to socioeconomically driven digital inequalities, which can result in differences in access to devices, reliable internet, and digital training. In order to guarantee that all students can equally benefit from digital improvements in education, this paper's conclusion highlights the necessity of structured digital literacy training as part of the formal curriculum. Enhancing digital literacy is essential for both academic success and preparing students for the demands of the contemporary workforce.

Keywords: Digital Literacy, Academic Success, ICT in Education, E-learning, Digital Divide, Student Engagement, Online Learning, Educational Technology

119 DEVELOPMENT OF FORECAST MODEL FOR PM10 CONCENTRATION IN TAWAU USING INPUT VARIABLE SELECTION AND ARTIFICIAL NEURAL NETWORK

Presenter: Dr. Muhammad Izzuddin Rumaling

Particulate matter with aerodynamic size of 10 microns (PM10) is one of the air pollutants that are hazardous to human health and have negative impacts on other aspects such as environment and economy. Tawau, being one of the developing cities in Sabah, is susceptible to negative effects caused by high concentration of PM10. Future PM10 concentration forecasting is crucial for proper urban development and reducing impacts of PM10. Despite the importance of forecast model, research related to PM10 concentration forecast model receives little interest especially in Tawau, Sabah. Furthermore, optimizing the efficiency of forecast model is always a challenge in previous studies. This research presents the development and analysis of ANN-based forecast model for PM10 concentration in Tawau. Dataset used in this research comprises of four meteorological variables (wind speed, wind direction, relative humidity, ambient temperature) and five air pollutant concentration variables (CO, NO2, O3, SO2, PM10) obtained from monitoring stations operated by Department of Environment (DOE) Malaysia. These data were initially processed upon applying for principal component analysis (PCA) and forecast model development. The selection of variables in PCA analysis was based on rotated component matrix of the first few principal components. Four performances indicators, which are root mean square error (RMSE), mean absolute error (MAE), index of agreement (IA), and fractional bias (FB), are used to analyze the forecast performance of the ANN models. The performance of this forecast model revealed that selected PCA and temporal variables as input variables are better on the average, in forecasting PM10 concentration in Tawau (RMSE = 6.699 μg/m3, MAE = 5.159 μg/m3, IA = 0.735, FB = 0.0045). The selected PCA variables used as input variables are associated with wind direction, ambient temperature, NO2 and O3 concentration, which are attributed to solar radiation, motor vehicle emission and wind direction. The developed model is computationally less cumbersome and require a smaller number of variables than the deterministic models without reducing the forecasting performance.

Cluster 2: Medicine And Natural Sciences

Session 16

116 EQUATORIAL WAVE EMBEDDED WITHIN THE MADDEN-JULIAN OSCILLATION LEADING TO THE 2021 PENINSULAR MALAYSIA FLOOD

Presenter: Jackson Chang Hian Wui

The 2021 Peninsular Malaysia Flood, triggered by Tropical Depression 29W (TD 29W), displaced over 125,000 people and claimed 54 lives. This study demonstrates that the event was driven by a convergence of synoptic-scale disturbances and equatorial wave interactions. Synoptic analyses revealed the influence of Typhoon Rai and enhanced monsoonal flow on the trajectory and intensification of TD 29W. Equatorial waves—specifically the Madden–Julian Oscillation (MJO), convectively coupled Kelvin waves (CCKWs), and equatorially coupled Rossby waves (CCERWs)—were found to modulate convective activity and contribute to the evolution of the Borneo Vortex (BV), which later intensified into TD 29W. Using five years (2017–2021) of GPM IMERG precipitation data, we quantified wave contributions through regression-based diagnostics. Simple linear regression (SLR) showed that CCKW was the leading contributor; however, the combined wave-induced rainfall explained only a small fraction of the total anomaly (r = 0.11), suggesting limitations in isolating wave modes. To address this, we applied multiple linear regression (MLR), which accounts for covariability among wave modes. The MLR model yielded a substantially higher correlation with observed rainfall anomalies (r = 0.60), indicating that all wave types jointly influenced the event. The contribution of MJO and ER became significant only in the combined framework. Further analyses of wave propagation and vertical wind structure revealed that low-level winds played a key role in the quasi-stationary behavior of the system. This study underscores the importance of equatorial wave interactions in extreme rainfall development and highlights their relevance for improving flood prediction in the Maritime Continent.

Keywords: Kelvin waves; Rossby waves; Madden-Julian Oscillation (MJO); Borneo vortex; equatorial wave; floods; Peninsular Malaysia; Maritime Continent.

127 MOLECULAR CHARACTERIZATION AND PHYLOGENETIC ANALYSIS OF PASTEURELLA MULTOCIDA ISOLATES FROM CATTLE IN SARAWAK

Presenter: Muhammad Zaki Zulkiffle

Pasteurella multocida is a Gram-negative bacterium that poses a significant threat to livestock health. It is associated with a range of diseases, including bovine respiratory disease in ruminants, haemorrhagic septicaemia (HS), fowl cholera in birds, and progressive atrophic rhinitis and pneumonic pasteurellosis in pigs. Understanding the virulence determinants of P.multocida is essential for effective disease prevention and control. This study represents the first molecular detection and characterization of P. multocida in cattle from Sarawak. A total of 415 samples were isolated from 22 farms and 23 isolates were obtained and confirmed as P.multocida through Polymerase Chain Reaction (PCR) targeting the kmt1 gene. Based on the obtained results on biochemical test the Sarawak isolates did not match those of the reference strain from Peninsular Malaysia, suggesting possible regional phenotypic variation. Capsular typing via PCR showed no amplification for capsular types A, B, or D, indicating the presence of untypeable or potentially novel capsular types. Phylogenetic analysis based on the 16S rRNA gene revealed that some isolates clustered closely with the reference strain P. multocida 375-A/15 (GenBank: CP023305.1), while others formed distinct clusters, indicating both genetic similarity and diversity among the Sarawak isolates. In conclusion, molecular and phenotypic characterization of P. multocida from Sarawak cattle reveals strain variability, which may have important implications for the development of targeted vaccines and region-specific disease control strategies.

Keywords: Capsular typing, cattle, Sarawak, Pasteurella multocida, virulence determinants.

Cluster 2: Medicine And Natural Sciences

Session 16

075 FACTORS ASSOCIATED WITH PREVENTABLE MATERNAL MORTALITY IN SABAH

Presenter: Annie Alfred

Reducing Maternal Mortality Ratio (MMR) is one of the targets in Sustainable Development Goals (3.1). Despite Malaysia's ongoing efforts to reduce maternal mortality, Sabah continues to record one of the highest MMR in the country, with no consistent decline observed over the past two decades.
Objective: This study aims to determine the proportion of preventable maternal mortality and its associated factors in Sabah, focusing on sociodemographic characteristics, obstetric and clinical characteristics, health care access and utilization, and timeliness of care.
Methodology: This cross-sectional study utilizes data from State Pregnancy-Related Death Reports (KIK/KI 3) retrieved from Sabah State Health Department from the year 2020 to 2024. Simple and multiple logistic regression were employed to test the association between the independent variables and preventable maternal mortality.
Results: A total of 292 maternal mortality cases were included in the analysis. 82.2% of the maternal deaths were preventable. Women with delay in deciding to seek appropriate treatment during obstetric events had nearly 19-times higher odds of preventable death (aOR 18.949;95% CI 8.296,43.280, p-value <0.001). The odds of preventable death were 8 times higher for women who experienced delay in receiving appropriate treatment during obstetric events (aOR 8.003; 95% CI 2.264,28.296, p-value=0.001).
Conclusion: Targeted community education programs should be implemented to raise awareness of danger signs during pregnancy and the importance of skilled birth attendance. Additionally, healthcare systems should be strengthened by improving healthcare infrastructure, human resource, referral systems, and emergency response protocols in order to reduce systemic delays in obstetric management.

