



UNIVERSITI
MALAYSIA
KELANTAN



3RD INTERNATIONAL CONFERENCE ON TROPICAL RESOURCES AND SUSTAINABLE SCIENCES

“STEERING SUSTAINABILITY FROM TROPICAL TO GLOBAL SCALE
THROUGH EFFECTIVE MANAGEMENT AND CONSERVATION OF NATURAL RESOURCES”

ABSTRACT BOOK



OfficialUMK
umk.edu.my

Entrepreneurship
is Our Thrust

Kita
#BinaLegasiUMK
Bersama

#WeAreUMKFamily
#OneUMKOneDream

Organised by:
Faculty of Earth Science, Universiti Malaysia Kelantan

**3rd International Conference on
Tropical Resources and
Sustainable Sciences
(CTReSS 3.0)**

Abstract Book

*Steering Sustainability From Tropical To Global Scale Through
Effective Management And Conservation Of Natural Resources*

Published by
Faculty of Earth Science (FSB)

2021

Copyright @ Faculty of Earth Science, Universiti Malaysia Kelantan 2021

All rights are reserved. No part of this publication can be reproduced or used for publication without the permission from the Faculty of Earth Science, Universiti Malaysia Kelantan.

3RD INTERNATIONAL CONFERENCE ON TROPICAL RESOURCES AND SUSTAINABLE SCIENCES (CTReSS 3.0)

Published by:

Faculty of Earth Science,
Universiti Malaysia Kelantan Jeli Campus,
17600 Jeli,
Kelantan,
Malaysia.

TABLE OF CONTENT

KEYNOTE SPEAKER1

THEME: ENVIRONMENT2

Invited Speaker	Utilization of Agricultural Waste Biomass in Health and Environmental Applications	3
EV-001	Spatiotemporal Analysis of Environmental Changes Based On Integrated Remote Sensing Indexes In River Basin of Kelantan	4
EV-002	High-quality Timber Species Production under Multi-storey Forest Management Approach in Malaysia	4
EV-003	Determination of Background Indoor Air Pollutants and Thermal Comfort in Faculty of Earth Science Building	5
EV-004	Assessment of health risk on metal accumulation from consumption of <i>Corbicula fluminea</i>	5
EV-005	Assessment of Kelantan River Water Quality using Water Quality Index (WQI)	6
EV-006	Identification of formaldehyde in groundwater using UV-Vis spectrometer	6
EV-007	Species Diversity and Enumeration of Shrub Species in Pantai Sabak, Kelantan, Malaysia	7
EV-008	Landslide Susceptibility Assessment using Geographic Information System in Aring, Gua Musang, Kelantan	7
EV-010	Identifying the Potential Use of Unmanned Aerial Vehicle (UAV) Technique in Mining Area for Geohazards and Safety Control	8
EV-011	Climbers Diversity in Agro Techno Park, Universiti Malaysia Kelantan, Jeli Campus	8
EV-012	Potential of a combination of <i>Heliconia psittacorum</i> and its associated bacteria for phytoremediation	9
EV-015	Torrefaction of Empty Fruit Bunch (EFB) Fibres Adopted in Modified Microwave	9
EV-017	Potential of Oil Palm Trunk Starch as Flocculant for Contaminant of Emerging Compound Removal	10
EV-018	Identification of Groundwater Potential Zones Using AHP in Kuala Krai, Kelantan	10
EV-019	Optimizations and artificial neural network validation studies for naphthalene and phenanthrene adsorption onto NH ₂ -UiO-66(Zr) metal-organic framework	11
EV-022	Highly sensitive aptasensor based on ‘rose petal’ shaped iron nanoparticles decorated on 3D graphene for detection of zearalenone	11

EV-023	Determination of potential groundwater sources using electrical resistivity imaging (ERI) in Lojing, Gua Musang	12
EV-025	A Systematic Review of Machine Learning Application in Water Quality Using Satellite Data	12
EV-026	Geoheritage Values Assessment in Aring, Gua Musang, Kelantan	13
EV-027	Evaluation on Floral Visitors of <i>Zingiber spectabile</i> (Zingiberaceae) at Gua Ikan, Kelantan, Peninsular Malaysia	13
EV-028	Organic and Nutrient Removal from Pulp and Paper Industry Wastewater Treatment by Extended Aeration Activated Sludge System	14
EV-029	Application of POMOF Composites for CO ₂ Fixation into Cyclic Carbonates	14
EV-030	Population Size Determination Using Photographic Estimation for The Conservation of Nectar Bat (<i>Eonycteris spelaea</i>) at Gunung Reng, Kelantan, Malaysia	15
EV-033	An Ethnobotanical Study on Medicinal Zingiberaceae used by Locals in Kelantan, Peninsular Malaysia	15
EV-035	Agroforestry Activities as Socioeconomic Enhancement in Tana Toraja Regency, Indonesia	16
EV-036	Analysis of Biophilic Design in Communal Spaces of Office Building in D7 at Sentul East, Malaysia	16
EV-038	Ultrasound-assisted lactic acid based deep eutectic solvent extraction of phenolic antioxidants from <i>Thymus broussonetii</i> : A Box–Behnken design approach for optimization	17
EV-039	Altitudinal Influence on Soil Properties Related to the Abundance of <i>Rafflesia</i> Buds in Lojing Highlands, Kelantan, Peninsular Malaysia	17
EV-040	Spatio-Temporal Analysis of Rainfall Data in Kuala Krai Kelantan	18
EV-041	Deep Learning Accuracy Assessment of Oil Palm Tree Recognition Based On Drone Remote Sensing Images	18
EV-045	Notes on Small Mammals Diversity at Perlis State Parks, Wang Kelian, Perlis, Malaysia	19
EV-046	Updates on Avifauna Community in Tasik Meranti, Wang Kelian, Taman Negeri Perlis	19
EV-047	Checklist of Small Vertebrates at Sime Darby Tangkah Estate, Tangkah, Johor	20
EV-048	Diversity of Freshwater Fish in Forest Research Institute Malaysia (FRIM): A Comparison of Diversity between Man-made and Natural Forest in Selangor, Malaysia	20
EV-049	Checklist on small vertebrates at Kuala Langat North Forest Reserve, Selangor, Malaysia	21

EV-050	Comparison of Terrestrial Vertebrates between Natural and Teak Plantation Forest in Peninsular Malaysia: A Case Study in Perlis State Park and Mata Ayer Field Center, FRIM	21
EV-051	Notes on Mammals and Avifauna at FRIM Campus, Selangor, Peninsular Malaysia	22
EV-052	Monitoring physiological and chemical response of lichen in free air CO ₂ enrichment (FACE) station	22
EV-054	Isotherms for adsorption of boron onto new fibrous adsorbent containing glycidol ligands: linear and nonlinear regression methods	23
EV-055	Optimization of Malachite Green Removal using Activated Carbon Derived from Coconut Shell	23
EV-056	Characteristics Study of Ammonia-N and Phosphorus in Sewage Wastewater Effluent: A Case Study of Alkhumrah, Jeddah Wastewater Treatment Plant	24
EV-057	Geology and Distribution of Heavy Metals in Topsoil, Kuala Krai, Kelantan	24
EV-058	Optimisation and Growth Kinetic Analysis of Microalgae, <i>Arthrospira platensis</i> in 2-L Photobioreactors	25
EV-059	Combined effects of <i>Curcuma longa</i> and <i>Trigonella foenum graecum</i> extracts on anti-hyperglycemic activity and Oxidative Enzymes in alloxan induced Type -1 diabetic rats	25
EV-061	DISTRIBUTION OF RARE EARTH ELEMENT (REE) IN GRANITOIDS IN KELANTAN AREA	26
EV-062	Comparative study of variation of Ground Level Ozone Concentrations and Total Column Ozone Concentrations Over Klang Valley	26

THEME: SOCIAL & MANAGEMENT27

Invited speaker	Sustainable Integrated Management Framework for Indigenous People in Peninsular Malaysia	28
SM-001	Knowledge, attitude and practice of environmental sustainability among Sustainable Science students in Universiti Malaysia Kelantan	29
SM-002	Pondok Community Participation in Sustainable Solid Waste Management Practices	29
SM-003	Developing a Sustainable Solid Waste Management System Using Analytical Hierarchy Process (AHP) Method at Pondok Institutions in Kelantan	30
SM-006	Tourist satisfaction on ecotourism facilities and services in Taman Negara National Park Sungai Relau, Merapoh, Pahang	30
SM-007	Local Visitors' Willingness to Pay of Entrance Fee at Taman Negeri Gunung Stong, Kelantan	31
SM-008	Bayesian spatial modeling of poverty risk in Kelantan	31

SM-009	The Importance of Ulu Sat Forest Reserve to Socio-Economic Activity of Local Community	32
SM-010	Society 5.0: Green Logistics Consciousness in Enlightening Environmental and Social Sustainability	32
SM-011	Community-based Tourism Benefits and Challenges for tourism development in Vietnam	33
SM-012	Key Biodiversity Areas (KBA): An Important Approach in Mainstreaming Biodiversity Conservation in Malaysia	33
SM-016	Augmented Reality (AR) to British pillboxes as a medium of education in heritage conservation in Kelantan	34
SM-018	Factors of Volunteerism Practice in Corporate Organization for Sustainable Development	34
SM-019	Social Return on Investment (SROI) for Government Flood Recovery Project: Case Study of “New Permanent Housing” (<i>Rumah Kekal Baharu</i>) RKB Project in Kg. Telekong, Kuala Krai, Kelantan	35
SM-020	Conserving living heritage site in Portuguese Settlement, Melaka World Heritage Site: Issues and Conservation Elements	35
SM-021	Impacts of River of Life Project Towards the Conservation of Urban Heritage Quarter in Kuala Lumpur: A Preliminary Study	36

THEME: SUSTAINABILITY37

Invited Speaker	Leaching of Heavy Metals from Waste Recycling In Building Materials	38
SS-001	Effect of photocatalyst dosage and air loading in photocatalytic degradation of metamifop	39
SS-002	Total phenolic content, total flavonoid content and antioxidant activity of ethanolic extract of <i>Rafflesia kerri</i> Meijer, Lojing Highlands, Peninsular Malaysia	39
SS-004	Recovery of Au, Ag and Cu from Printed Circuit Board Leachate Using Activated Carbon Derived from Foxtail Fruit	40
SS-007	Total phenolic content and antioxidant activity of limestone endemic Araceae species, <i>Alocasia farisii</i>	40
SS-009	Synergistic effect of <i>Alocasia longiloba</i> fruit’s extract with ampicilin and tetracycline against bacteria	41
SS-012	The Effect of Organic Amendments on the Growth of Gaharu (<i>Aquilaria malaccensis</i>)	41
SS-013	Water Usage for Hygiene Practices among Tanjong Malim, Perak Community during Movement Control Order (MCO) Due to Covid-19	42

SS-015	Optimisation of Treated Black Soldier Fly Larvae (BSFL) Using Acidic Salt to Improve Protein Digestibility of Giant Freshwater Prawn (<i>Macrobrachium rosenbergii</i>) Larvae	42
SS-016	Active Design: Promoting Physical Activity through Building Layout	43
SS-017	Molecular Identification and Phylogenetic Analysis of Fungi and Bacteria Associated to Common Spear Rot Disease in Malaysia	43
SS-018	Managing and protecting of endangered Rafflesia species in Kelantan, Peninsular Malaysia	44
SS-019	Comparison of Chemical Compositions Between Two Fast Growing Species: <i>Acacia mangium</i> and <i>Leucaena leucocephala</i>	44
SS-020	Spatial Framework of Zero Covid 19 Outbreak for Sustainable Health in Kelantan	45
SS-021	Spatial and Temporal Changes of Urban Forest in Jeli, Kelantan	45
SS-022	Pre-treatment of Black Soldier Fly Larvae (BSFL) using Neutral Salt to Improve Protein Digestibility of <i>Macrobrachium rosenbergii</i> Feed	46
SS-023	Sustainable Living: Did Gender Influence Psychological Wellbeing?	46
SS-024	Conceptual Framework of Smart Fertilization Management for Oil Palm Tree Based on IoT and Deep Learning	47
SS-025	Above Ground Biomass Estimation of Oil Palm Plantation in Jeli, Kelantan Using Drone-Based Remote Sensing Image	47
SS-029	Evaluation on Mechanical Properties of Plywood from Two Fast Growing Species: <i>Neolamarckia cadamba</i> and <i>Paraserianthes falcataria</i>	48

ACKNOWLEDGEMENT.....49

KEYNOTE SPEAKER



DATO' SERI Ir. DR. ZAINI UJANG

KEYNOTE:

Sustainability: From Paris Agreement to Individual Domain

Dato' Seri Ir. Dr. Zaini Ujang is an administrator, professional environmental engineer and a passionate academic. Blend together with his knowledge and 30 years of experience on environmental sustainability with special focus on built environment in the context of river basin management, he is a Malaysia icon for water and environment through eco-shift in thinking and action. He is the first recipient of the most prestigious Merdeka Award 2009 for Outstanding Scholastic Achievement and the youngest Vice-Chancellor appointed in the history of public universities in Malaysia, at the age of 43. He received Honorary Doctor of Science from Newcastle University, UK in 2018. He has been a visiting professor at Imperial College, London (since 2013) and Tsukuba University, Japan (since 2013) and research associate at Massachusetts Institute of Technology (MIT), US. With his vast knowledge and experiences in multiple disciplines, he had been appointed to lead several ministries as the Secretary-General namely the Ministry of Education Malaysia, Ministry of Higher Education Malaysia and Ministry of Energy, Green Technology and Water Malaysia before becoming the Secretary-General for the Ministry of Environment and Water in March 2020. He is an author of 42 books across multiple disciplines; his latest publication is Denai: Tersangkar Menuju Sungai.

THEME: ENVIRONMENT

INVITED SPEAKER



**ASSOC. PROF. DR. ZAINUL
AKMAR ZAKARIA**

Utilization of Agricultural Waste Biomass in Health and Environmental Applications

**Mohd. Amir Asyraf Mohd. Hamzah¹, Then Kek Hoe², Nurzila Abd. Latif³, Muhammad Abbas Ahmad Zaini¹
and Zainul Akmar Zakaria^{1,*}**

1School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

2FGV (R&D) Sdn Bhd, Level 9 (West), Wisma FGV, Jalan Raja Laut, 50350 Kuala Lumpur, Malaysia

3Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

*Corresponding author: zainulakmar@utm.my

Abstract

Improper management of agricultural waste biomass posed serious threat to human health due to environmental pollution and green-house gases contribution. Palm kernel shell (PKS) and solid pineapple waste (SPW) are two examples of agricultural waste biomass that require proper management strategies primarily due to its huge volumes. Thermochemical conversion of these PKS and SPW into phenolic-rich liquid extracts or biochar offers interesting solution for this problem. The resulting phenolic-rich extracts has the potential to be used in various health applications such as antioxidant, antibiofilm, anti-inflammatory and wound healing agents. Biochar can be applied as soil additive or can be converted further to activated carbon to be used as adsorbent for pollutants present in water and wastewater system.

EV-001

Spatiotemporal Analysis of Environmental Changes Based On Integrated Remote Sensing Indexes In River Basin of Kelantan

S N H Mohd Ruhaizi¹ and S Daliman^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: shaparas@umk.edu.my

Abstract

Analysis of environmental changes is a key to knowing the state of vulnerability of the environment. However, in recent years, environmental changes are often evaluated based on one factor per research. In this study, several factors will be integrated to get an evaluation of the environment that consider the influences of many natural factors at the same time. In this study, spatiotemporal analysis of environmental changes based on integrated remote sensing indexes in river basin of Kelantan will be conducted to evaluate the environmental condition of the Kelantan river basin. It will also help in evaluating the environmental health of the Kelantan River. The Kelantan River basin is an important source of water to Kelantan's population, and up to 2014, Kelantan River basin is also housing about 68.5% of the Kelantan population lives within the Kelantan River Basin. This means that any negative changes of the environment of the Kelantan River basin could affect the community severely. Hence, the environmental quality evaluation throughout the time is needed in order for any protection and management enforcement if necessary. The process of environmental evaluation includes the usage of indexes, namely the normalized difference vegetation index (NDVI), wetness index (WI), albedo, salinization index (SI), and land surface temperature (LST) will be used to calculate the data obtained from Landsat TM and Landsat 8 from the year 2000, 2005, 2010, 2016, and 2020. Data processing, compilation, verification, calculation and analysis will be conducted using ArcGIS 10.3. The result of this study will give the condition status on the environmental that has happened since 2000 until 2020 in Kelantan River Basin. The information gained will be helpful assistant in creating rules and regulation, formulation, protection and management effort to conserve the environment of the river basin. This study will also show that by using remote sensing technology, environmental changes of certain area can be evaluated.

EV-002

High-quality Timber Species Production under Multi-storey Forest Management Approach in Malaysia

N J N Jemali^{1,*}, J Yahya², H N R Bam³, S Majid¹ and M Muhammad¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Forest Department of Peninsular Malaysia, Kuala Lumpur, Malaysia

³Faculty of Agriculture (Subtropical Agro-Environmental Sciences), University of the Ryukyus, Okinawa, Japan

*Corresponding author: janatunnaim@umk.edu.my

Abstract

The multi-storey forest management project (MFMP) intended to identify the best silvicultural practices for tropical forest tree species as well as producing high-quality timber and seeds in a multi-storey forest. Plots were established to examine the transition of existing forest plantations and secondary forest to multi-storey forest type. The study aims to evaluate the current performance of the growth rate and productivity of selected local species through a multi-storey forest management approach. Based on the growth performance and productivity obtained, it was found that the method of planting under shading is a practical approach compared to the open planting method. *Acacia mangium* is planted 3 - 4 years earlier which acts as shade trees. Five study designs implemented using crop strip at a distance of 3.0 x 3.7m alternating between three different local species and shade trees with a ratio of A (1: 1), B (2: 2), C (4: 4), D (8: 8) and E (16:16). From this study, we found that Malaysia's local timber species can grow under the shade at the beginning of establishment and it can grow well on narrow crop lines such as crop design A and B. On the other hand, these local species need sufficient levels of sunlight as well as other environmental requirements such as humidity, soil and weather changes over time as they grow. For that reason, these three local species namely *Shorea leprosula*, *Shorea parvifolia* and *Neobalanocarpus heimii* showed good performance in crop design C, D and E. This multi-storey forest management concept can be practised for the establishment of forest plantations and silvicultural treatment in degraded areas with high-quality local timber species.

EV-003

Determination of Background Indoor Air Pollutants and Thermal Comfort in Faculty of Earth Science Building

N R Awang^{1,*}, N A N M Radzi¹, T S Yong¹, M A Abas¹, N S Zainordin², N A Ramli³ and N Ibrahim⁴

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Forestry and Environment, Universiti Putra Malaysia, 43300, Serdang, Malaysia

³School of Civil Engineering, Universiti Sains Malaysia Engineering Campus, 14300, Nibong Tebal, Penang, Malaysia

⁴Department of Civil Engineering, Faculty of Engineering, Science & Technology, Infrastructure University Kuala Lumpur, 43000, Kajang, Malaysia

*Corresponding author: norrimi.a@umk.edu.my

Abstract

The focus of this study was to determine the most significant factors that influencing indoor air quality (IAQ) and thermal comfort of a mechanically ventilated lecturer office room in FSB new building. This study measured the concentrations of ozone (O₃), nitrogen dioxide (NO₂), total volatile organic compound (TVOC), carbon dioxide (CO₂), carbon monoxide (CO), particulate matter (PM), temperature and relative humidity using seven set up conditions. The set-up condition for study room is based on temperatures that have been selected between 22°C to 26°C and window of the room being either close or open. The IAQ were analyzed by descriptive analysis to indicate the parameters variations. Furthermore, thermal comfort for the room of FSB new building has been determine by the CBE thermal comfort tool based on ASHRAE 55 standards. Result suggested that the IAQ of the studied room in FSB new building showed maximum reading during the window was opened condition. The setup of selected temperature air conditioner was minimizing the concentrations of IAQ because IAQ were increase during high temperature. Among of the selected IAQ parameters, particulate matter was the most significant indoor air pollutants in the studied room with the highest average concentration was 20.944 µg/m³. The increment of particulate matter concentrations was due to the suspended dust in the room and additional movements of the occupants inside the room exaggerate the condition. Besides, results of this study suggested that a good IAQ inside an air conditioning room was achieved when the temperature is set at 26°C.

EV-004

Assessment of health risk on metal accumulation from consumption of *Corbicula fluminea*

N S U Idris^{1,*}, N Abdul Zali² and N S Abdul Halim¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Pengurusan Air Selangor Sdn. Bhd., Jalan Pantai Bharu, Bangsar, 59200 Kuala Lumpur, Malaysia

*Corresponding author: shahirul@umk.edu.my

Abstract

Indicators of environmental quality encompass a number of environmental aspects such as water, soil and biotic life. As an example, the fundamental human needs is access to clean food sources. Nowadays, metals pollution has become a great concern as it could lead to a bad effect on a human's health. In this study, heavy metals concentration in *Corbicula fluminea* is a clam that is frequently consumed by the local people in the state of Kelantan. In this study, metal concentration in *Corbicula fluminea* were determined and the possible human health effects were evaluated by using the Target Hazard Quotients (THQ). Five heavy metals were determined which are cadmium, arsenic, lead, copper, and zinc. The samples were collected from Tumpat, Kelantan whereby the study area was surrounded by agricultural activities and housing settlement. The sample went through a wet digestion process before being analysed by the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). The limit of heavy metals concentrations in aquatic species for consumption has been set for human health by Food and Agriculture Organization (FAO). Accumulation of heavy metals in the species were found to be high for cadmium. Furthermore, in risk and safety assessment, both arsenic and lead had very low level of metal concentration in the species. Based on the result obtained, cadmium exceeded the permissible limit set by the FAO, whereas, the calculated THQ was below one, which indicated means there was a least chance of carcinogenic effects to human's health.

EV-005

Assessment of Kelantan River Water Quality using Water Quality Index (WQI)

F S Radin Nizar¹, R Mohd Ghazi^{1,*}, N R Awang¹ and M Muhammad¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: rozidaini@umk.edu.my

Abstract

Kelantan River is the main river in Kelantan, and it has been used for water sources for irrigation, small-scale fishing industries, transportation, and sand mining. WQI is a comprehensive method for displaying water quality status and achieving good water quality. This study aims to identify the significant difference in water quality index (WQI) parameters and the correlation between WQI parameters in urban, suburban, and residential area along the Kelantan River from 2015 until 2019. Water quality stations in urban, suburban, and residential areas were selected with facilitation of ArcMap 10.0 software. In this study, Kota Bharu represented urban area, Kuala Krai represented suburban area and Tanah Merah represented residential area. The significant difference between WQI value with different stations were determined using analysis of variance (ANOVA). Meanwhile the correlation between WQI parameters were determined using Pearson correlation. From this research, there is no significant difference in water quality between urban, suburban, and residential areas along Kelantan River. The correlation of water quality parameters varies between locations which indicates different water pollution contributors except correlation between biochemical oxygen demand (BOD) and chemical oxygen demand (COD), pH and ammoniacal nitrogen (AN), and total suspended solid (TSS) and WQI. WQI in urban, suburban, and residential areas were classified in Class II from 2015 until 2019 except WQI in residential area in 2019 which was classified in Class III. This study will provide scientific reference for future use to protect local aquatic environment in Kelantan River and can be used to manage the river basin development in future.

EV-006

Identification of formaldehyde in groundwater using UV-Vis spectrometer

N Rosli¹, M Jani^{1,*}, N S U Idris¹, R Mohd Ghazi¹ and N R Nik Yusoff¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: musfiroh@umk.edu.my

Abstract

This research aims to identify the concentration of formaldehyde in groundwater by using UV-Vis spectrophotometer and to assess the physico-chemical parameters of water quality in groundwater. The samples were collected from a cemetery of Kampung Darat Demit, Kubang Kerian, Kota Bharu where the formalin-based specimen/pathological waste was buried. The unknown concentration of the formaldehyde was determined by using chromotropic acid method for the analysis of formaldehyde. A calibration curve was prepared with six different concentrations to determine the unknown concentration of formaldehyde in the samples. Seven parameters of water quality were analyzed using respective methods and the relationship with the presence of formaldehyde in water were discussed. By using the National Water Quality Standard (NWQS) of Malaysia 2008 the class of water for all samples were determined. A statistical study of one-way analysis of variance (ANOVA) was conducted using SPSS 20th version software. The results showed the different concentration of formaldehyde found in all four samples for four consecutive weeks. The classes of water samples for each physical-chemical parameter vary and in range between Class II and III. The presence of formaldehyde in water may has significant effect on the water quality parameters physically, biological and chemically.

EV-007

Species Diversity and Enumeration of Shrub Species in Pantai Sabak, Kelantan, Malaysia

N A Z Zamri¹, N A Ab Majid¹, N N Mohd Zulkafli¹, S A Ahmad Zu¹, Z Hamzah¹, R Zakaria² and N A Amaludin^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Public Health, Universitas Muhammadiyah Aceh, Banda Aceh, 23123, Indonesia

*Corresponding author: nazanis@umk.edu.my

Abstract

Coastal forest plays a vital role in our ecosystem because of its numerous and varied human use. In Malaysia especially Kelantan, there is a lot of coastal forests that are not recognised or has been introduced as the forest that consists of much biological diversity that can be important and useful for the development and management of the forest. This study documented shrubs species that were found in Pantai Sabak, Kelantan where all shrubs species were identified and enumerated by using a systematic plot sampling method while relating it with soil composition and their characteristic. A total of 3752 shrubs plants representing 28 species belong to 24 genera from 17 families were identified within 0.05 hectare plots. Species diversity with Shannon-Wiener Diversity Index (H') with a value of 1.67, while H_{max} was 3.34 and Evenness Index (E_H) value was 0.50 for the entire study area. Family Capparaceae (1425) and Euphorbiaceae (1260) were dominant families grown in loam and silt soil and the least dominant represented by *Vitex rotundifolia* and *Ipomoea pes-caprae* species which grown in sandy soil. Only certain species can grow and be able to survive in different habitats where types of soil play an important role in the factors of the tree species that grow around Pantai Sabak which can be observed that during the study was conducted.

EV-008

Landslide Susceptibility Assessment using Geographic Information System in Aring, Gua Musang, Kelantan

W S Udin^{1,*}, N N Yahaya¹ and S I M Shariffuddin²

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Urban Explorer Sdn Bhd, 40160 Shah Alam, Selangor

*Corresponding author: wanisofia@umk.edu.my

Abstract

Aring is located in Gua Musang District, Kelantan, prone to have geological hazards such as rock falls or slides. It is also very vulnerable to landslide in some areas, contributing to life losses and properties damages such as houses and vehicles. This study aims to evaluate the landslide causative factors and to produce the landslide susceptibility map with scale of 1:25000. The causative factors; aspect, slope, elevation and drainage density, were determined from the Digital Elevation Model (DEM). Lithology was adopted from the geological map, while the lineament was processed from satellite data. These weighted causative factor maps were integrated into Geographic Information System (GIS) platform using Weighted Overlay Method (WOM) analysis to prepare a susceptibility landslide map. The landslide susceptibility map of the study area was classified into three classes. Class 1 is low hazard, class 2 is medium hazard, and class 3 is the high hazard. In conclusion, the capability to determine landslide susceptibility leads to a better understanding of landslide mechanisms, thus leading to enhanced prevention of the most likely failure sites within a landslide-prone area for future urbanization.