Keywords: Maternal mortality, Associated factors, Preventable death, Sabah, Three delay model

041 THE ASSOCIATED RISK FACTORS FOR PERINATAL DEPRESSION AMONG TEENAGE MOTHERS – A NARRATIVE REVIEW

Presenter: Holly Girlchy Jastin

This narrative review focuses on the risk factors of depression in perinatal teenage mothers, a significant global health concern with implications for mother and child's health. Perinatal depression is a common mental health disorder that affects a significant proportion of teenage mothers worldwide. Depending on the area and population under study, research has revealed that the prevalence of perinatal depression in adolescent women can vary from 33.2% to 74.3%. Given these concerns, this narrative review aims to examine the risk factors contributing to PND in perinatal teenage mothers, synthesizing evidence from global studies to inform targeted interventions.
Methodology: This narrative review examined studies published in English from 2014 to 2024, sourced from Google Scholar, ScienceDirect, Scopus, PubMed, and ResearchGate. A structured search strategy was applied using Boolean operators (AND/OR) and Medical Subject Headings (MeSH) terms to identify studies on risk factors of perinatal depression among adolescent mothers. Studies were screened based on title, abstract, and full text, with inclusion criteria focusing on those addressing specific risk factors for perinatal depression in teenage mothers. The SANRA scale was used to assess study quality, ensuring methodological rigor. Key findings were thematically categorized and synthesized to identify common patterns and gaps in existing literature.
Results: This review identifies key factors contributing to perinatal depression among teenage mothers, including socio-demographic, economic, cultural, and trauma-related factors. Low education, single status, and financial hardship were linked to higher depression risk due to limited resources and healthcare access. Stigma, social isolation, and cultural expectations further exacerbated mental health challenges. Additionally, trauma and polyvictimization, such as childhood abuse and partner violence, significantly increased depression risk. These findings highlight the need for holistic interventions addressing social, economic, and psychological determinants.
Conclusions: Perinatal depression is a significant concern among adolescent mothers, influenced by multiple social, economic, and psychological risk factors. This review underscores the need for targeted interventions, early screening, and effective mental health support to mitigate its impact. Addressing these gaps through research and policy development is crucial to improving maternal and child health outcomes.

Keywords: Perinatal depression, teenage mother, Adolescent mother, Risk Factors

Cluster 2: Medicine And Natural Sciences

Session 16

056 COMPUTER VISION SYNDROME AND ITS RISK FACTORS AMONG UNDERGRADUATE STUDENTS IN UNIVERSITI MALAYSIA SABAH

Presenter: Thirumurugan Nyanasegram

Computer Vision Syndrome (CVS) refers to a group of eye- and vision-related problems resulting from prolonged use of digital devices such as computers, tablets, and smartphones. With increasing screen time among students, this study aimed to determine the prevalence of CVS and its associated factors among undergraduate students at Universiti Malaysia Sabah (UMS). A cross-sectional study was conducted using a series of validated questionnaires, including sociodemographic details, the National Institute of Health (NIH) computer workstation ergonomics checklist, initial ergonomics risk assessment tools, and the Computer Vision Syndrome Questionnaire (CVS-Q). Data were analyzed using SPSS version 29.0. Simple and multiple logistic regression were performed to determine associations. The prevalence of CVS among undergraduates was 79.1% (95% CI: 74.80-83.44%). Wearing eyeglasses significantly increased the likelihood of CVS (Adjusted Prevalence Odds Ratio [APOR] = 2.68; 95% CI:1.49–4.84; p = 0.001), as did frequent blinking (APOR = 3.73; 95% CI: 1.48–9.39; p = 0.005). Ergonomic factors such as having the monitor below eye level (APOR = 0.46; 95% CI:0.23–0.92; p = 0.027) and using a laptop with external accessories (APOR = 0.54; 95% CI:0.30–0.99; p = 0.048) were protective against CVS. Musculoskeletal pain, specifically upper back pain (APOR = 2.52; 95% CI: 1.27–5.02; p = 0.008), was positively associated with CVS, while shoulder discomfort showed marginal significance. This study highlights a high burden of CVS among university students and identifies modifiable risk factors. The findings support the need for ergonomic and health-focused interventions to reduce CVS-related morbidity in academic settings.

Keywords: Computer Vision Syndrome, Eyeglasses, Ergonomics, Undergraduate, Risk Factors, Musculoskeletal Pain, Digital Devices

144 PREVALENCE, CLINICAL PRESENTATION, ALLERGEN TRIGGERS, AND ARIA (ALLERGIC RHINITIS AND ITS IMPACT ON ASTHMA) CLASSIFICATION OF ALLERGIC RHINITIS AMONG UNIVERSITI MALAYSIA SABAH STAFF- A PRELIMINARY REPORT

Presenter: Nur Izzati Ishak

Allergic rhinitis (AR) is an inflammatory condition of nasal cavity mucosa due to IgE mediated sensitivity. It's a global condition affecting around 10-40% populations that impacts quality of life and productivity. The distribution of allergen triggers and classification according to ARIA guideline in university staff populations in Sabah, Borneo is not well documented yet.

Objective: To determine the AR prevalence, clinical presentation, allergen triggers, and AR classifications according to ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines among Universiti Malaysia Sabah (UMS) staff.

Methods: A cross-sectional study was conducted among UMS staff (n = 93) using a structured questionnaire. Data collected included demographics, AR symptoms, allergen triggers (dust, animal fur, cold weather/environment, certain food), and severity–frequency classification according to ARIA guideline (mild intermittent, mild persistent, moderate/severe intermittent, moderate/severe persistent). Prevalence was calculated as the proportion of respondents classified with AR, and descriptive statistics summarized the findings.

Results: The mean age of respondents was 41.3 ± 7.68 years (range 24–66), with a female predominance (62.4%). The prevalence of AR was 91.4%. The most common symptoms were nasal congestion (63.4%), itchy nose (61.3%), runny nose (54.8%), frequent sneezing (52.7%), and itchy/red/watery eyes (48.4%). Dust was the leading allergen trigger (68.8%), followed by cold weather/environment (49.5%), certain food (28.0%), and animal fur (26.9%). Among AR cases, the most common category was moderate/severe persistent (35.5%), followed by moderate/severe intermittent (21.5%), mild intermittent (15.1%), and mild persistent (6.5%).

Conclusion: AR is highly prevalent among UMS staff, with dust as the most common trigger. Over one-third of affected individuals have moderate/severe persistent AR, underscoring the need for sustained workplace-based management strategies.