EV-010

Identifying the Potential Use of Unmanned Aerial Vehicle (UAV) Technique in Mining Area for Geohazards and Safety Control

M F Alias^{1,*} and W S Udin¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: farisalias13@gmail.com

Abstract

Nowadays, flexible Unmanned Aerial Vehicle (UAV) technology has many benefits especially in geoscience work include; rock types identification, safety developments, data acquisition and land profiling. This study focuses on the potential geohazard threats that may occur in mining areas. Various methods, techniques and approaches in terms of inputs and outputs from previous studies have been analyzed to identify the probabilities of the geohazard problems encountered. It is conducted by performing aerial mapping with flight mode that has been set according to the specifications of the method used, mapping scale and data accuracy. This analysis discusses the effective solutions in identifying the actual accuracy to provide an assessment of the geohazard level at the mining area and then establish safety controls either biological or engineering control. The accuracy of the data and maps are very important to maintain the reliability of the data collected. As a result, the findings from the review can be compared; based on the capability of the UAV methods that have been adopted in producing geohazard output quantity and quality of findings. The output data is then analyzed to give an accurate assessment in determining the level of security to be considered at the mining area. In conclusion, these data can be used as an assessment to determine security control in mining areas based on the shape of the terrain, the capabilities of the UAV techniques used, accessibility, the type of mining applied and others. It is shown that this research can be presented to the authorities in improving the quality of safety in mining centres to ensure the safety of the parties involved.

EV-011

Climbers Diversity in Agro Techno Park, Universiti Malaysia Kelantan, Jeli Campus

Nadiah Ahmad Fikri¹, Muhammad Firdaus Abdul Karim^{1,*}, Nor Hidayu Mazri¹, Nursyakirah Saharizan¹, Nur Safiqah Adnan¹, Nur Basyirah Mohd Ali¹, Nazahatul Anis Amaludin¹ and Radhiah Zakaria²

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Public Health, Muhammadiyah University of Aceh, Banda Aceh, Aceh, Indonesia

*Corresponding author: firdaus.ak@umk.edu.my

Abstract

Species diversity of climbers were inventoried in four nature trails of Agro Techno Park Universiti Malaysia Kelantan (UMK), Jeli campus. The purpose of this study was to determine the diversity, composition and abundances of climbers in Agro Techno Park Universiti Malaysia Kelantan, Jeli Campus. Samples of the climbers were randomly collected from four natural trails for herbarium preparation and preserved using 70% ethanol solution. The preservation was done by putting the samples in zip lock transparent bag that contained of 70% ethanol solution. The samples were oven-dried at 30-40 °C, mounted and labelled before identification. The diversity pattern of the climbers was analyzed by using Shannon Diversity Index, Shannon Evenness Index, Margalef Richness Index, Abundance Parameters and Importance Value Index (IVI). A total of 593 climbers belonging to 35 species were recorded. Family Fabaceae was the most diverse plant from the climbers' family which consisted of 4 genera and 5 species. This was followed by family Menispermaceae, Melastomataceae, Connaraceae, Apocynaceae, Rubiaceae and Vitaceae. The result obtained indicated that alteration of the ecological environment through natural disturbances influenced the abundance and distribution of climbers.

EV-012

Potential of a combination of *Heliconia psittacorum* and its associated bacteria for phytoremediation

M I Baharuddin^{1,*}, A Eh Rak¹, S R M Kutty², S N Mohd Roslan³ and R Hanaphi³

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Civil & Environmental Engineering, Universiti Teknologi PETRONAS (UTP), 32610, Sri Iskandar, Perak

³Faculty of Applied Science, Universiti Teknologi Mara (UiTM), 02600, Arau, Perlis

*Corresponding author: miorumk@gmail.com

Abstract

The topic of remediation generation has recently received a lot of attention to combat or deal with contaminated soil, water, or air. There are a few types of remediation technologies, such as microbiological remediation and phytoremediation, in which microbial remediation uses microorganisms as the agent while phytoremediation uses flowers as the agent. As a result, phytoremediation is a cost-effective generation that relies on plants and related bacteria to overcome soil and water contamination problems. *H.psittacorum* is one of the flowers with phytoremediation and ecologically favorable potential. This study is aimed at learning more about the types of microorganisms that could help with phytoremediation. In addition, the water quality was evaluated to see if it was correlated with *H.psittacorum's* phytoremediation capacity. For microbe counting, two soil and root samples were organized and serially diluted. Microorganism awareness within the root pattern increased to 4.4×10^9 cfu/ml, whereas the soil pattern increased to 1.5×10^9 cfu/ml. In comparison to soil, roots are frequently associated with microorganisms and, as a result, contribute to a better understanding of microorganisms. Several probable colonies were then selected, cultivated, and diagnosed using biochemical tests and API identity kits. *Pseudomonas luteola*, *Serratia liquefaciens*, *Serratia marcescens*, *Enterobacter cloacae*, *Staphylococcus xylosus*, *Staphylococcus saphrophyticus*, and *Enterococcus faecium* were among the seven bacteria identified. All microorganisms that have been identified have a historical mechanism that has proven to be effective in removing, transferring, stabilizing pollutants, and promoting more favorable plant growth. Furthermore, individual copper, zinc, and phosphate concentrations in the water were reduced from 0.64 mg/l to 0 mg/l, 0.173 mg/l to 0.068 mg/l, and 0.513 mg/l to 0.293 mg/l, respectively. Finally, the concentration and identity of bacteria in roots and soil revealed information on these bacteria's ability to remove pollutants, while the water quality assessment demonstrated *H.psittacorum's* phytoremediation potential.

EV-015

Torrefaction of Empty Fruit Bunch (EFB) Fibres Adopted in Modified Microwave

M I Ahmad^{1,*}, M S M Rasat¹, M F Mohd Amin², P Elham³, M A Abas², H Lateh⁴ and M A Mohd Amin⁵

¹Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor Darul Ehsan, Malaysia

⁴Railway Transportation Testing Center, Thailand Institute of Scientific and Technological Research, 35 Mu 3 Technopolis, Tambon Khlong Ha, Amphoe Khlong Luang, Pathum Thani 12120, Thailand

⁵Verdastro Sdn Bhd, Kawasan Perindustrian Gebeng, Kuantan, Malaysia

*Corresponding author: iqbal.a@umk.edu.my

Abstract

Thermochemical pre-treatment process was implemented within the torrefecation temperature to improve the EFB fibers material, further exploiting for low rank solid energy material purposes. Modified microwave was introduced as a heat source chamber using the irradiation wavelength, with the mild exposure of atmospheric air in the system. As such parameter of (i.e heating rate and temperature) has influenced the process yield. Therefore, a regulated power input within 100 to 700 W was capped to access the effect toward samples and alumina crucible prepared. Thus, the 385 W of power selection was made with bound consideration of formation thermal shock at a constant nitrogen supply as inert gas during the heating process. The yield of compound constituents from this treatment also been discussed.

EV-017

Potential of Oil Palm Trunk Starch as Flocculant for Contaminant of Emerging Compound Removal

M F Mohd Amin^{1,a}, M S M Rasat², M I Ahmad², N S Aftar Ali³, K Muda^{3,b}, N S Zaidi³, S Ismail⁴, M F Mohamad Shahimin⁵, M A Mohd Amin⁶ and L Rietveld⁷

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Department of Water and Environmental Engineering, School of Civil Engineering, Universiti Teknologi Malaysia, Johor, Malaysia

⁴Faculty of Ocean Engineering Technology and Informatics, Universiti Malaysia Terengganu, Terengganu, Malaysia

⁵Faculty of Environmental Technology (FTK), Universiti Malaysia Perlis, Kampus Alam UniMEP Pauh Putra, Perlis, Malaysia

⁶Verdastro Sdn Bhd, Kawasan Perindustrian Gebeng, Kuantan, Malaysia

⁷Water Management Department, Faculty of Civil Engineering and Geoscience, TU Delft, Delft, the Netherland

*Corresponding author: mohamadfaiz@umk.edu.my; khalida@utm.my

Abstract

In this study, a natural flocculant is developed from an oil palm trunk. The flocculant further tested for its ability in turbidity and COD removal with additional of atrazine in wastewater and demineralised water matrix. At the optimum dosage of 20mg/L, the developed cationic OPT starch able to remove around 95% turbidity and 85% COD. In addition, the cationic OPT starch also show the ability to remove spiked atrazine from both water matrixes to the maximum range of 55-85%. In conclusion, the developed oil-palm based flocculant show great potential for real-world application with added cost-effective benefits.

EV-018

Identification of Groundwater Potential Zones Using AHP in Kuala Krai, Kelantan

R Muhammad Jamil^{1,*}, S S Hisham¹, M C Leong¹, S A Nawawi¹, A N Muhamad Nor¹ and N Ibrahim¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: rohzaini@umk.edu.my

Abstract

Groundwater is one of the main sources of water in Kelantan which consumes 70% of the water supply. The rapid development in the field such as population, urbanization, agriculture, and industry has led to an increased water supply and demand. Hence, it is necessary to identify the groundwater potential area to enhance groundwater supply in the study area. This study was carried out at Kuala Krai, Kelantan within latitude 5°36'30" to 5°33'50" N and longitude 102°8'25" to 102°11'10" E. The main objective of this study is to identify the new source of groundwater using Analytical Hierarchy Process (AHP) method and eventually come out with groundwater potential zones. The parameters such as lithology, geomorphology, land use, slope, drainage density, rainfall density, and soil type were chosen and spatially generated via the GIS platform. Those parameters were subjected to weighted overlay analysis to obtain the potential zones of groundwater. The weights for the various layers were generated and assigned using the AHP technique which allows the comparison of criteria influencing the potential zone. The results of the study revealed that the good potential zone comprises 36.1%, moderate 32.4%, and poor 31.5% respectively. In conclusion, factors such as low elevation, gentle slope, alluvial plains, and vegetation area have given a high potential of groundwater in this study area.

EV-019

Optimizations and artificial neural network validation studies for naphthalene and phenanthrene adsorption onto NH₂-UiO-66(Zr) metal-organic framework

Z U Zango^{1,2}, K Jumbri^{1,3,*}, H F M Zaid⁴, N S Sambudi⁴ and J Matmin⁵

¹Fundamental and Applied Sciences Department, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

²Department of Chemistry, Al-Qalam University Katsina, P.M.B 2137, Katsina, Nigeria

³Centre of Research in Ionic Liquids (CORIL), Institute of Contaminant Management, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

⁴Chemical Engineering Department, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

⁵Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia

*Corresponding author: zakariyya4@gmail.com

Abstract

Adsorptive removal of naphthalene (NAP) and phenanthrene (PHE) was reported using NH₂-UiO-66(Zr) metal-organic frameworks. The process was optimized by response surface methodology (RSM) using central composite design (CCD). The fitting of the model was described by the analysis of variance (ANOVA) with significant Fischer test (F-value) of 85.46 and 30.56 for NAP and PHE, respectively. Validation of the adsorption process was performed by artificial neural network (ANN), achieving good prediction performance at node 6 for both NAP and PHE with good agreement between the actual and predicted ANN adsorption efficiencies. The good reusability of the MOF was discovered for 7 consecutive cycles and achieving adsorption efficiency of 89.1 and 87.2% for the NAP and PHE, respectively. The performance of the MOF in a binary adsorption system was also analyzed and the adsorption efficiency achieved was 97.7 and 96.9% for the NAP and PHE, respectively.

EV-022

Highly sensitive aptasensor based on 'rose petal' shaped iron nanoparticles decorated on 3D graphene for detection of zearalenone

S S Sangu^{1,2}, N A M Abdul Karim¹, M S M Saheed^{2,5,*} and S C B Gopinath^{3,4}

¹Department of Fundamental and Applied Sciences, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

²Centre of Innovative Nanostructures & Nanodevices (COINN), Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

³School of Bioprocess Engineering, Universiti Malaysia Perlis, 02600 Arau, Perlis, Malaysia

⁴Institute of Nano Electronic Engineering (INEE), Universiti Malaysia Perlis, 01000 Kangar, Perlis, Malaysia

⁵Department of Mechanical Engineering, Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak, Malaysia

*Corresponding author: shuaib.saheed@utp.edu.my

Abstract

Zearalenone (ZEA), a mycotoxin mainly synthesized by *Fusarium graminearum* and *F. culmorum* is a widespread contaminant of several important crops such as wheat, maize, and paddy causing major plant diseases. Environmental factors such as rain and wind aids in the dispersal of ZEA in the soil and waters which affects aquatic lives. ZEA causes detrimental health effects such as hyper-oestrogenism and premature abortions to human and animals when contaminated crops are ingested. Hence, it is vital to detect ZEA as early precautionary step in lowering the risks related with the health impairment to human and animals, as well as environmental contamination. Conventional methods are time-consuming and complex, thus, this study aimed on developing a highly sensitive biosensor using graphene-nickel decorated with 'rose petal' shaped iron nanoflowers (GNINF) as the transducer and aptamer as the bioreceptor. Low-pressure chemical vapour deposition is used to grown 3D-graphene followed by electrochemical deposition of iron (II) sulphate on its surface to form iron nanoflowers. Immobilisation of chemical and biomolecules were done using the layer-by-layer technique. Field-Emission Scanning Electron Microscopy showed prominent 'rose petal' shaped nanoflowers on the graphene surface. This unique assembly creates large surface area for immobilisation and better electric charge transfer on the material surface. The existence of hydroxyl group on the surface of GNINF also plays a role as linker to the surface. Besides, the sensitivity of the aptasensor was characterised using electrochemical impedance spectroscopy. The limit of detection achieved in this study is 1 fg ml⁻¹ and the linear range is 1 fg ml⁻¹ to 1 ng ml⁻¹, which is highly sensitive than most reported biosensors. Overall, this highly sensitive aptasensor is a straightforward and cheap alternative for detecting ZEA in crops and the environment.