Keywords: prevalence, allergic rhinitis, hypersensitivity, rhinosinusitis, allergy

ABSTRACTS

Cluster 1: Science, Technology & Engineering

POSTER SESSION

101 KINETICS OF LACTIC ACID PRODUCTION FROM STARCH-BASED FOOD WASTE FERMENTATION USING SASAD FOR ANIMAL FEED PRODUCTION

Presenter: Angela Cheryl Celestine

The rapid increase in food waste poses significant environmental and economic challenges, particularly in Sabah. This study addresses this issue by valorising starch-based food waste (SBFW), specifically rice waste, through fermentation using Sasad, a traditional Sabahan rice wine starter culture rich in lactic acid bacteria (LAB) and yeast. The aim is to convert food waste into a sustainable, value-added product for animal feed, in line with the principles of the circular bioeconomy and the goals of sustainable engineering. The study's objectives are to (i) characterize the biochemical properties of SBFW, (ii) evaluate the fermentation kinetics of lactic acid production using Sasad via Monod and Luedeking-Piret models, and (iii) assess the nutritional potential of the fermented product as animal feed. The rice waste was sourced from Universiti Malaysia Sabah and nearby communities. The fermentation was conducted using Sasad from Tambunan and Keningau and monitored over 16 days inside tajau jars, placed in a cupboard under ambient conditions (25°C). Fermentation parameters, including pH, total titratable acidity (TTA), glucose levels, and LAB colony-forming units (CFUs), were analysed. The preliminary findings observed show an inconsistent increase in TTA and a surprising upward shift in pH from 3.7 to over 4.2, indicating acid consumption or alkaline metabolite production by secondary microbes. Kinetic modelling is employed to optimize lactic acid yield and fermentation performance. The anticipated outcome is a fermented biomass rich in protein, fat, fibre, and lactic acid, suitable as a probiotic-enhanced animal feed, particularly for Oreochromis niloticus (Nile tilapia). This research demonstrates a novel integration of traditional microbiota and modern kinetic modelling to promote sustainable engineering solutions in food waste management and animal nutrition, which eventually contribute directly to regional sustainability goals.

Keywords: Sasad, lactic acid fermentation, rice waste, kinetic modelling, sustainable animal feed

106 METAGENOMIC ANALYSIS OF BIOETHANOL PRODUCTION KINETICS FROM STARCH-BASED FOOD WASTE FERMENTED WITH SASAD YEAST

Presenter: Nurul Nabilah Nahrawi

As global energy demand continues to rise and landfill accumulation of food waste increases, this study explores the potential of producing bioethanol from starch-rich food waste using Sasad, a traditional indigenous yeast sourced from Tambunan and Keningau in Sabah. Given that food waste constitutes approximately 40–60% of landfill contents, its conversion into biofuel presents a promising avenue for sustainable energy development. This research investigates the fermentation of rice-based food waste, focusing on how substrate concentration and different Sasad yeast strains influence fermentation efficiency and kinetic behavior. Prior to fermentation, samples were characterized based on their glucose content, total solids, volatile solids, carbohydrates, cellulose, hemicellulose, lignin, and protein levels. Experimental fermentations were conducted using 85 g of rice waste combined with varying volumes of water (136, 170, 360, and 425 mL), corresponding to substrate concentrations of 75%, 60%, 28.33%, and 24% (w/v), respectively. Key kinetic parameters monitored throughout the process included colony-forming units (CFU), glucose and ethanol concentrations, pH, and protein levels. The highest ethanol yield was observed at a 75% (w/v) substrate concentration using the Sasad strain from Tambunan. An optimized fermentation setup involving 102 g of rice waste and 136 mL of water was maintained under ambient temperature and atmospheric pressure. A gradual decline in pH from Day 0 to Day 10 indicated increasing acidity in the system. The maximum microbial growth rate was recorded at 0.68 day^{-1}, with a peak ethanol concentration of 465.93 ppm (equivalent to 13.84 g ethanol/g glucose). Glucose concentration increased from 13.7 to 15.7 g/mL over 14 days, while protein content peaked mid-process before stabilizing at 7.2%. These findings demonstrate the viability of utilizing local yeast strains and food waste for efficient bioethanol production, contributing to renewable energy efforts and sustainable waste management.

Keywords: Starch-based food waste; alcohol fermentation; Sasad; bioethanol; fermentation kinetics; sustainability

ABSTRACTS

Cluster 1: Science, Technology & Engineering

POSTER SESSION

027

SOURCE TRACING OF HEAVY METAL CONTAMINATION IN SOILS OF PUTRAJAYA'S URBAN AREAS
Presenter: Mohd Ashadie Kusno

Urban soils, especially in public parks, are increasingly contaminated by heavy metals due to urbanization, industrialization, and vehicular emissions. This study investigates the concentration of Arsenic (As), Cadmium (Cd), Nickel (Ni), and Lead (Pb) in soils from various urban park types—Commercial, Industrial, Institutional, Recreational, and Residential—across Kuala Lumpur and Putrajaya, Malaysia. The objective was to trace the sources of heavy metal pollution and assess its potential risks to public health and the environment. Soil samples were collected from five different land use areas, and heavy metal concentrations were analyzed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The Geoaccumulation Index (Igeo) and Enrichment Factor (EF) were applied to assess contamination levels and identify pollution sources. Results indicated that Residential and Commercial areas had the highest concentrations of As and Pb, with values reaching 255.40 mg/kg and 113.65 mg/kg, respectively. Elevated levels of Ni and Cd were found in Industrial and Residential areas. Traffic emissions, construction activities, and historical use of leaded gasoline contributed significantly to the contamination. Notably, even Recreational parks, often considered cleaner, exhibited significant contamination, particularly for As and Pb. The study shows that urban areas, including eco-designed Putrajaya, are vulnerable to heavy metal pollution, largely from surrounding industrial and vehicular activities. The findings highlight the need for continuous soil monitoring and environmental management to mitigate contamination in public spaces, where residents and children interact with the environment. This research contributes to understanding urban soil pollution in Malaysia, underscoring the importance of assessing environmental risks in public spaces to protect human health and the environment.

Keywords: Heavy metal pollution; urban soils; Putrajaya; environmental monitoring

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WEB-BASED FLOOD MONITORING SYSTEM USING ESP32 MICROCONTROLLER: AN INTEGRATED IOT SOLUTION FOR EARLY WARNING
Presenter: Sherry Mansuit

Flood disasters continue to pose significant threats to communities worldwide, with Southeast Asia being particularly susceptible due to increasing extreme weather events driven by climate change. This study presents the development of a web-based flood monitoring system that integrates Internet of Things (IoT) technologies with cloud computing to enhance early flood detection and response capabilities. The system employs ESP32 microcontrollers interfaced with ultrasonic distance sensors for water level measurements, BME280 environmental sensors for atmospheric data collection, and high-precision tipping bucket rain gauges for precipitation monitoring. Sensor data are transmitted via HTTP POST requests to a PHP-based server and securely stored within a structured MySQL database. Real-time visualization and data management are provided through a Django-powered web application, facilitating the preparation of machine-learning-ready datasets for future predictive analytics. Innovations in the system include adaptive sampling algorithms, wavelet-based signal processing for noise reduction, and a self-cleaning mechanism for rainfall sensors to improve measurement reliability. Hosted on PythonAnywhere, this solution offers a scalable, cost-effective alternative to conventional monitoring infrastructure, particularly for developing regions. The research establishes a comprehensive framework bridging IoT technologies with hydrological monitoring, setting the foundation for future expansion into predictive flood early warning systems.

Keywords: flood monitoring, IoT system, ESP32 microcontroller, real-time data collection, hydrological sensors, early warning system, web-based platform, PythonAnywhere, disaster preparedness, environmental monitoring

Cluster 1: Science, Technology & Engineering

POSTER SESSION

131 EVALUATING GLYCEMIC RESPONSES TO RICE-BASED MEALS USING REAL-TIME CGM AND ITS APPLICATION IN LOW-GLYCEMIC INDEX EDUCATION FOR OVERWEIGHT AND OBESE YOUNG ADULTS

Presenter: Khadidja Chekima

Self-monitoring tools have gained recognition for their role in promoting adherence to dietary interventions, particularly among individuals at risk of metabolic disorders. This study examined the glycemic responses to three rice-based mixed meals using real-time continuous glucose monitoring (rtCGM) and explored its potential as a personalized education tool for overweight and obese young adults. A prospective, open-label trial was conducted among 14 participants (mean age: 22.8±4.6 years; BMI: 32.9±5.8 kg/m²). Each participant consumed three rice-based meals; white rice meal (WRM), brown rice meal (BRM), and parboiled basmati rice meal (PBRM) on alternate days, each containing 50g available carbohydrate. A 50g glucose reference drink was also consumed for glycemic index (GI) comparison. rtCGM was used to capture postprandial responses, 24-hour mean glucose, glycemic variability, and time-in-range (TIR) metrics. Changes in carbohydrate preference and the frequency of postprandial glucose levels ≥7.8 mmol/L were assessed before and after the intervention. The GI values categorized WRM as high (83.0±2.2), BRM as medium (56.4±2.3), and PBRM as low (45.4±2.1). PBRM resulted in significantly lower 24-hour mean glucose and higher TIR compared to WRM ($p<0.05$). Notably, preference for PBRM increased from 21.4% to 71.4% after participants viewed their individual glucose profiles. Furthermore, the occurrence of postprandial glucose spikes ≥7.8 mmol/L decreased by 61.5±20.3% on average. These findings suggest that rtCGM not only distinguishes the glycemic impact of common rice meals but also supports individualized nutrition education. By providing real-time feedback, rtCGM can influence food choices and encourage the adoption of low-GI diets among overweight and obese young adults. Further large-scale randomised controlled trials are warranted to validate these outcomes and inform broader public health interventions.

Keywords: Continuous glucose monitoring (CGM), glycemic index, rice-based meals, low-GI diet, overweight adults, postprandial glucose, nutrition education

117 AGRISENSE VERTICAL: SMART AQUAPONICS MONITOR

Presenter: Joshua Frances Anak Sagu

Aquaponics integrates aquaculture and hydroponics, where fish and aquatic animals are cultivated alongside soil-less plant systems within a recirculating environment. Vertical aquaponics typically employs the nutrient film technique (NFT), using pipes to continuously deliver water, nutrients, and oxygen to the plants. This project focuses on developing a real-time monitoring system for the vertical aquaponics setup, utilizing Hibiscus Sense combined with an Arduino Mega to measure pH, total dissolved solids (TDS), and water temperature, thereby establishing optimal conditions for growing Bak Choy. All collected data is transmitted to the Favoriot IoT platform, which features a dashboard for data visualization. The results reveal a strong positive correlation between TDS levels and plant growth, indicating efficient nutrient uptake by the plants. The correlation coefficients (R) for TDS and growth rate are close to 1.0, with values of 0.9234 and 0.9384, respectively, highlighting a significant relationship. Optimal conditions for Bak Choy growth include TDS levels between 220 and 270 ppm and a pH of around 7.5. Additionally, maintaining water temperatures between 26°C and 29°C helps prevent plant shrinkage during hot weather. Overall, the findings suggest that TDS significantly influences Bak Choy growth, while pH and temperature have a comparatively minor effect.

Keywords: Aquaponics, Nutrient film technique (NFT), Total dissolved solids (TDS), Favoriot, Bak choy

ABSTRACTS

Cluster 1: Science, Technology & Engineering

POSTER SESSION

079 METHANE-HYDROGEN BLENDS IN GAS TURBINES: A COMPREHENSIVE REVIEW OF PERFORMANCE, EMISSIONS, AND TECHNOLOGICAL ADVANCEMENTS

Presenter: Ezzam Ag Sani

The global push for sustainable energy has spurred interest in alternative fuels for gas turbines, with methane-hydrogen blends emerging as a promising solution to reduce carbon emissions while utilizing existing natural gas infrastructure. This review explores the potential of these blends to enhance the efficiency and environmental performance of gas turbines in power generation. This paper aims to comprehensively assess the performance, combustion characteristics, and emission profiles of methane-hydrogen blends in gas turbines, identify technical challenges, and highlight necessary technological adaptations and future research directions for their effective integration. The study synthesizes experimental and numerical research, examining combustion dynamics, stability, and emissions across varying blend ratios. Experimental investigations involved swirl burners and open-ended tubes, while numerical analyses utilized computational fluid dynamics (CFD), large eddy simulations (LES), and chemical kinetics modeling to evaluate flame behavior and turbine performance. Results demonstrate that hydrogen addition enhances combustion efficiency, increases laminar burning velocity (e.g., 16% increase at 20% hydrogen by volume), and improves flame stability, enabling micro gas turbines to operate with blends up to 100% hydrogen. CO2 emissions decreased significantly (e.g., 20% reduction at 30% hydrogen), though higher flame temperatures increased NOx, requiring advanced control strategies like lean premixed combustion. Turbine modifications, including combustor design and material upgrades, were critical for safe operation. Methane-hydrogen blends offer a viable strategy for decarbonizing gas turbines, balancing efficiency gains and emission reductions against challenges like NOx emissions and infrastructure compatibility. Future research should focus on long-term material durability, safety protocols, and economic feasibility to support widespread adoption in sustainable energy systems.

Keywords: methane-hydrogen blends, gas turbines, combustion stability, emission reduction, sustainable power

082 A SYSTEMATIC REVIEW OF CONSUMER BEHAVIORAL BARRIERS TO SUSTAINABLE ENERGY ADOPTION: INSIGHTS INTO SOLAR PHOTOVOLTAIC ADOPTION IN ASIA

Presenter: Chen Meiguirong

The adoption of solar energy is critical for Asia's transition to sustainable development. However, solar adoption remains limited due to poor understanding of consumer behavioral barriers. The adoption of solar photovoltaic (PV) systems in Asian markets is under-researched in terms of perceived usefulness, perceived ease of use, and adoption attitude. This study addresses this gap by examining how these behavioral constructs influence consumers' willingness to adopt residential solar energy. This study analyzes perceived usefulness, perceived ease of use, and consumers' attitudes toward the adoption of residential solar PV systems. A literature review approach was used to integrate relevant studies from the recent period. The analysis explicitly focused on studies that adopted the TAM framework in the context of renewable energy. The results show that perceived usefulness significantly influences adoption intention, and consumers place a high value on financial returns. Perceived ease of use remains a key barrier due to technical complexity, perceived maintenance burden, and unclear operational guidelines. Consumers' attitudes toward solar energy adoption are largely influenced by social influences and economic factors.