EV-023

Determination of potential groundwater sources using electrical resistivity imaging (ERI) in Lojing, Gua Musang

N Sulaiman^{1,*}, N S M Saliman^{1,*} and N Sulaiman¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: zamzarina@umk.edu.my

Abstract

The study area is located at the sub-district of Lojing, Gua Musang, Kelantan. The dimension of the study area is approximately 25km². This study aims to determine the possibility of groundwater existence using Electrical Resistivity Imaging (ERI) method. The lithology of the study area is a metamorphic rock which is schist and the parent rock for schist is a sedimentary rock. Schist has a characteristic that not suitable for groundwater accumulation between grains, therefore the groundwater may exist within the fractured zones. In Kelantan, it used both groundwater and surface water treatment as their main resources for daily uses. However, continuous extraction of groundwater can cause depletion and continuous contamination of the river and reduces the quality of water treatment. Therefore, new sources of groundwater are needed to support the water storage. The study area has a high potential of groundwater located in the subsurface. ERI results show that the subsurface consists of low resistivity material such as sedimentary rocks that can store groundwater in a large volume. Therefore, the study area is highly potential as a zone for groundwater accumulation.

EV-025

A Systematic Review of Machine Learning Application in Water Quality Using Satellite Data

N Hassan^{1,2,*} and C S Woo¹

¹Faculty of Computer Science and Information Technology, University Malaya, 50603 Lembah Pantai, Kuala Lumpur, Malaysia

²Institute of Oceanography and Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia

*Corresponding author: zuhrah82@gmail.com

Abstract

Monitoring water quality is a critical aspect of environmental sustainability. Poor water quality has an impact not just on aquatic life but also on the ecosystem. The purpose of this systematic review is to identify peer-reviewed literature on the effectiveness of applying machine learning (ML) methodologies to estimate water quality parameters with satellite data. The data was gathered using the Scopus, Web of Science, and IEEE citation databases. Related articles were extracted, selected, and evaluated using advanced keyword search and the PRISMA approach. The bibliographic information from publications written in journals during the previous two decades were collected. Publications that applied ML to water quality parameter retrieval with a focus on the application of satellite data were identified for further systematic review. A search query of 1796 papers identified 113 eligible studies. Popular ML models application were artificial neural network (ANN), random forest (RF), support vector machines (SVM), regression, cubist, genetic programming (GP) and decision tree (DT). Common water quality parameters extracted were chlorophyll-a (Chl-a), temperature, salinity, colored dissolved organic matter (CDOM), suspended solids and turbidity. According to the systematic analysis, ML can be successfully extended to water quality monitoring, allowing researchers to forecast and learn from natural processes in the environment, as well as assess human impacts on an ecosystem. These efforts will also help with restoration programs to ensure that environmental policy guidelines are followed.

Geoheritage Values Assessment in Aring, Gua Musang, Kelantan

N Sulaiman^{1,*}, W S Udin¹, N S Shafiee¹ and R Ismail¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: nursufiah@umk.edu.my

Abstract

The study conducted in the Aring area, with the latitude of 4° 51' 00" N to 4° 58' 17" N and longitude of 102° 19' 24" E to 102° 24' 40" E. Three geological formations existed in this area, namely the Aring Formation, Telong Formation and Koh Formation. The lithology of the Aring Formation includes volcanic rocks such as lapilli tuff, andesite, autobreccia. Other than volcanic, the Aring Formation also consists of limestone, sandstone, and shale. Roughly similar to Aring Formation, the Telong Formation in this area is comprised of Mudstone Unit I, which consists of mudstone, carbonaceous shale, sandstone and tuffaceous mudstone. Koh Formation, however, has quite distinguished lithology and only comprised of sedimentary rocks. The lithology includes conglomerate, sandstone, shale, chert and Mudstone Unit II; carbonaceous lime mudstone and mudstone. Six fossil phyla, namely Echinodermata, Brachiopoda, Cnidaria, Antropoda, Porifera, Mollusca and unidentified trace fossils, were observed in the study as strong evidence of the paleoenvironment of the Aring area. In terms of geoheritage, the fossil occurrences in Aring were determined as regionally significant and essential for that area's regional geology. Fossil is not significant and rare or unique occurrences to classify the fossil occurrences as high rank for geoheritage value. The development of fossil sites over this area can be considered only for educational and scientific purposes. Although fossils were found to be diversely distributed in several locations at Aring, Gua Musang, Kelantan, the levels of significance and value of Total Heritage Value were not high enough to acknowledge the fossils in Aring as a geoheritage potential site.

Evaluation on Floral Visitors of *Zingiber spectabile* (Zingiberaceae) at Gua Ikan, Kelantan, Peninsular Malaysia

N Arumugam¹, V K Jayaraj^{1,2}, S Subramaniam^{3,4,5} and S Appalasamy^{1,6*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Global Entrepreneurship Research and Innovation Centre, Universiti Malaysia Kelantan City Campus, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

³School of Biological Sciences, Universiti Sains Malaysia, 11800, Gelugor, Pulau Pinang, Malaysia

⁴School of Chemical Engineering, Universiti Malaysia Perlis, 02600 Arau, Perlis, Malaysia

⁵Chemical Centre Biology (CCB), Universiti Sains Malaysia, 11900 Bayan Lepas, Pulau Pinang, Malaysia

⁶Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: suganthi.a@umk.edu.my

Abstract

Insects are the well-known pollinators of angiosperm plants. However, the discovery of specific insect pollinators of a specific plant is still lacking in many angiosperms. Family Zingiberaceae which is also known as a ginger family, is one of the least explored angiosperms in the aspect of plant-pollinator interaction. Hence, this study was conducted to understand the interaction between *Zingiber spectabile* and pollinators. The aims of the study are i) to determine the floral blooming period of *Z. spectabile*; ii) to identify floral visitor of *Z. spectabile*; iii) to identify the insect pollinators of *Z. spectabile*. The study was conducted in the limestone forest of Gua Ikan (Dabong, Kelantan) in September 2020. Direct observation method was used to achieve the above-mentioned objectives. Observation was performed from 0700 hours to 2000 hours. A floral visitor was counted as pollinator when the insect touches the sexual organs of the flower. This study reveals that flower of *Z. spectabile* have a lifespan of less than a day. Flower opening (anthesis) starts at 1000 hours while flower closure time starts at 2000 hours. An inflorescence of *Z. spectabile* produce one to three flowers per day. Insect order Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera are the common floral visitors of the *Z. spectabile*. However, among the floral visitors, order Diptera, Hemiptera and Lepidoptera were found to play the role of pollinator for *Z. spectabile*. This study reveals the fundamental information about pollinators of *Z. spectabile*. Further detailed study is recommended to reveal the effects of floral scent in attracting the pollinators as further evaluation of Zingiberaceae-pollinator interaction.

EV-028

Organic and Nutrient Removal from Pulp and Paper Industry Wastewater Treatment by Extended Aeration Activated Sludge System

A H Jagaba^{1,*}, S R M Kutty¹, M A H B M Fauzi¹, M A B Razali¹, M F U B M Hafiz¹ and Vicky Kumar¹

¹Department of Civil and Environmental Engineering, Universiti Teknologi PETRONAS, Bandar Seri Iskandar, Perak Darul Ridzuan, Malaysia

*Corresponding author: ahmad_19001511@utp.edu.my

Abstract

Pulp and paper industries are critical to a country's economic growth. The type of raw material used and the pulping process determine the quality and quantity of wastewater generated. However, the generated wastewater with a dark colour comprises a high concentration of suspended solids, organic content, chemical oxygen demand (COD), volatile organic compounds, and a variety of other impurities. Therefore, in this study, a bench scale activated sludge treatment system was set up using a reactor consisting of an aeration tank with 5000 mg/L initial biomass and a clarifier chamber for the biomass to settle. The reactor was run few weeks with real domestic wastewater as the influent for 3 weeks to acclimatize the sludge inside the reactor. The reactor was then fed with the influent mixture of 20% industrial pulp wastewater and 80% domestic wastewater. Organic and nutrient parameter concentrations are tested from the influent and effluent sample throughout the study duration and recorded for data analysis. The removal of COD and TSS are at 83% and 90% respectively while the averaged BOD value of the treated wastewater is at 74.6%. The conclusion of this project is that the bench scale EAAS is able to treat BOD and TSS according to standard. However, a modification may be required to increase the efficiency of removing COD to meet the requirement standards. This modification could be either by using a biocarrier or an activated carbon to further enhance the treatment efficiency even at higher wastewater concentration.

EV-029

Application of POMOF Composites for CO₂ Fixation into Cyclic Carbonates

S G Musa^{1,*}, Z M A Merican^{1,2*}, A M Zabidi^{1,2} and O Akbarzadeh³

¹Fundamental and Applied Science Department, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak, Malaysia

²Institute of Contaminant Management for Oil & Gas, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak, Malaysia

³Nanotechnology & Catalysis Research Centre (NANOCAT), University of Malaya, 50603 Kuala Lumpur, Wilayah Persekutuan, Malaysia

*Corresponding author: zulkifli.aljunid@utp.edu.my

Abstract

The problem of global warming is one of the major concerns in the world today as there has been continuous rise in temperature resulting from increase in the emission of anthropogenic carbon dioxide (CO₂). Recently, carbon dioxide is considered as an abundant C1 feed-stock for organic transformations, due to its free availability, non-toxicity, and simplicity in handling. The synthesis of metal-organic framework/polyoxometalates supported composites (POM@MOF), were prepared by incorporation of Keggin type-polyoxometalate groups via impregnation method. The as-synthesized composites were characterized by powder X-ray diffraction (PXRD), fourier-transform infrared spectroscopy (FT-IR), and field emission scanning electron microscope (FESEM), which confirm the presence of the polyoxometalates group after formation of the composites. The composites were employed as catalyst for the conversion of CO₂ and epichlorohydrin into cyclic chloropropylene carbonate. The reaction was carried out under mild condition of atmospheric pressure in a schlenk tube and the yield have progressively increase over time as indicated by GC results from 30% to 87% over a period of 48 h of continuous siring. The catalyst was used without addition of any co-catalyst or solvent.

EV-030

Population Size Determination Using Photographic Estimation for The Conservation of Nectar Bat (*Eonycteris spelaea*) at Gunung Reng, Kelantan, Malaysia

M F Siti Fadzliana¹, H F Muhammad Aminuddin Baqi^{1,2}, P H Fong³, B Parasuraman⁴ and V K Jayaraj^{1,2,3,5,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Conservation & Research Program, Malayan Rainforest Station, 27210 Kuala Lipis, Pahang, Malaysia

³Global Entrepreneurship Research and Innovation Centre, Universiti Malaysia Kelantan City Campus, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

⁴Faculty Of Entrepreneurship And Business, Universiti Malaysia Kelantan City Campus, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

⁵Academy of Sciences Malaysia, Level 20, West Wing, Menara MATRADE, Jalan Sultan Haji Ahmad Shah, 50480, Kuala Lumpur, Malaysia

*Corresponding author: jayaraj@umk.edu.my

Abstract

The cave nectar bat, *Eonycteris spelaea*, is one of the three fruit bats in mainland Southeast Asia that roost in caves, unlike other fruit bats roosting in the forest. This bat species is an important pollinator for many plant species, including economically important crops including durian, petai and jackfruit. Hence, this study was conducted to determine the population size of cave nectar bat (*Eonycteris spelaea*) at Gunung Reng, Kelantan, Malaysia, since no information was recorded for conservation purposes. We determined the bat population size using the photographic estimation method at the 13 *E. spelaea* roosts (5 times per roost) found inside Gunung Reng for 20 days (4-30 August 2019). Our bat population size estimate resulted in about 207 to 344 individuals of *E. spelaea* ($F(4,0) = 5.66$, $p\text{-value} < 0.05$). This estimate is a relatively modest population size of bats in an isolated limestone karst surrounded by human-dominated habitats. Though *Eonycteris spelaea* is listed as Least Concern in the IUCN Red List, it is an important bat species ecologically and economically, contributing to the fruit agriculture economy in Jeli, Kelantan. Future studies should incorporate a combination of bat census techniques with long term planning in mind to completely understand the population dynamics of this paramount bat species.

EV-033

An Ethnobotanical Study on Medicinal Zingiberaceae used by Locals in Kelantan, Peninsular Malaysia

S Appalasamy^{1,2,*}, A Z Nor Syahaiza² and S Subramaniam^{3,4,5}

¹Institute of Food Security and Sustainable Agriculture (IFSSA), Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³School of Biological Sciences, Universiti Sains Malaysia (USM), 11800 Gelugor, Pulau Pinang, Malaysia

⁴School of Chemical Engineering, Universiti Malaysia Perlis (UNIMAP), 02600 Arau, Perlis, Malaysia

⁵Chemical Centre Biology (CCB), Universiti Sains Malaysia (USM), 11900 Bayan Lepas, Pulau Pinang, Malaysia

*Corresponding author: suganthi.a@umk.edu.my

Abstract

The locals in Kelantan, Peninsular Malaysia have been taking certain Zingiberaceae plants with medicinal value as daily dietary intake primarily for common health purposes and these traditional uses has not been explored and documented well. The objective is to recognize and list out both plants and plant parts that have been utilized by Kelantan people and the traditional uses. A verbal interview with 20 old folks of the certain village were recorded regarding the uses of Zingiberaceae medicinal plants. The identification process was done by collecting Zingiberaceae plants under guidance from the old folks. Further information from plants identification was assembled through literature reviewed on their recorded medicinal values. A total of ten plants are collected, identified, and documented. The studied plants list aids to preserve the knowledge of medicinal plants used by locals in Kelantan.

EV-035

Agroforestry Activities as Socioeconomic Enhancement in Tana Toraja Regency, Indonesia

J Azrihisyam¹, H Z Pakhriazad^{1,*} and I Mohd Hasmadi¹

¹Faculty of Forestry and Environment, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

*Corresponding author: pakhriazad@upm.edu.my

Abstract

Separate systems of land management often supply the basic human needs of food, shelter and fuel. Building material and fuelwood are harvested from forests and food produced from herbaceous crops, fruit orchards, and livestock grazing in pastures. Agroforestry is a land uses management system in which trees are mixed in the same land with food crops or pasture for domestic animals. This study examined the agroforestry activities and monetary values of goods collected by selected village communities in Tana Toraja, South Sulawesi, Indonesia. The local government seat of Tana Toraja is in Makale, which comprises 47 sub-districts, 112 villages adjacent to Toraja Utara District and West Sulawesi Province in the north, to Enrekang and Pinrang District in the south, Luwu District in the east, and West Sulawesi Province. The monetary value of agriculture and non-timber forest products (NTFPs) collected from the forest and cultivated and harvested from forestlands has been evaluated. Primary and secondary data were collected. Primary data consists of questionnaires distributed to selected 250 respondents, in-depth interviews, and site observations. Secondary data was collected through literature review through a journal, articles, and local governments official documents. Data collected has been analysed by using the Chi-square test and SPSS. The multiple regression analysis was applied to develop an agroforestry dependency model for the selected villages. This study revealed that more than eighty-one percent or half of the respondents actively involved in the agricultural and forest-related activity. The highest income range is RM 901.00- RM1,200.00 (Rp 3,0M – Rp 4,0M). Tana Toraja community highly depends on agricultural and agroforestry related activities as their primary income and sustains their livelihood.