Keywords: Sustainable Energy Adoption; Solar Photovoltaic (PV); Consumer Behavior; Technology Acceptance Model (TAM); Asia

ABSTRACTS

Cluster 1: Science, Technology & Engineering

POSTER SESSION

132 CFD ANALYSIS OF SOLAR PV SURFACE TEMPERATURE REDUCTION USING MXENE NANOFLUIDS: A PRELIMINARY STUDY

Presenter: Abdul Rahman

Solar photovoltaic (PV) systems are increasingly adopted for sustainable energy generation, yet their performance is often hindered by elevated operating temperatures. This preliminary study investigates the thermal management potential of MXene nanofluids in actively cooling a 200-watt solar PV module using Computational Fluid Dynamics (CFD) simulations. A flat-tube copper cooling system was designed in SolidWorks to enhance thermal contact with the PV back surface. Simulations were conducted under standard conditions of 101,325 Pa pressure, 30°C ambient temperature, and 1000 W/m² solar irradiance, with cooling fluids comprising ethylene glycol water (EGW) and MXene nanofluids at concentrations of 0.01%, 0.05%, and 0.1%. Results indicate that the 0.1% MXene nanofluid achieved the most effective cooling, reducing surface temperature to 318.53 K compared to 348.64 K without cooling, and outperforming the conventional 30% EGW solution. The superior thermal conductivity and favorable viscosity of MXene-based fluids, attributed to their 2D layered structure, high surface area, and hydrophilic nature, contribute to enhanced heat dissipation through Brownian motion. These findings highlight the promising role of MXene nanofluids in improving PV system efficiency and support further exploration into their application for advanced thermal management in renewable energy technologies.

Keywords: Solar Panel, Mxene, Nanofluids, Active Cooling

053 THE IMPACT OF BRAND AI ATTITUDE ON CONSUMER PURCHASE INTENTION: A SYSTEMATIC LITERATURE

Presenter: Liu Futian

With smartphone manufacturers now embedding AI functionality deeply into customized operating systems, consumers' perceptions of a brand's AI capability have become a pivotal factor in purchase decisions. Most consumers, however, lack sustained experience with AI-enabled phones. Their perceptions stem chiefly from external information sources—advertising, social media, and hands-on demonstrations—and their attitudes toward AI are further shaped by personal evaluations of the technology's potential impact. Existing studies have paid limited attention to the brand-specific AI attitudes that arise from such perceptions. Therefore, this study conducts a systematic literature review of recent publications to explore how external information shapes consumers' perceptions of brand AI capability and, in turn, influences their brand AI attitudes and purchase intentions. The review clarifies the mechanisms underlying the formation of brand AI attitudes and details their subsequent effects on purchasing decisions. By filling this theoretical gap in consumer AI perception within the smartphone domain, the study also provides empirical grounding and research directions for manufacturers and marketers seeking to design targeted AI marketing strategies.

Keywords: Brand AI Attitude, Perceived AI Capability, Purchase Intention, Consumer Decision-Making, Technology Acceptance

Cluster 1: Science, Technology & Engineering

POSTER SESSION

121 REDUCE THE RISKS OF AUTONOMOUS DRIVING BY LATTICE-BASED AKA

Presenter: Weiqi Wang

The comprehensive promotion and in-depth application of advanced driver assistance systems (ADAS) are irreversibly reshaping the transportation ecosystem. According to the authoritative industry white paper released by McKinsey, the market size of ADAS and autonomous driving technology is expected to exceed $55 billion to $80 billion by 2030. However, with the acceleration of technology commercialization, security risks and privacy protection crises are accumulating at an alarming rate. Especially the network security and personal data privacy issues. In these fields, autonomous driving technology has many flaws, such as man in the middle attacks, remote control attacks, data tampering, and data breaches. In the field of autonomous vehicle, authentication and key agreement (AKA) has significant applications and significance. AKA is a secure protocol that ensures authentication between both parties and generates shared keys to ensure communication security. AKA can be used to ensure the safety of communication between autonomous vehicle and infrastructure, including communication between vehicles and traffic lights, road infrastructure and other infrastructure. There has proposed using AKA protocol to mitigate security threats in this situation. However, AKA itself also faces the challenge of quantum attacks. For example, hackers intercept encrypted traffic data and decrypt it through quantum computing, exchanging time for space to achieve their attack goals. This study is based on a lattice based lightweight post quantum encryption V2X （vihicle to everything） model and an post quantum AKA protocol to address this situation. By integrating NTRU, the advantages of all evaluated security features, including quantum resistance, are demonstrated, which is crucial for defending against future quantum computing threats. This comparative analysis emphasizes the importance of selecting robust encryption algorithms such as ECC and NTRU to enhance the security of autonomous driving (V2X) systems, ensuring comprehensive protection in increasingly complex threat environments.

Keywords: authentication and key agreement (AKA);autonomous vehicle;quantum attacks

086 PURIFICATION AND CHARACTERISATION OF RECOMBINANT TYROSINASE MUSHROOM

Presenter: Viaevanilly David

Tyrosinase is a copper-containing oxidase enzyme involved in melanin biosynthesis via the Raper–Mason pathway. It catalyzes two essential reactions: the hydroxylation of L-tyrosine to L-DOPA and the oxidation of L-DOPA to dopaquinone, both key steps in pigment formation. Despite its biological significance, limited studies have explored tyrosinase from native Borneo mushroom species.
Objective: This study aims to characterize the biochemical properties of tyrosinase isolated from Lentinula edodes, a wild mushroom species found in Borneo.
Methodology and results: The gene encoding tyrosinase was recombinantly expressed in Escherichia coli, and the resulting protein was purified using Ni^{2+}-NTA affinity chromatography. Biochemical characterization was carried out to evaluate its specific activity and kinetic behavior using L-DOPA as a substrate. Enzymatic activity was measured under standard assay conditions demonstrated enzymatic activity with a Vmax of 0.503 mM/sec, a Km of 0.948 mM for L-DOPA, and a specific activity of 9.3×10^{-4} U/mg, indicating moderate substrate affinity and catalytic efficiency.
Conclusion: Tyrosinase from Lentinula edodes demonstrated functional enzymatic activity and was successfully purified using Ni^{2+}-NTA chromatography. The findings suggest that this enzyme is a promising candidate for applications in natural pigment production, biocatalysis, and biosensor development. This study also contributes to the growing biochemical understanding of enzymes derived from underexplored native mushroom species.

Keywords: Tyrosinase, Lentinula edodes, Melanin biosynthesis, Raper–Mason pathway Ni^{2+}-NTA affinity chromatography, Enzyme kinetics, L-DOPA.

Cluster 2: Medicine And Natural Sciences

POSTER SESSION

004 NAVIGATING THE CHALLENGES OF HOSPITAL DIGITALIZATION IN SOUTHEAST ASIA: A SYSTEMATIC REVIEW

Presenter: Abdul Rahman Ramdzan

The rapid advancement of digital technologies has transformed healthcare globally, offering opportunities to improve the efficiency, quality, and accessibility of health services. In hospital settings, digitalization involves the adoption of tools such as electronic health records (EHRs), telemedicine, artificial intelligence (AI), Internet of Things (IoT), and healthcare management software. These technologies have the potential to optimize workflows, enhance patient care, reduce operational costs, and support data-driven decision-making. However, the transition from traditional operations to digital systems poses significant challenges, particularly in regions like Southeast Asia, where healthcare infrastructure and policies vary widely between countries. This systematic review aims to explore the challenges of hospital digitalization, particularly in Southeast Asia, focusing on barriers that hinder the adoption, implementation, and integration of digital technologies in hospital settings. As healthcare systems transition towards digitalization, identifying and addressing challenges becomes critical to ensuring efficient hospital management, improved patient outcomes, and sustainable healthcare delivery. This review seeks to provide a comprehensive understanding of the factors impeding digital transformation, including technological, infrastructural, financial, and human resource limitations. The findings will contribute to identifying strategies and policy recommendations to facilitate the smooth transition to digital healthcare. This study followed PRISMA guidelines to ensure systematic and transparent reporting. Articles were retrieved from ProQuest, Semantic Scholar, and PubMed databases, focusing on peer-reviewed literature published in English between 2019 and 2024. Six articles which met the inclusion criteria were analysed, and the findings were categorised to identify common themes. Five themes identified related to the challenges include: (1) System and data organization, (2) Patients as beneficiaries, (3) Human resources, (4) Exposure to digital tools, and (5) Facility environment. Understanding the specific barriers to digitalization is crucial for developing targeted interventions and strategies and helping policymakers, healthcare administrators, and managers to develop practical solutions for sustainable digital transformation in healthcare.

Keywords: challenges, barriers, digitalization, hospital care

006 CAMERA TRAP SURVEY OF TWO PHEASANT SPECIES IN THE CROCKER RANGE BIOSPHERE RESERVE

Presenter: Wing Shen Lim

The crested partridge (Rollulus rouloul) and the great argus (Argusianus argus), both part of the Phasianidae family, face a high risk of extinction due to habitat loss and illegal hunting. Although these relatively large pheasant species can be monitored using camera traps, such studies have been infrequent in the inland forests of Sabah, Malaysia Borneo. To determine the feasibility of using camera traps for monitoring the activity patterns of these threatened species in Sabah, a preliminary survey was commenced at the Inobong Substation of the Crocker Range Biosphere Reserve. Ten sampling points were established, each spaced at least 200.0 m apart and located a minimum of 5.0 m away from local hiking trails and vehicle roads, with one camera trap deployed at each point. Over 675 nights of camera trapping, the great argus was detected eight times, predominantly passing through the sampling points (n = 7 or 87.5 %) while the crested partridge was observed six times, mainly engaging in foraging behaviour (n = 5 or 83.3 %). Both species were sighted either individually or in groups of varying sizes and sex compositions, with the crested partridge exhibiting a larger average group size (2.833 ± 0.703) than the great argus (1.375 ± 0.183). While their overall diurnal activity patterns were highly similar ($\Delta 1 = 0.5787$), the crested partridge exhibited peak activity during different daylight hours compared to the great argus. This highlights a subtle form of temporal niche partitioning, likely driven by interspecific competition for food, shelter, and movement space along the forest floor at the sampling points. Consequently, the present findings support the viability of using camera traps for long-term monitoring of these two pheasant species in the inland forests of Sabah, though further research is required to address the limitations of this preliminary research.

Keywords: Camera Trap Survey, Crocker Range Biosphere Reserve, Human Pathway, Interspecific Competition, Phasianidae

Cluster 2: Medicine And Natural Sciences

POSTER SESSION

025 CO-CIRCULATION OF ALL FOUR DENGUE VIRUS SEROTYPES AND GENOTYPIC DIVERSITY IN TAWAU DIVISION, SABAH (2019–2021)

Presenter: Rahmawati Pare

Dengue is a globally emerging infectious mosquito-borne disease that can cause mild to severe illnesses in humans. The dengue outbreak in Malaysia has yet to show any signs of being contained. There is limited understanding of the factors that contribute to the onset and persistence of dengue. Surveillance and pathogen detection of dengue will provide more understanding on the future prevention and control in Malaysia. The aim of this study was to determine the burden of dengue infection in Tawau Division of Sabah to enhance understanding of local transmission.
Methods: Cross-sectional blood samples of Tawau Division between 2019 to 2021 were obtained from the Public Health Laboratory, Kota Kinabalu. Viral RNAs were extracted using QIAmp Viral RNA Kit. Dengue infection was confirmed with two-step Reverse Transcriptase PCR (RT-PCR) using dengue universal primer and then isolates were subjected to multiplex serotyping using Serotyping Universal Primer or Morita Primer.
Results: Out of 252 samples, 115 were positive dengue infections. All dengue serotyping DENV-1 to DENV-4 was detected. The most predominant serotypes in Tawau Division for 2019 are DENV-3 (55%), meanwhile in 2020 is DENV-1 (35%) and in 2021 DENV-4 (9%). The burden of dengue infection in Tawau Division from 2019 to 2021 is 46%. The Tawau division DENV-1 isolates were classified into Genotype I, DENV-2 isolates were Cosmopolitan genotype, DENV-3 isolates were Genotype I and III, and DENV-4 isolates were Genotype II.
Conclusion: Findings show dengue's dynamic transmission and diversity, highlighting the importance of ongoing surveillance and health preparedness

Keywords: Dengue infection, molecular epidemiology, Surveillance, Tawau Division, Sabah.

066 DETERMINANTS OF WILLINGNESS TO PAY FOR OUTPATIENT SERVICES IN HEALTH GOVERNMENT CLINICS AMONG COMMUNITY IN SABAH

Presenter: Nurshafinaz Hj Abu Bakar

Malaysia's healthcare system faces increasing financial pressures, with Sabah experiencing unique challenges due to high poverty rates, geographical barriers, and disparities in healthcare access. Outpatient services (OP), while heavily subsidized, are often overburdened and under-resourced. Understanding the community's willingness to pay (WTP) for these services is crucial for informing sustainable health financing and equitable access, yet limited research exists for the Sabah context. This study aimed to describe the WTP among Sabahan and to determine the factors associated with WTP for outpatient services among the Sabah community. A cross-sectional study was conducted in government health clinics across Sabah. Data was collected using a self-administered online questionnaire. A total of 869 valid responses were analyzed using Logistic Regression. The result showed that 54.1% were willing to pay more than the current nominal fee of RM 1 for outpatient services, with a median WTP of RM5 (IQR RM3–5). For specialist outpatient services RM5, 42.9% were willing to pay more, with a median of RM10 (IQR RM10–15). Key determinants positively associated with WTP included higher educational attainment (certificate/diploma and above), employment in the public sector, higher household income (M40 and T20 groups), and having health insurance. Conversely, increasing age and a greater number of dependents were associated with lower WTP. Regional differences were observed, with residents from Kudat, Pedalaman, and Tawau divisions less likely to be willing to pay compared to those from West Division. These findings highlight the importance of tailoring healthcare financing reforms to local socioeconomic contexts and suggest that targeted subsidies or insurance schemes may enhance equity and sustainability in outpatient service provision in Sabah.