EV-036

Analysis of Biophilic Design in Communal Spaces of Office Building in D7 at Sentul East, Malaysia

I L Ibrahim^{1,*}, R Khairuddin¹, A Jain¹, I Amin¹ and F Maharimi¹

¹Faculty of Architecture and Ekistics, Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

*Corresponding author: hamadi.i@umk.edu.my

Abstract

Biophilic design is an innovative approach to creating an environment to provide a feeling of attachment to nature by various means. Many studies and researches are conducted today with credible data that explore the benefits and impacts of biophilic nature on our health and well-being. With increasing interest in biophilic design, its use in spaces and buildings is becoming more prevalent. This research explores biophilic design elements and attributes that can be used in communal spaces of an office building based on existing studies from other countries and to observe how biophilic design elements and attributes are applied. Also, to understand its impact on the occupants, with the possibility of defining preferred biophilic design in the local context. The report will concentrate on the communal spaces of an office building in D7 at Sentul East, Malaysia. The analysis was conducted through the researcher's experience, supported by the established existing studies and from the occupants' perspective through the survey. The findings reveal that the visual relation with nature attribute is the most preferred, and in this case, the following two preferred attributes are access to thermal and airflow and prospect, likely owing to the local climatic context. In addition to that, besides the benefits of biophilia, the design can also help address sustainability issues through exemplary design implementation of utilizing the climatic and environmental context of the building's site, which is addressed in the findings.

EV-038

Ultrasound-assisted lactic acid based deep eutectic solvent extraction of phenolic antioxidants from *Thymus broussonetii*: A Box–Behnken design approach for optimization

S Kaoui^{1,*}, B CHEBLI¹, G AIT BADDI², K Basaid¹, M Zaafrani¹ and Y Mir³

¹Laboratory of Mechanic Process Energy and Environment, National School of Applied Sciences, Ibn Zohr University, Agadir, Morocco

²Laboratoire des Sciences de l'Ingénieur et Management de l'Energie, Higher School of Technology, IBN ZOHR University, Agadir, Morocco

³MIBCM, Faculty of Medicine and Pharmacy, Ibn Zohr University, Agadir, Morocco

*Corresponding author: soukainakaoui@gmail.com

Abstract

Developing of an eco-friendly, sustainable and efficient solvents with low toxicity and cost has always been a tremendously important goal for industries. In this context, green solvent, such as natural deep eutectic solvent, have been developed as a promising solvent capable of replacing organic ones. The combination of lactic acid: glucose (5:1) was investigated as an extraction medium for bioactive phenolic compounds from *Thymus broussonetii*. The ultrasonication method was established and optimized by a systematic investigation of the influencing factors: water content in solvent (0/35/70 %), extraction time (30/60/90 min), and temperature (30/50/80°C). A Box–Behnken design was adopted including 17 experiments with three center points. The results obtained presented an excellent efficacy of polyphenols extraction ranging from 25.53±0,02 to 153.23±0,03 mg GAE/g dm and a high scavenging activity attending 80.64 %, the optimized conditions selected for both responses were 66.47 min, at 80°C and a 40.72 % of water, with an extraction yields of 144.394 ±0,02 mg GAE /g dm and 75.9 % for phenolic compounds and antioxidant activity, respectively. Regression analysis showed a good fit of the experimental data which indicates the suitability of the model employed and the successful application of Box–Behnken design in optimizing the extraction conditions. Furthermore, the developed procedure represents an excellent alternative for the extraction of natural products from sample matrices.

EV-039

Altitudinal Influence on Soil Properties Related to the Abundance of *Rafflesia* Buds in Lojing Highlands, Kelantan, Peninsular Malaysia

N Mokhtar¹, M F Abdul Karim^{2,*}, A L Mohamad³ & Z Hamzah²

¹School of Engineering and Technology, University College of Technology Sarawak, No. 1, Jalan Universiti, 96000 Sibul, Sarawak, Malaysia.

²Faculty of Earth Science, Universiti Malaysia Kelantan, Beg Berkunci No. 100, 17600 Jeli, Kelantan, Malaysia.

³Faculty Science and Technology, University Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia.

*E-mail: firdaus.ak@umk.edu.my

Abstract

Tetrastigma (Vitaceae) is a host plant of *Rafflesia* and known to thrive in varying environmental conditions. The study was designed to examine the correlation between soil properties and *Tetrastigma* at different altitude. These three are 800, 900 and 1200 meters above sea level (masl). Method used in this study includes composite sampling of soils and laboratorial analysis for soil properties. Plotless sampling method was applied to determine the abundance of *Rafflesia* buds. The results showed that, the number of *Rafflesia* bud populations varied significantly at different altitudes. The highest number of buds was in acidic soils (pH= 4.58 ± 0.36) at altitude of 1,200 masl. In contrast, other soil properties such as soil texture, N, P, K, organic C and Cation Exchange Capacity were similar across the altitudes. This indicated a weak relation between these soil properties and the number of *Rafflesia* buds on *Tetrastigma*. The findings contribute to the information on soil properties of *Tetrastigma* that is crucial for conservation of *Rafflesia*.

Spatio-Temporal Analysis of Rainfall Data in Kuala Krai Kelantan

M Muhammad^{1,*}, Q A Q Ibrahim¹, M S M Ghani², N Jemali¹ and N R Awang¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Department of Irrigation and Drainage Malaysia, 50626 Kuala Lumpur, Malaysia

*Corresponding author: marinah@umk.edu.my

Abstract

This paper interpreted spatio-temporally the relationship between event of weather activities and flooding in Kuala Krai Kelantan. During the Kelantan big yellow flood event in December 2014, Kuala Krai was one of the worst affected area with the rarity of the return period approximately 1 in 1000 years. Many say this is due to the unusual occurrence of extreme rainfall. Therefore, this research work on spatio-temporal analysis of the time series rainfall data in Kuala Krai Kelantan, to describe and determine the behaviour and pattern of the data. The data on the monthly amount of rainfall between (2013-2019), were collected from Department Irrigation and Drainage (DID). The main aim of this study is to statistically determine whether it is true the flooding in Kuala Krai Kelantan on 2014 is because of heavy rainfall. The collected rainfall data had been spatially analysed using ArcGIS to compare the distribution of rainfall from year 2013 to 2019. Then, the trend pattern of the data had been determined using Mann Kendall Test and Sen's slope Test. From those analysis it can be concluded that the huge amount of rainfall intensity is the major factor that contribute the extreme flood event in Kuala Krai Kelantan on December 2014.

Deep Learning Accuracy Assessment of Oil Palm Tree Recognition Based On Drone Remote Sensing Images

S Daliman^{1,*} and I N Md Rodi¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: shparas@umk.edu.my

Abstract

Tree plantation identification is very important for plantation management, environmental management, biodiversity monitoring and many other applications. Accurate inventories and monitoring oil palm estates can be challenge and critical towards the plantation management and plant area expansion. Managing oil palm estate manually can almost be impossible, so do the tree counting. Manual field-based tree counting is time consuming and high cost. Developing easier, simpler and cheaper method for tree counting is needed. There were enormous challenges for deriving oil palm plantation structure parameter using drone based remote sensing image because of spectral similarity of vegetation, mixed pixels, shadows of trees, layers and multiple sizes of oil palm tree. In order to reduce these uncertainties, a feature extraction will be analysed for oil palm tree detection and counting. Hence, an automated image recognition techniques for oil palm plantation will be developed based on the highest accuracy image achieved. The study aims in developing an automated image recognition technique for oil palm tree area recognition based on highest accuracy obtained in oil palm tree recognition. By using drone based remote sensing image, an enhanced tree recognition techniques will be established. This research will produce new techniques in deep learning and pattern recognition by using drone based remote sensing images. The results from this research would be a high accuracy accomplishment in oil palm industry especially in developing in a new tree detection and counting techniques. In oil palm plantation management, identifying and counting the oil palm tree is important in order to ensure the quality and quantity produced by each plantations. By improving the existing techniques of deep learning using drone-based remote sensing images, it will be an advantage for the oil palm industry in overcoming inefficient management of oil palm plantation which may assist the government policy.

EV-045

Notes on Small Mammals Diversity at Perlis State Parks, Wang Kelian, Perlis, Malaysia

N F M Fauzi^{1,*}, M A Shahfiz^{1,2}, N H Ahmad Ruzman¹, K Munian^{1,3}, M S Baharudin¹, M A Azahar¹, N A Z Zam Beri¹, A S Ag Ahmadni⁴ and F Mohamad⁴

¹Zoology Branch, Fauna Biodiversity Program, Forest Biodiversity Division, Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor, Malaysia

²Faculty of Science and Technology, The National University of Malaysia, 43600, Bangi, Selangor, Malaysia

³Faculty of Applied Science and Technology, Universiti Tun Hussein Onn Malaysia (Pagoh Campus), 84000, Muar, Johor Darul Ta'zim, Malaysia

⁴Perlis State Forestry Department, Kilometer 2, Jalan Kaki Bukit, 01000 Kangar, Perlis, Malaysia

*Corresponding author: noorfaradiana@frim.gov.my

Abstract

Three surveys were conducted to document diversity on small mammals at Perlis State Park, Wang Kelian, Perlis, Malaysia from 2019 until 2020. For each survey, a total of 50 cage traps, 10 mist-nets and two four-bank harp traps were set up for three-trapping nights along a 500 m transect line to sample small mammals. The opportunistic observation was also applying to record the incidence of small mammals. In total, 17 species of small mammals were documented during these surveys. Of these, seven species are volant small mammals, and ten species are non-volant small mammals. The family with the most diverse species was Pteropodidae with five species and *Cynopterus brachyotis* being the most dominant species (n = 46). Interestingly, these surveys report new distributional records for three small mammal species in Perlis State Park, though several studies have been conducted previously. This information demonstrates that there may be more species yet to be recorded from this study site. Comparing the species similarity between our study site and several state parks in Peninsular Malaysia shows that Perlis State Parks also holds a relatively high diversity of small mammals. Therefore, adequate conservation measures such as recognizing this state park as an important conservation area are needed to ensure valuable small mammals' sustainability.

EV-046

Updates on Avifauna Community in Tasik Meranti, Wang Kelian, Taman Negeri Perlis

A Z Zam Beri¹, M A Shahfiz^{1,2,*}, N H Ahmad Ruzman¹, N F M Fauzi¹, A A Ag Ahmadni³ and F Mohamad³

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Science and Technology, The National University of Malaysia, 43600, Bangi, Selangor, Malaysia

³Perlis State Forestry Department, No. 71, Jalan Kaki Bukit, Kampung Kechor Behor Ampang, 01000, Kangar Perlis, Malaysia

*Corresponding author: shahfiz@frim.gov.my

Abstract

The information and status of the avifauna community that resides in Tasik Meranti, Wang Kelian, Taman Negeri Perlis are mostly outdated since the last survey conducted was 20 years ago. Therefore, the study aims to update the status and establish a checklist to compare the bird species present within the vicinity of Tasik Meranti, Wang Kelian, Taman Negeri Perlis. The survey was conducted during a short expedition held on 15-18 August 2019. Based on the field observation, a total of 20 species of birds from 14 families were recorded. The recent survey recorded an additional 18 bird species from 8 families, totalling the current inventory of 45 bird species from 24 families. Species from the family Pycnonotidae dominated the site with six species, namely *Pycnonotus finlaysoni*, *Pycnonotus brunneus*, *Pycnonotus plumosus*, *Pycnonotus goiavier*, *Iole charlottae* and *Pycnonotus simplex*. The high number of species present from the family Pycnonotidae may be due to the availability of food resources. Out of 45 species of birds in the current checklist, three species are listed as near threatened and one species as vulnerable based on the IUCN Red List. Therefore, the result documents the importance of the site for the avifauna community. Therefore, further studies are needed to understand the avifauna population dynamics in Taman Negeri Perlis.

EV-047

Checklist of Small Vertebrates at Sime Darby Tangkah Estate, Tangkah, Johor

M Appanan^{1,*}, M A Shahfiz^{1,2}, N F M Fauzi¹, N H Ahmad Ruzman¹, N A A Mahyudin¹, Z A Nafiz³ and S N Yahya³

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Science and Technology, The Faculty National University of Malaysia, 43600 Bangi, Selangor, Malaysia

³Group Sustainability Conservation and Biodiversity Unit, Sime Darby Plantation Berhad, Main Block Plantation Tower Ara Damansara, 47301 Petaling Jaya, Selangor Darul Ehsan, Malaysia

*Corresponding author: manoshini@frim.gov.my

Abstract

Oil palm plantations might possess lower species composition compared to forest or riparian areas. Therefore, this assessment is carried out at Sime Darby Tangkah Estate to assess small vertebrates' composition adjacent to Gunung Ledang National Park. This survey was carried out at two sites: Plot 05A and Plot 18A, from 22nd to 25th October 2019. A transect line of 400 meters was set up at each plot for active trappings, with a total of 20 cage traps, 20 Sherman traps, five mist nets, and one harp trap were deployed. All trapped animals were identified, measured, photographed and released after being examined. Observations were also carried out using Binoculars. Based on this survey in plot 05A, eight species from five families of mammals and seven species from four families of birds were recorded. While in plot 18A, a total of 12 species from six families of mammals and seven species from seven families of birds were documented. Moreover, a total of 17 species of birds was observed during the survey. Oil palm may function as one of the forest buffers, requiring further monitoring and enforcement to prevent poaching and hunting of these resources.