Keywords: Willingness to pay, outpatient services, health clinic, Sabah, primary healthcare

Cluster 2: Medicine And Natural Sciences

POSTER SESSION

042 POTENTIAL CROSS-PROTECTION BY COVID-19 MRNA VACCINES AGAINST SEASONAL CORONAVIRUSES AND INFLUENZA

Presenter: Vennila Gopal

There have been changes in the epidemiology of respiratory viral infections through the pandemic which cannot be fully explained by non-pharmaceutical interventions. The global rollout of COVID-19 vaccines may have an additional impact on other respiratory viruses in addition to reducing severe COVID-19 disease.
Materials & Methods: We conducted an observational cohort study involving 142 adults (mean age 47.5 years, 61% women) who provided blood samples before their first dose and 6 months after their second dose of COVID-19 mRNA vaccine. IgG levels to the spike component of different variants of Human Coronavirus (HCoV-NL63, HCoV-HKU-1, HCoV-229E (S1 subunit) and HCoV-OC43 (S1+S2 ECD)) as well as anti-hemagglutinin (HA) titres, were determined for Influenza A H1N1 (A/California/06/2009), H1N1 (A/Michigan/45/2015), H3N2 (A/Switzerland/9715293/2013) and H3N2 (A/Hong Kong/45/2019) using ELISA method based on previously published protocols. We performed microneutralisation assays on a subset of the 142 samples (n=12): to confirm the ELISA findings. Data were compiled in Microsoft Excel, and antibody levels were compared using Vassar Stats (Vassar, USA), and SPSS.
Results: There was a significant increase 6 months after COVID-19 vaccination in the antibody levels against S protein ($p<0.001$) of HCoV-OC43 and HCoV-229E. There was also a significant rise in the antibody level to H3N2 ($p<0.05$) post COVID-19 vaccination but not to influenza A H1N1 or the other seasonal coronaviruses. The microneutralization studies revealed positive correlation between ELISA and neutralizing antibodies against HCoV-OC43 and HCoV-229E in the sample although the neutralizing antibodies only rose post COVID-19 vaccination for HCoV-OC43. The correlation between ELISA results and microneutralization was less clear for H3N2 influenza but there were still 5 out of 12 which showed a rise in % of microneutralization post-COVID-19 vaccination.
Conclusion: Vaccination against COVID-19 using mRNA vaccines appears to have raised neutralizing antibodies to seasonal HCoV and possibly H3N2 influenza. Cross protective immunity may have contributed to the reduced circulation of seasonal influenza following the widespread rollout of COVID-19 vaccines. Our finding of rises in neutralising antibodies to HCoV infection following COVID-19 vaccination may have positive implications for the development of a pan-coronavirus vaccine in the future.

072 ALPHA-MANGOSTIN ENHANCES ENDOTHELIAL REPAIR MARKERS IN A HIGH GLUCOSE MODEL OF DIABETIC WOUND HEALING

Presenter: Melonney Patrick

Diabetic wounds heal slowly due to impaired blood vessel formation, persistent inflammation, and disrupted tissue repair. Endothelial cells play a crucial role by promoting angiogenesis and releasing proteins like platelet-derived growth factor (PDGF), which supports cell growth and regeneration. Under hyperglycemic conditions, PDGF levels decrease, while matrix metalloproteinase-9 (MMP-9) increases and tissue inhibitor of metalloproteinase-2 (TIMP-2) decreases, factors that together impair wound healing. Alpha-mangostin, a natural xanthone derived from the pericarp of the mangosteen, has gained considerable attention due to its anti-inflammatory properties, suggesting its potential to promote wound healing. However, its effect on endothelial cell function in diabetic wound conditions remains unclear. This study aimed to evaluate whether alpha-mangostin can improve PDGF secretion and regulate MMP-9 and TIMP-2 expression in endothelial cells exposed to high glucose. Human coronary artery endothelial cells (HCAEC) were incubated with 35 mM glucose for 96 hours to simulate a diabetic environment. The cells were then treated with alpha-mangostin (0.15, 2.5, and 5 µg/mL), a positive control (carboxymethyl cellulose, CMC), and negative controls (high glucose and untreated media). Protein expression of PDGF, MMP-9, and TIMP-2 was measured using ELISA, while gene expression was assessed using RT-PCR. Alpha-mangostin significantly increased PDGF protein expression at 0.15 and 5 µg/mL, with no changes observed at the gene level. MMP-9 expression was significantly reduced at both gene and protein levels across all concentrations. TIMP-2 protein was upregulated at all doses, while gene expression increased only at 0.15 µg/mL. Alpha-mangostin increased PDGF secretion and TIMP-2 gene expression, while lowering MMP-9 at both protein and gene levels, suggesting its potential use in promoting endothelial repair in diabetic wound healing.

Keywords: Alpha-mangostin; diabetic wound healing; endothelial cells; protein & gene expression

Cluster 2: Medicine And Natural Sciences

POSTER SESSION

078

SAGO FIBER MYCELIUM COMPOSITES: TRANSFORMING NATURAL WASTE INTO SUSTAINABLE, BIODEGRADABLE MATERIALSOWLAND

Presenter: Ann Anthony

The global population is expected to exceed 9.7 billion by 2050, demanding a vital reduction in our reliance on petroleum-derived, non-biodegradable plastics that significantly contribute to environmental pollution and resource depletion. Mycelium-based composites (MBC), which are made from fungal mycelium and lignocellulosic substrates, are better for the environment because they are biodegradable, renewable, and require less energy. Notably, sago waste fiber a byproduct from the sago palm is an effective lignocellulosic substrate for MBC, adding value to agricultural waste and enhancing the composite's sustainability profile. This article previews how sago waste fiber has potential and economic advantages of utilizing mycelium to convert into valuable composite material. Finally, it explores the viability of sago waste fiber as a substrate for mycelium growth, discussing the material properties, manufacturing processes, and suitable mycelium strains for optimal composite production. The study covers the phases of MBC manufacturing, encompassing substrate selection, fungal inoculation, growth conditions, and drying procedures, which influence the materials physical and mechanical properties. Overall, this study shows that MBC are a potential new material that can help solve important environmental problems by lowering carbon footprints and plastic waste. Finally, it explores the viability of sago waste fiber as a substrate for mycelium growth, discussing the material properties, manufacturing processes, and suitable mycelium strains for optimal composite production.

Keywords: agricultural; mycelium-based composite; composite; Sago fibre waste.

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CORONARY ARTERY DISEASE PREDICTIVE BIOMARKERS AND METABOLIC SYNDROME IN ADULT POPULATION OF KOTA KINABALU

Presenter: Aye Aye Wynn

Coronary artery disease (CAD) is a prominent noncommunicable disease and the cause of one-third of deaths worldwide. It is commonly associated with components of metabolic syndrome such as dyslipidemia and diabetes mellitus.
Objectives: To compare the atherogenic index (AI) and coronary risk index (CRI) between males and females and the status of smoking, diabetes, hypertension, and knee pain.
Methodology: 101 adults in Kota Kinabalu participated after obtaining informed consent. Questionnaires were used for subjects' information and comorbidity. Blood samples (5.0 mL) was collected after overnight fast. Serum lipid profile and fasting glucose concentrations was determined. Atherogenic index is calculated as log (TG/HDL–C) and the Coronary risk index calculated as CRI=TC/HDL-C. An independent t-test was adopted to fulfil the objective.
Results: There were 52 (51.5%) males and 49 (48.5%) females in this study. For the AI, there were statistically significant mean differences between genders (p-value < 0.001) and diabetes status (p-value = 0.039). Whereby, for CRI, only gender (p-value < 0.001) shows a statistically significant mean difference.
Conclusion: Hence, we conclude that there is a significant mean difference between males and females for both AI and CRI. As for the other health status, only the diabetes status was found to have a significant mean difference for AI.

Keywords: Coronary artery disease, metabolic syndrome, diabetes mellitus, dyslipidemia, atherogenic index, coronary risk index

Cluster 2: Medicine And Natural Sciences

POSTER SESSION

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PRELIMINARY TEST ON PATHOGENICITY OF CERATOCYTIS MANGENICANS ON ACACIA HYBRID

Presenter: Maznah Binti Muning

Forest plantations have been established to help preserve and manage Malaysia's remaining natural forest resources. Various species have been introduced for economic purposes and to meet the demands of the wood industry. Among these, Acacia mangium, A. auriculiformis, and Acacia hybrids are widely cultivated due to their fast growth, reaching up to 30 cm in height and 50 cm in diameter at breast height (DBH) under favorable conditions. However, Acacia species are increasingly vulnerable to infections by Ceratocystis manginecans, which causes wilt disease and eventually leads to tree mortality. This study aims to preliminarily investigate the pathogenicity of three C. manginecans isolates (Isolate 1, Isolate 5, and Isolate 6) on Acacia hybrids obtained from the Sabah Forestry Development Authority (SAFODA). Pathogenicity tests were conducted on phyllodes measuring 12 to 18 cm in length, with inoculations of C. manginecans and a control using Malt Extract Agar (MEA) alone. The tests involved four treatments including control and each treatments replicated three times. Lesion development was assessed on the 7th, 14th, and 21st days post-inoculation. Lesions appeared as dark reddish-brown to purple discolorations, and a discoloration index was calculated as the percentage of lesion length relative to total phyllode length. Findings reveal that Isolate 6 is the most pathogenic, causing the most severe lesions and highest discoloration in the Acacia hybrid.

Keywords: Acacia hybrids, Ceratocystis manginecans, Pathogenicity

Cluster 3: Arts And Social Sciences

POSTER SESSION

008

LEADING FOR INNOVATION: HOW SERVANT LEADERSHIP DRIVES ENGAGEMENT AND INNOVATIVE WORK BEHAVIOUR AMONG UNIVERSITY MIDDLE MANAGERS

Presenter: Mohamad Nasaruddin Mahdzir

In today's knowledge-driven and competitive higher education landscape, fostering innovative work behaviour (IWB) among middle administrators is critical for institutional adaptability and sustainability. Despite their pivotal role in bridging academic and administrative functions, the innovative capacities of non-academic middle managers remain underexplored. This study investigates the influence of servant leadership on work engagement and IWB among non-academic middle administrators in Malaysian public universities, drawing on Conservation of Resources (COR) Theory. COR Theory posits that individuals strive to acquire and protect valuable resources necessary for managing stress and promoting well-being. Within resource-constrained university environments, servant leadership operates as a resource caravan passageway, offering psychological safety, autonomy, and professional support that empower middle administrators to engage in resource-intensive behaviours like innovation. A quantitative survey was conducted among 374 non-academic middle managers from 20 Malaysian public universities. Using Structural Equation Modeling (SEM), the study examined the direct and indirect relationships between servant leadership, work engagement, and IWB. The results indicate a significant positive relationship between servant leadership and work engagement ($\beta = 0.12$), as well as between work engagement and IWB ($\beta = 0.22$). However, the direct relationship between servant leadership and IWB was non-significant ($\beta = -0.07$), highlighting the mediating role of work engagement in this dynamic. The findings contribute to COR Theory by demonstrating that servant leadership enhances middle managers' engagement, which subsequently drives innovative behaviours. Practically, the study underscores the need for Malaysian public universities to adopt servant leadership practices that prioritize employee development and psychological well-being, fostering a supportive environment for engagement and innovation. By empowering middle administrators through servant leadership, universities can enhance their capacity for strategic action and institutional change. This study extends theoretical understanding and offers practical insights for leadership development in higher education, emphasizing the strategic role of middle managers in driving institutional innovation.

Keywords: Servant Leadership, Work Engagement, Innovative Work Behaviour, Conservation of Resources Theory, Middle Managers, Higher Education Institutions

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STRATEGIC ROLES OF MALAYSIAN BUSINESS SCHOOLS IN COMMUNITY-BASED SUSTAINABLE DEVELOPMENT: A CASE INSIGHT FROM UKM GSB

Presenter: Gou Yi Hui

Business schools are increasingly expected to contribute not just to industry, but also to society. This paper explores how Malaysian business schools, particularly the Graduate School of Business (GSB) at Universiti Kebangsaan Malaysia (UKM), engage in community-based sustainable development. At UKM GSB, MBA students must complete a group project before graduation. These projects fall under three main categories: project management, corporate social responsibility (CSR), and consulting. CSR projects, in particular, often involve direct engagement with local communities and sustainability goals Using a qualitative approach, this paper reviews relevant literature and analyzes project documents and guidelines to understand how such initiatives are structured, governed, and aligned with the Sustainable Development Goals (SDGs). The study highlights the strategic value of CSR-based projects as a bridge between classroom learning and real-world community needs. It also examines challenges such as sustaining impact, securing partnerships, and integrating these efforts into long-term business education. The paper concludes with practical suggestions for strengthening the role of business schools in local development.

Keywords: Business education, Community engagement, Corporate Social Responsibility (CSR), Sustainable Development Goals (SDGs), Malaysian business schools, Strategic partnerships

Cluster 3: Arts And Social Sciences

POSTER SESSION

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THE EFFECTIVENESS OF CHOICE THEORY MODULES ON ADOLESCENTS' BASIC NEEDS SATISFACTION AND FRUSTRATION

Presenter: Nurul Fathihah Nor Azhar

The objectives of this study are to look into the impact of Choice Theory modules on satisfaction and frustration in improving students' academic progress. The present study used a quasi-experimental approach with a pretest-posttest design and a control group. The statistical population included 60 pupils in Grades 2 and 4 of Malaysia's high schools. The sample consisted of students recruited using a multistage cluster sampling procedure and randomly divided into two experimental and control groups. The experimental group went through 8 meeting sessions for 90 minutes using the Choice Theory approach. This study uses the instrument The Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) developed by Chen et al. (2015) that measures six subscales. The data were analyzed by the analysis of Mancova test. The findings revealed that the effect of Choice Theory Modules on improving students' academic progress and its subscales (satisfaction relatedness, frustration relatedness and frustration competences) were statistically significant ($P > 0.05$). However, However, findings show that this approach is not effective on the satisfaction autonomy, frustration autonomy, satisfaction competences subscales ($p < 0.05$). Based on the findings obtained from this study, it shows that Choice Theory group guidance session can have an effect on several subscales in satisfaction and frustration of basic needs. Based on the findings obtained from this study, it shows that Choice Theory group guidance session can have an effect on several subscales in satisfaction and frustration of basic needs in influencing student academic achievement. Therefore, group guidance modules based on Choice Theory should be applied more widely in the education system as one of the effective intervention approaches in helping students achieve psychological well-being and academic success.

Keywords: Choice Theory modules, satisfaction, frustration, basic needs, adolescents, academic achievement

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