EV-048

Diversity of Freshwater Fish in Forest Research Institute Malaysia (FRIM): A Comparison of Diversity between Man-made and Natural Forest in Selangor, Malaysia

M A Azahar^{1,*}, K Munian^{1,2}, and M A Shahfiz^{1,3}

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Applied Sciences and Technology, University Tun Hussein Onn Malaysia (Pagoh Campus), 84000, Muar, Johor Darul Ta'zim, Malaysia

³Faculty of Science and Technology, The National University of Malaysia, 43600 Bangi, Selangor, Malaysia

*Corresponding author: asyraff@frim.gov.my

Abstract

This present study aimed to investigate the diversity of freshwater fish in a planted forest within three tributaries, namely Sungai Kroh, Sungai Chemubong, and Sungai Cahaya, in the Forest Research Institute Malaysia (FRIM) campus. In this study, freshwater fish were sampled using a backpack electro-fisher and scoop nets along 100m transect lines for each sampling site (at upper, middle, and lower part) of the respective river. All individuals collected were examined and measured to identify at their species level. However, we found no fish presence in Sg. Cahaya across all sub-section of the tributary. Hence, the result of fish was based on two tributaries of Sg. Kroh and Sg. Chemubong. A total of 235 individual freshwater fish recorded in FRIM belong to 10 species comprising six families. The highest recorded family belongs to Cyprinidae (30%), followed by Channidae and Danionidae families with 20% respectively, whereas the other three family only represent 10% respectively. Shannon-Wiener indices showed that the highest diversity was recorded for Sg. Chemubong, $H = 1.283$, while the lowest was recorded for Sg. Kroh, $H = 1.097$. The highest Evenness index of fish species was detected for Sg. Chemubong, $E = 0.5098$ and the lowest for Sg. Kroh, $E = 0.2994$. We carried out a similarity analysis by comparing freshwater fish from adjacent natural forest reserves, namely Sungai Kanching Forest Reserve. Based on the presence-absence data, the species composition of the freshwater fish between the man-made forest (FRIM campus) and natural forest (Sungai Kanching Forest Reserve) was almost 82% similar based on the Sørensen similarity index. The discussion was made based on the available findings in this study to illustrate the freshwater ecosystem stability in a man-made tropical forest, for instance, in FRIM Campus.

EV-049

Checklist on small vertebrates at Kuala Langat North Forest Reserve, Selangor, Malaysia

M S Baharudin^{1,*}, M A Shahfiz^{1,2}, K Munian^{1,3}, N F M Fauzi¹, N H Ahmad Ruzman¹, M A Azhar¹ and A Z Zamberi¹

¹Zoology Branch, Fauna Biodiversity Program, Forest Biodiversity Division, Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Science and Technology, The National University of Malaysia, 43600 Bangi, Selangor, Malaysia

³Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia (Pagoh Campus), 84000, Muar, Johor Darul Ta'zim, Malaysia

*Corresponding author: syaridzwan@frim.gov.my

Abstract

A survey was conducted in Kuala Langat North Forest Reserve, Selangor from 24 to 28 February 2020. The main objective of this survey is to document the small vertebrates information from this area. There were two harps and 10 mist nets deployed to capture the bats, with an addition of 50 collapsible cage traps placed along the transect line of 500 metres for the trapping of non-volant small mammals. The collapsible cage traps were baited with oil palm seed. The observation of avifauna and active searches for herpetofauna were also carried out. A total of eight small mammal species from four families, 19 species of avifauna from 13 families, and eight species of the herpetofauna from five families were documented. There is not much information on small vertebrates at Kuala Langat North Forest Reserve that has been recorded. With this information, it is hoped that a long-term study can be carried out and an effective management plan can be formulated to conserve this forest reserve.

EV-050

Comparison of Terrestrial Vertebrates between Natural and Teak Plantation Forest in Peninsular Malaysia: A Case Study in Perlis State Park and Mata Ayer Field Center, FRIM

N A A Mahyudin^{1,*}, K Munian^{1,2}, M A Shahfiz^{1,3}, N F M Fauzi¹, N H Ahmad Ruzman¹, M S Baharudin¹, A Z Zamberi¹, M A Azhar¹ and M S A Fauzi⁴

¹Zoology Branch, Fauna Biodiversity Program, Forest Biodiversity Division, Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia (UTHM) Kampus Pagoh, KM1, Jalan Panchor, 84600 Panchor, Johor, Malaysia

³Faculty of Science and Technology, The National University of Malaysia, 43600, Bangi, Selangor, Malaysia

⁴Mata Ayer FRIM Research Station, KM 28 Jalan Padang Besar, 02100 Padang Besar, Perlis, Malaysia

*Corresponding author: nurainaamira@frim.gov.my

Abstract

Species compositions are influenced by the habitat types and methods used in a study. The objectives of this study are to document species diversity in teak plantation in Mata Ayer Research Station, FRIM and to compare differences in species diversity and composition between plantation and natural forest of Perlis State Park. Different types of traps and methods were used to survey four targeted groups of vertebrates (small mammal, bird, reptile and amphibian), including mist net, harp trap, collapsible trap, and active search. A total of 252 individuals were captured, representing 117 species of 53 families of vertebrates. Alpha diversity analysis shows that natural forest has higher species diversity than a teak plantation. Shannon-Weiner Index show higher result in natural forest (3.768) than teak plantation (3.439) while evenness of species distribution is higher in teak plantation (0.8419) than the natural forest (0.4755). Sorenson dissimilarity index indicates that 90.4% significant difference between sites thus; both sites have different species composition of vertebrates. Taxonomic distinctness however reflects different significant variation responses of both areas. Natural forest shows more species compared to plantation forest as it provides more food resources, suitable home and higher rate of reproduction while teak plantation shows a similar habitable environment with structural and conditions more similar to natural forest. So, both natural forest and plantation should be protected, manage and use suitable planning in order to sustain the biodiversity for future generation.

EV-051

Notes on Mammals and Avifauna at FRIM Campus, Selangor, Peninsular Malaysia

M A Shahfiz^{1,2,*}, M Munian^{1,3}, A R Nor Hazwani¹, M F N Faradiana¹, M B Syaridzwan¹, Z B Anis Zafirah¹, M N Aina Amira¹, A Manoshini¹ and M A Asyraff¹

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan, Malaysia

²Faculty of Science and Technology, The National University of Malaysia, 43600 Bangi, Selangor, Malaysia

³Faculty of Applied Sciences and Technology, University Tun Hussein Onn Malaysia (Pagoh Campus), 84000, Muar, Johor Darul Ta'zim, Malaysia

*Corresponding author: shahfiz@frim.gov.my

Abstract

Forest Research Institute Malaysia (FRIM) was established in 1985, and later in 2009, FRIM was awarded as Natural Heritage of Malaysia. Researchers of FRIM Zoology Branch conducted continuous monitoring of faunal diversity, especially on mammal and bird groups. The study's objective is to illustrate the diversity of mammals and birds found within the FRIM Campus. There are 62 species of mammals from 18 families with highest species recorded (10spp) was from family Vespertilionidae, followed by family Sciuridae and Hipposideridae with nine and seven species, respectively. A total of 233 species of birds from 58 families were recorded up to date of which 173 are resident, and 28 are migratory. Pycnonotidae or Bulbuls are the family with highest number of species (18spp), followed by family Cuculidae (14spp) and Rallidae (13spp). Although FRIM used to be an agricultural and mining area, it is believed that the faunal composition is "returning" to this forest since it was reforested back in the early 1900s. Connected to Bukit Lagong Forest Reserve, this 544.3-ha campus is blessed as it provides a natural habitat and ensures the continuity of vast faunal diversity.

EV-052

Monitoring physiological and chemical response of lichen in free air CO₂ enrichment (FACE) station

A Abas^{1,*}

¹Centre for Research in Development, Social and Environment, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, 43650 UKM Bangi, Selangor, Malaysia

*Corresponding author: azlanabas@ukm.edu.my

Abstract

In Malaysia, a limited number of studies have used lichens as indicators of air pollution, especially to evaluate lichens response on elevation of CO₂ levels. The negative effects of warming on the carbon balance of lichens may be at least partly counteracted by increases in atmospheric CO₂ levels. Therefore, this study aims to study the physiological changes in lichen in FACE Station and to analyse the chemical profile changes of lichen in FACE Station. This study has been conducted in FACE Station at Jengka, Pahang. A total of 20 sampling trees have been selected and epiphytic lichen have been collected from the selected trees. In this study, there are three (3) sampling and experimental approaches; 1) Sample collection from control and FACE station; 2) Analysing sample in the laboratory (physiological and chemical response) and 3) statistical analysis (Mann-Whitney U test) will be used for testing the relationship between parameters and sampling areas. This study has found only three species of foliicolous lichen from both stations namely a) *Byssoloma subdiscordans*, b) *Eugeniella micrommata* and c) *Sporopodium flavescens*. For the photosynthetic cell efficiency test, the FV/FM ratio shows a significant difference for both stations where all of the three species from FACE Station have lower cell efficiency compare to the Control Station. At the other hand, for the membrane cell integrity analysis, no significant changes were found for the three species from both stations. In term of chemical response, there is no any significant difference on the secondary metabolite from any sample taken from both stations. This study urges that there is slight difference in term of lichen physiology from Face Station and Control Station. This proves that lichen responded towards CO₂ elevation and effect their growth simultaneously. In bigger perspective, climate change and global warming will be affecting lichen diversity and growth.

EV-054

Isotherms for adsorption of boron onto new fibrous adsorbent containing glycidol ligands: linear and nonlinear regression methods

H K Afolabi^{1,*}, N A H Nordin¹, M Ma Nasef², N Y Harun¹, T M Ting³ and A A H Saeed¹

¹Chemical Engineering Department, Universiti Teknologi PETRONAS, Seri Iskandar 32610, Malaysia

²Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur, Malaysia

³Radiation Processing Technology Division, Malaysian Nuclear Agency, 43000 Kajang, Selangor, Malaysia

*Corresponding author: harun4uall@gmail.com

Abstract

The most appropriate way to design and evaluate an adsorption system performance is by having an idea of the equilibrium relationship, which is also known as adsorption isotherms. The adsorption isotherms provide information on how pollutants such as boron are interacting with adsorbent materials. The equilibrium behaviour of a new glycidol-containing adsorbent for boron adsorption prepared by radiation-induced grafting of N-vinylformamide (NVF) onto polyethylene/polypropylene (PE/PP) non-woven fabric followed by hydrolysis and chemical treatment with glycidol was investigated using the Langmuir, Freundlich, and Redlich-Peterson isotherms. Comparison of linear and non-linear regression methods was used to determine the most suitable isotherm that best describes the boron adsorption by the new adsorbent. The non-linear method is a better way of obtaining isotherm parameters. The best-fitting isotherm was found to be the Redlich-Peterson ($R^2 > 0.99$) and Langmuir isotherms ($R^2 = 0.99$).

EV-055

Optimization of Malachite Green Removal using Activated Carbon Derived from Coconut Shell

W A N Zakaria¹, R Mohd Ghazi^{1,*}, M Muhammad¹ and M Jani¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: rozidaini@umk.edu.my

Abstract

The textile industry is a sub-industry that contributes to our country's economy, and as a result, it is expanding on a daily basis. The processes that are involved in the textile industry are fibre production, spinning, twisting, weaving, knitting, scorching and dyeing, which involve colours or dyes. The combination of processes and products causes waste from the textile industry to contain a wide range of pollutants. The presence of even trace amounts of dye in water (less than 1 ppm) is highly visible and will affect water transparency and gas (carbon dioxide, oxygen) solubility in water bodies where waste is discharged. Dyes are usually resistant to conventional biodegradation. Therefore, adsorption is an effective alternative for dye removal treatment. Therefore, a study has been conducted to find a low-cost raw material for an alternative method of treating textile wastewater. In this study, the capability of activated carbon derived from coconut shells to remove malachite green dye was investigated. Three parameters were studied, such as activated carbon with different chemical impregnation and carbonization time, contact time and initial concentrations of dye. From the results acquired, 99.9% of malachite green dye was removed by the activated carbon impregnated with phosphoric acid solution of 5 minutes carbonization time. The optimum contact time and initial concentration of dye were 1 hour and 10 mg/L, respectively. Therefore, this result can contribute to some knowledge of using low-cost raw material impregnation with some chemicals to remediate textile wastewater.

EV-056

Characteristics Study of Ammonia-N and Phosphorus in Sewage Wastewater Effluent: A Case Study of Alkhumrah, Jeddah Wastewater Treatment Plant

A A S Saleh¹, N Ibrahim^{1,*}, N R Awang² and N A Akbar³

¹Department of Civil Engineering, Faculty of Engineering, Science & Technology, Infrastructure University Kuala Lumpur, 43000, Kajang, Selangor, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Faculty of Civil Engineering, Universiti Teknologi MARA Cawangan Pulau Pinang Campus Permatang Pau, 13500 Permatang Pau, Pulau Pinang, Malaysia

*Corresponding author: nurazim@iukl.edu.my

Abstract

Ammonia-N (NH₃-N) and Phosphorus (P) pollutions remain highly challenging pollutants to the Saudi environment. The sewerage treatment plant can be one of the main contributors to NH₃-N and P pollutants. The main aim of this study is to investigate the concentration of NH₃-N and P released from the Al Khumrah wastewater treatment plant in Jeddah. The treatment process used in this treatment plant consists of screening, aerated grit removal chambers, surface aeration, sedimentation and sludge thickening and de-watering via belt filter presses. For this study, primary data of N and P is obtained from the Ministry of Environment & Agriculture, Kingdom of Saudi Arabia. The data is collected from the wastewater treatment plant of Al Khumrah, Jeddah. A total of 101 data is collected for NH₃-N and P within a period of 6 months from September 2019 to February 2020. Descriptive statistic was used to analyse the data. It was found that the highest mean concentration of NH₃-N and P in the effluent are 4.2 mg/L and 1.7 mg/L respectively. The concentration of NH₃-N and PO₄³⁻ in the influent exceeded the maximum limit of 1.0 mg/L stated in General Environmental Regulations and Rules for Implementation (2001) provided by the Kingdom of Saudi Arabia Presidency of Meteorology and Environment. A low effluent concentration is set up by the authorities to meet the requirement of water reuse and recycling. The result has shown that the removal efficiency of NH₃-N during the treatment is 55%. However, the removal efficiency of PO₄³⁻ is very inconsistent with the percentage removal varied from 0% - 61.5 %. This finding demonstrated that the treatment plant will continuously not be able to comply with the standard discharge limit especially if a higher concentration of NH₃-N and PO₄³⁻ entering the treatment plant. In this case, the changes of the current treatment process or addition of tertiary treatment would be needed to ensure the discharge wastewater met the reuse and recycling requirement.

EV-057

Geology and Distribution of Heavy Metals in Topsoil, Kuala Krai, Kelantan

R Krishnan¹, N S Shafiee^{1,*}, A M A Bahar¹ and Z Sulaiman¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: shahidashafiee@umk.edu.my

Abstract

The study for geology of Guchil, Kuala Krai, Kelantan was carried out approximately 25 km² in and around Guchil. Preliminary research and field studies conducted to produce geological map of Guchil, Kuala Krai, Kelantan. Based on the field study carried, carbonaceous mudstone interbedded with greywacke sandstone, shale and ignimbrite distribution of rock found in this study. Meanwhile, investigation on distribution and potential heavy metals (Cu, Fe, Mn, Pb and Zn) in topsoil Guchil, Kuala Krai, Kelantan was conducted. Total of nine soil sample in and around Guchil undergo soil digestion and analyzed by Inductively Coupled Plasma Spectroscopy (ICP-OES). The heavy metals concentration in the topsoil was varied between 21176-138962; 649-8411; 11-505; 43-455; and 11-115 mg/kg for Fe, Pb, Mn, Zn and Cu respectively. The average concentration of heavy metals in this study followed the order of Fe > Pb > Mn > Zn > Cu. The spatial distribution pattern shows similar distribution pattern of heavy metals in residential area. The concentration of Cu, Fe, Mn, Pb and Zn from the soil samples compared with naturally occurring value of contaminated land management and control guidelines of Department of Environment Malaysia (DOE), 2009 and Barceloux (1999) as well as with permissible limit values in soil of Polish Ministry of the Environment, 2002. From this assessment method, highly potential element was Pb followed by Zn and Cu. Besides that soil characteristic of this study shows that soil pH which is acidic condition with low total organic matter. The soil fractions tend to dominated by clay fraction in topsoil.

EV-058

Optimisation and Growth Kinetic Analysis of Microalgae, *Arthrospira platensis* in 2-L Photobioreactors

A A Hussin¹, S W To¹, M H Sani¹, M F M Amin² and M F Kamaroddin^{1,*}

¹Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia, 81310, UTM, Johor Bahru, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: farizal@utm.my

Abstract

In recent years, photoautotrophic microalgae are widely recognised due to their diverse yet significant natural values, particularly in healthcare, including pharmaceuticals, cosmetics and feedstock industries. One of the most exploited blue-green microalgae, *Arthrospira* sp. has been addressed as a potent superfood. However, the microalgal mass-production requires suitable inoculum strain and controlled cultivation conditions for enhanced growth performance. Hence, this study aimed to maximise biomass of *Arthrospira platensis* chosen strain in a 2 litres indoor photobioreactor under three different parameters which were aeration rate, light intensity and pH of the medium. In the present study, a comparative study of growth performance between helical (S1) and straight form (S2) of *A. platensis* was conducted and the results revealed that morphological differences did not affect growth performances. Meanwhile, the optimisation based on the parameters studied shows that cultivation of *A. platensis* with aeration of 0.5 L/min and medium of pH 9.0 yielded the highest biomass production which were 1.500 ± 0.049 g/L. Under different light intensity, *A. platensis* produced the highest biomass and maximum specific growth rate of 1.142 ± 0.037 g/L and 0.716 ± 0.018 1/day, respectively when cultivated under irradiance of 6000 Lux. In conclusion, compared to before optimisation, biomass and maximum specific growth rate after optimisation was 137% and 24% increased, respectively.

EV-059

Combined effects of *Curcuma longa* and *Trigonella foenum graecum* extracts on anti-hyperglycemic activity and Oxidative Enzymes in alloxan induced Type -1 diabetic rats

S B Shaik^{1,2}, S F Shaik³, S Aluru², M I Shaik^{2,4}, M Arifullah⁵ and B Matcha²

¹Department Humanities and Sciences, Annamacharya Institute of Technology and Sciences, Rajampet, Andhra Pradesh, India

²Department of Zoology, Sri Venkateswara University, Tirupati, Andhra Pradesh, India

³Department of Biochemistry, Sri Venkateswara University, Tirupati, Andhra Pradesh, India

⁴Faculty of Fisheries and Food Science, Universiti Malaysia Terengganu, Kuala Nerus, Terengganu, Malaysia

⁵Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: aurifullah@umk.edu.my

ABSTRACT

Diabetes mellitus is a metabolic disorder that is one of the major causes of global mortality. The current aimed to determine the combined protective effect of *Curcuma longa* (CL) and *Trigonella foenum graecum* (TFG) on alloxan induced oxidative stress in liver tissue of albino Wister rats. Rats were divided into 8 groups with 6 individuals each. Group I served as control, Group II, III and IV treated with CL, TFG and CL + TFG respectively, Group V (Alloxan induced diabetic rats), Group VI, VII and VIII are diabetic rats treated with CL, TFG and CL + TFG respectively. There are no significant changes in blood glucose levels of group II, III and IV after the treatment with plant extracts. In case of group V the blood glucose levels were significantly increased after induction of alloxan. The group VI, VII and VIII rats were showed significant decrease in blood glucose levels. However, the more lowering blood glucose levels were found in Group VIII. The initial weight of all animals was recorded as 180 ± 20 g. The body weights were slightly increased in the group II, III and IV after the treatment of plant extracts. In the group V, diabetic rats showed significantly decreased body weights after induction of alloxan. In group VI, VII and VIII was no significant change were observed. Moreover, a slight increase found in Group VIII. The oxidative enzyme levels were lowered after administration of plant extracts to alloxan induced diabetic rats. The group VI, VII and VIII rats were shown significantly decrease in oxidative enzyme levels compared to group V. Therefore, the combined administration of CL + TFG exhibit highest hypoglycemic activity by reducing the oxidative enzyme levels.

DISTRIBUTION OF RARE EARTH ELEMENT (REE) IN GRANITOIDS IN KELANTAN AREA

M F Abdul Patah¹, N S Shafiee^{1,*} and R Ismail¹

¹Geoscience Department, Faculty of Earth Science, University Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: *shahidashafiee@umk.edu.my

Abstract

Peninsular Malaysia is being distributed into three parallel belts (Western, Central and Eastern). Kelantan is one of the states in Peninsular Malaysia and consider as a unique territory to have all three belts (Western, Central and Eastern). Each belts divided into several formations which are Western Belt (Main Range Granite), Central Belt (Jeli Granite, Kemahang Granite, Noring Granite, Kenerong Leucogranite, Berangkat Tonalite and Senting Granite) and Eastern Belt (Boundary Range Granite). Rare Earth Elements (REEs) are usually concentrated related to the alkaline – peralkaline, carbonatite igneous rocks, as well as sedimentary rocks. Granitoid and some intrusive volcanic rocks are widely exposed in Malaysia, as well as Kelantan state. REEs are relatively abundant in the Earth crust, however these elements are rarely concentrated in the mineable ore deposit. There are a lot of research about granitoids, but very limited studies about the distribution of the REE. The objective of this study is to investigate the distribution of REEs in different type of granitoid rocks in Kelantan. For this purpose, 15 samples were selected and analysed using Inductive Coupled Plasma Mass Spectrometry (ICP-MS). Result shows that, distribution of light REEs in all samples up to 78% and heavy REE up to 22% with total value 5350.69 ppm and 1491.27 ppm respectively. Surprisingly, Jeli Granite formation (LT15) is high potential of REE among the samples tested with total REE 3164.93 ppm and Kemahang Granite (JD18) is least potential with total REE 31.95 ppm. The granitoid distribution can be found widely in Kelantan with special characteristic and detailed study about mineral composition will help identifying the REE potential as well as generate more reliable study about genesis and nature of rocks in Malaysia.

Comparative study of variation of Ground Level Ozone Concentrations and Total Column Ozone Concentrations Over Klang Valley

N A Azmi¹, N R Awang^{1,*} and S H Ya'Acob¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: norrimi.a@umk.edu.my

Abstract

Ozone is a gas that plays important role in balancing the Earth's atmosphere thermal and chemical. Ozone is capable of absorbing the harmful sun's ultraviolet (UV) radiation. The stratospheric ozone has protecting humans and the ecosystems on Earth from solar radiation. However, ground level ozone (GLO) has been related to secondary pollutants and greenhouse gases that give adverse impacts on human health and crop yield. Hence, determining ozone concentration measurement is important for air quality status for the environmental and public health warnings. Variations of ground level ozone (GLO) and total column ozone (TCO) concentrations over Klang Valley, Malaysia in 2014 and 2015 were determined in this study. The GLO measurement data was acquired from Department of Environment (DOE) Malaysia and is measured using standard method instrument, UV Absorption Ozone Analyzer Model 400A while, TCO measurement using Ozone Monitoring Instrument (OMI). The analysis suggests that GLO concentrations in all four stations in Klang Valley exceeded the Malaysia Ambient Air Quality Standard (NMAAQS) 2020 prescribed limit of 90 ppb per hour. In both 2014 and 2015, TCO concentration observed higher from May to August with the highest concentration of 290 DU and lowest from November to February with the lowest concentration of 230 DU, suggesting that there is seasonal fluctuation caused by Northeast Monsoon (NEM) and Southwest Monsoon (SWM). This is due to environmental factors during SWM that favour a rise in TCO concentration, such as low precipitation, low relative humidity, high temperature, and prolonged sunshine hours. On the other hand, NEM result in lower TCO concentration due to high precipitation, high relative humidity, cold temperature, and short sunshine hours. Meanwhile, GLO peaks are usually seen towards the end of March through April and in October, according to GLO trend research (40 to 50 ppb). This is during the transitional monsoon season, where the west part of Peninsular Malaysia received precipitation lower than usual.

THEME: SOCIAL & MANAGEMENT

INVITED SPEAKER



ASSOC. PROF. DR. SEOW TA WEE

Sustainable Integrated Management Framework for Indigenous People in Peninsular Malaysia

Seow Ta Wee^{1,*}

¹Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia

*Corresponding author: tawee@uthm.edu.my

Abstract

Indigenous people make up about 217,000 people of the total population in Peninsular Malaysia. They faces the issues of poverty, health, educational, cultural conservation, right of use to land, water scarcity and the absence of proper sanitation. They are independent group, they provided their family with the sufficiently through forest resources and subsistence farming. Due to the customary lands are being aggressively targeted for development and economics activities, indigenous people lost their living environment especially food supply. Modernization and lack of recognition for indigenous people's heritage and culture have brought about the lost of their traditional knowledge system. Sustainable integrated management frameworks are potentially to be brought out for the betterment of the following: (1) Institutional structure and process, (2) Cultural conservation, (3) Land right, (4) Education, (5) Health, (6) Social & infrastructure, and (7) Economic development programme. Therefore, there is an urgent need for policymakers to adopt the integrated management strategies in conserving and improving the indigenous people's quality of life.

SM-001

Knowledge, attitude and practice of environmental sustainability among Sustainable Science students in Universiti Malaysia Kelantan

N S Abdul-Halim^{1,*}, N S Ruslan¹, N S U Idris¹ and S A Nawawi¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: syazana@umk.edu.my

Abstract

This study was conducted on the Sustainable Science (SEL) students to reveal their knowledge, attitude, and practice towards the environment sustainability according to year of study. Besides, the relationship between the knowledge, attitude and practice of SEL students towards environment were also examined. The survey was conducted using a quantitative approach involving 128 respondents (n = 128). The data from this study were analysed using Kruskal-Wallis and Spearman's Rho test using SPSS version 20.0 software. Based on the Kruskal-Wallis results, the knowledge, attitude and practice were statistically significant with *p* value below 0.05 for all cases. The results showed that SEL students including the Alumni have a high level of knowledge while satisfactory level for attitude and practice on the environment. The study also found that there was a correlation between knowledge, attitude and practice of environmental sustainability. However, this correlation was different between year of study. It was found that the Alumni and Year Four has a higher knowledge, attitude and practice of the environment sustainability. Thus, SEL program is important in order to build environmental concern among the students and also to encourage their attitude and practice towards more environmentally friendly behaviour.

SM-002

Pondok Community Participation in Sustainable Solid Waste Management Practices

N A Barudin¹, M A Abas^{1,*}, N H Hassin¹, K A Hambali¹, M F A Karim¹, N Fitriani², M R M Yusoff³ and S T Wee⁴

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Mathematics and Natural Sciences, Universiti Padjadjaran, 45363 Sumedang, Indonesia

³SWCorp Pahang, 25300 Kuantan, Malaysia

⁴Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Malaysia

*Corresponding author: azahar.a@umk.edu.my

Abstract

This study is focusing on Pondok community participation in a sustainable solid waste management programme. Besides that, the factors that influence Pondok community participation, such as knowledge and awareness, were explored. This study adopted a stratified sampling technique with 99 respondents from Pondok Pasir Tumbuh, Kota Bharu, Kelantan were participating in this study. The data was processed SPSS software with descriptive and inferential analysis. This study revealed that Pondok community has excellent knowledge and awareness regarding sustainable solid waste management practices. However, the exercise of Pondok community in sustainable solid waste management is still moderate. Besides that, this study also found out that the different groups of age, marital status, and education level significantly influence Pondok community's participation in sustainable solid waste management practices. The findings of this study are crucial in providing the preliminary data of Pondok community readiness and willingness to practice sustainable solid waste management like recycling and composting.

SM-003

Developing a Sustainable Solid Waste Management System Using Analytical Hierarchy Process (AHP) Method at Pondok Institutions in Kelantan

S N S S Azahari¹, M A Abas^{1,*}, H Hussin¹, A N M Nor¹, S T Wee², N Fitriani³ and M R M Yusoo⁴

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Malaysia

³Faculty of Mathematics and Natural Sciences, Universiti Padjadjaran, 45363 Sumedang, Indonesia

⁴SWCorp Pahang, 25300 Kuantan, Malaysia

*Corresponding author: azahar.a@umk.edu.my

Abstract

This study focuses on developing a sustainable solid waste management system at Pondok institution using the Analytical Hierarchy Process (AHP) method. Besides that, the types of solid waste generated were determined. Three alternatives were underlined, which are composting, recycling, and both composting and recycling. This research utilised the convenience sampling method, where a constructive questionnaire was used as a research instrument. An online questionnaire with detailed descriptions was distributed to two (2) Pondok institutions in Kelantan. After that, empirical research using the AHP method was carried out to find the priority weights of alternatives to develop a sustainable solid waste management system in Pondok institution. There are two significant findings in this research. This research revealed the types of solid waste generated by Pondok institutions that are food waste/ farm waste, plastics, papers, metal and aluminium tin, and glass. The highest types of solid waste generated are organic waste, and the least is glass. Besides that, this research discovered the most appropriate sustainable solid waste management system alternative to be implemented in Pondok institutions, which is composting and recycling. Developing a sustainable solid waste management system will reduce excessive solid waste generation, reduce space for dumping sites, and overcome environmental problems.

SM-006

Tourist satisfaction on ecotourism facilities and services in Taman Negara National Park Sungai Relau, Merapoh, Pahang

T Z W Lee¹, H Yazid^{1,2,*}, I Mukri^{1,2}, M N Arifuddin^{1,2}, P H Fong³, B Parasuraman⁴ and V K Jayaraj^{1,2,3,5}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Malayan Rainforest Station, Kg Gua Layang, 27210, Lipis, Pahang

³Global Entrepreneurship Research and Innovation Center, Universiti Malaysia Kelantan City Campus, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

⁴Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan City Campus, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

⁵Academy of Sciences Malaysia, Level 20, West Wing, Menara MATRADE, Jalan Sultan Haji Ahmad Shah, 50480, Kuala Lumpur, Malaysia

*Corresponding author: muhammadhafizyazid@gmail.com

Abstract

Satisfaction of tourists is the reflection of the performance quality in the development of tourism industry in Malaysia from different aspects. This is very important in the ecotourism industry in Malaysia where more than half of the total land area is covered by forests. Taman Negara National Park (TNNP), Sungai Relau in Merapoh, Pahang has decline number of incoming tourists since 2017 and this trend raises the research motivation to find out the reasons behind this result. The purpose of research is to study the expectation and performance scores of tourists towards the ecotourism facilities and services in TNNP and collect the feedbacks and suggestions for improvement and the future development. A total of 250 questionnaire forms in which the respondents have to give a rating of 1-5 towards 20 dimensions of ecotourism in TNNP were distributed to visitors of TNNP from June 2019 to September 2019 and the data collected were analyzed using Expectation-Performance Analysis Grid (EPAG) method. The results from 147 respondents showed that overall tourists are not satisfied with the quality of ecotourism facilities and services provided by TNNP and the local communities in Merapoh, Pahang. Eight dimensions of ecotourism were grouped in the 'Excellence' Quadrant of the EPAG. 'Cleanliness of Attraction Points' was the only dimension that is present in the 'Urgent Action' Quadrant while 'Conditions of Toilets' shows the biggest gap between expectation and performance (-1.09) which highlights the importance and dissatisfaction towards cleanliness in general experienced by visitors to TNNP. This research recommends that TNNP and local communities have to improve their service quality and facilities to increase satisfaction of tourists and also create their loyalty to TNNP and also Merapoh ecotourism industry as a whole.

SM-007

Local Visitors' Willingness to Pay of Entrance Fee at Taman Negeri Gunung Stong, Kelantan

N H Hassin^{1,*}, D A N Abang Jais¹, M A Abas¹, Z Hamzah¹, A N Muhammad Noor¹, H Hussin¹, M Abdullah², N Koshy³ and S Alhaji Dauda⁴

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor, Malaysia

³Faculty of Environmental Studies, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

⁴Federal University Gashua, Gashua, Yobe State, Nigeria

*Corresponding author: hizami.h@umk.edu.my

Abstract

The forest ecosystem offers plenty of benefit and provision for the environment and human wellbeing. One of the forest ecosystem's potential advantages is that it serves as a recreational forest area for tourists. However, most tourist destination faces minimal or raising public support for natural attraction maintenance and management. Hence, managing the recreational forest lacks financial resources to provide and restore adequate recreation facilities. This study aims to determine local visitors' willingness to pay an entrance fee in Taman Negeri Gunung Strong, Kelantan, Malaysia. A total of 150 respondents who had visited Taman Negeri Gunung Stong has participated in this study. The sampling techniques employed in this study is a probability stratified sampling approach. A contingent valuation method dichotomous choice was performed in this study to elicit the mean value of willingness to pay. The study found that the mean willingness to pay for an additional entrance fee to enter Taman Negeri Gunung Stong is estimated at RM 5.03 per visit. The variable of socioeconomic which only income has an influence towards mean value on acceptance of suggested price. The study is proposed that the entrance fee collections can provide support as supplementary funds for the allocations made of management and maintenance costs in Taman Negeri Gunung Stong.

SM-008

Bayesian spatial modeling of poverty risk in Kelantan

S A Nawawi^{1,*}, N M Fauzi¹, A N M Nor¹, N Ibrahim², R M Jamil¹, H A Aziz¹, R Nawawi³, S H Ya'acob¹ and N S A Halim¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan, 17600 Jeli, Malaysia

³UiTM Cawangan Kota Bharu, Kota Bharu Kelantan.

*Corresponding author: aisayah.n@umk.edu.my

Abstract

Poverty data vary in rural areas, in certain states or regions, and some urban areas. These areal data tends to have spatial autocorrelation. A Bayesian hierarchical model is commonly used to estimates the risks using a combination of available covariate data and a set of spatial random effects. These random effects are commonly modelled by conditional autoregressive (CAR) prior distributions, a type of Markov random field model. Spatial autocorrelation between the random effects, ϕ in CAR models is induced by a $n \times n$ neighbourhood matrix, \mathbf{W} . However, many studies assumed that the \mathbf{W} is fixed when fitting the model. Therefore, this study evaluates the performance of the Poisson-log linear Leroux Conditional Autoregressive (CAR) model with m -nearest neighbourhood weight matrices using a simulation study. This study creates simulated poverty data for 66 districts of Kelantan with different scenarios that related with random effects and covariate. A Poisson log-linear Leroux CAR model with $m=1, 5$ and 10 nearest neighbours are applied to the simulated poverty data. The performance of the models is evaluated using bias, Root Mean Square of Error (RMSE) and Deviance Information Criterion (DIC). The results show that the choice of $m=1, 5$ and 10 neighbourhood matrices and scenarios do not affect the bias for either the regression parameter β or the risk R_k and RMSE for the risk R_k . Nevertheless, there is the dissimilarity of the performance of the models in the RMSE of regression parameter β . The results suggest that the Poisson log-linear Leroux CAR model with the $m=5$ nearest neighbours performed overall best for simulated poverty data. It consistently gives good results across different strength of spatial autocorrelation of random effects ϕ and covariate. The model also gives the lowest DIC in all the scenarios, indicating a better fitting model than other models. The findings of this study give guidance in choosing the suitable m -nearest neighbourhood matrices to estimate the poverty risk in Kelantan.

The Importance of Ulu Sat Forest Reserve to Socio-Economic Activity of Local Community

M A Abas^{1,*}, N L M M Lukman¹, N Fitriani², Z Hamzah¹ and S T Wee³

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Mathematics and Natural Sciences, Universiti Padjadjaran, 45363 Sumedang, Indonesia

³Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Malaysia

*Corresponding author: azahar.a@umk.edu.my

Abstract

Kelantan state has rich natural landscapes and interesting geological features, which has excellent potential to be developed. Ulu Sat Forest Reserve is one of the important forest reserves that available in Kelantan. It functions as a water catchment area make it very significant to the local community nearby. The study's aim is to explore the significance of Ulu Sat Forest Reserve to socio-economic of local community. The qualitative approach was executed via focus group discussion and in-depth interview technique with the leader and local communities. This study has found out that Ulu Sat Forest Reserve has played a significant role in the local community livelihood in the context of income resources, traditional medicine resources, water resources, and a preferable recreational place for family. Besides that, this article also discussed a brief background of the local community living near the Ulu Sat Forest Reserve. Discussion on the local community's demographic is essential to understand their socio-economic activities related to Ulu Sat Forest Reserve. This study indicates that the local community is still dependent on the forest reserve ecosystem and services in their livelihood. The disturbance of the Ulu Sat Forest Reserve ecosystem will cause an indirect negative impact on the tranquillity of the local community.

Society 5.0: Green Logistics Consciousness in Enlightening Environmental and Social Sustainability

S Sidek^{1,*}, N A M Khadri¹, H Hasbolah¹, M F A Yaziz¹, M M Rosli¹ and N M Husain²

¹Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan, Kampus Kota, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, Malaysia

²Faculty of Art, Computing and Creative Industry, Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak, Malaysia

*Corresponding author: suriana@umk.edu.my

Abstract

Currently, there is growing attention towards improving sustainability, including the worldwide agenda in moving towards Society 5.0. Since the formulation of Sustainable Development Goals (SDGs), the green logistics issue has been widely recognized as one crucial element to reducing environmental and social impact. Nevertheless, only a few studies in this area were established since the ignorance regarding this issue was immense globally, including in the Malaysian context. This paper intends to examine the relationship of organizational performance consciousness, economic performance consciousness, and environmental performance consciousness towards green logistics consciousness in enlightening environmental and social sustainability in the Malaysian situation. The data of 387 respondents throughout Malaysia were collected using a convenience survey sampling technique. This data was initially analyzed via descriptive, validity, reliability, and normality test using *IBM SPSS Statistics*. All hypotheses were analysed using the hierarchical regression analysis, which confirmed that organizational performance consciousness, economic performance consciousness, and environmental performance consciousness directly influence green logistics consciousness in Malaysia. This study is significant and crucial for business strategies formulation, predicting and assessing the potential environmental and social impacts of a proposed project, including evaluating alternatives, designing appropriate mitigation, management and monitoring measures via several entities such as government and policymakers.

SM-011

Community-based Tourism Benefits and Challenges for tourism development in Vietnam

T N Do^{1,*}

¹Institute of Engineering - Technology, Thu Dau Mot University (TDMU), 820000 Thu Dau Mot City, Binh Duong Province, Vietnam

*Corresponding author: trinhutdo@tdmu.edu.vn

Abstract

This paper identifies how community-based tourism affects the benefits and challenges of tourism development in Vietnam. The proposed conceptual framework focuses on distribution of benefits sharing among involved stakeholders of the community-based tourism industry in the whole nation that comes along with 64 provinces. The power relations of government and local people in tourism sub-regions are needed in order to cooperate tightly on program perception and management. The research work with desk research method explores regions' local communities in order to find out their roles in the mentioned relation. A citizen-based tourism planning process in several places in Vietnam from suburbs to ethnic villages is discussed to illustrate how the benefits are brought to all involved stakeholders that includes tourists, local people and government. It is concluded that power relations are endemic features of emergent tourism settings. Moreover, challenges of community-based tourism development are highlighted in order to reveal opportunities we should have. Several experiences from Asian countries such as Thailand, Laos, Philippine, Sri Lanka, et al. are briefly described as lessons and references in order to propose sustainable development strategies.

SM-012

Key Biodiversity Areas (KBA): An Important Approach in Mainstreaming Biodiversity Conservation in Malaysia

N H Ahmad Ruzman^{1,*}, M A Shahfiz^{1,2}, K Munian^{1,3}, N F M Fauzi¹, M A Azahar¹, A Z Zam Beri¹, M Appanan¹, M S Baharudin¹ and N A A Mahyudin¹

¹Zoology Branch, Forest Biodiversity Division, Forest Research Institute Malaysia (FRIM) 52109 Kepong, Selangor, Malaysia

²Faculty of Science and Technology, The National University of Malaysia, 43600 Bangi, Selangor, Malaysia

³Faculty of Applied Sciences and Technology, University Tun Hussein Onn Malaysia (Pagoh Campus), 84000 Muar, Johor Darul Ta'zim, Malaysia

*Corresponding author: norhazwani@frim.gov.my

Abstract

Malaysia has adopted two ways of conserving its biodiversity; species-based and landscape-based approaches. However, there are limitations of these approaches that can be addressed via Key Biodiversity Areas (KBA). Hence, the aim of the study is to review and compare several current conservation approaches in Malaysia with KBA. Systematic literature search was done using a set of keywords in search engine and visited official government websites to obtain relevant documentations on conservation and biodiversity in Malaysia. Based on the findings, KBA is a holistic approach consisting of several biodiversity elements, criteria and themes that can be put in place, including Important Plant Areas (IPA), Important Bird and Biodiversity Areas (IBA), Important Fungus Areas and Prime Butterfly Areas. This approach has successfully helped many countries such as the Philippines, Indo-Burma hotspot, Uganda, and Canada identify and prioritize important sites for biodiversity conservation. Thus, KBA approach is an alternative approach to support stakeholders in mainstreaming biodiversity conservation approaches in Malaysia for more effective conservation planning in the future. This approach also offers geographic targets for the expansion of protected area coverage and identifies the site for urgent conservation action.

SM-016

Augmented Reality (AR) to British pillboxes as a medium of education in heritage conservation in Kelantan

N A Hashim^{1,2,*}, T F T Anuar^{1,3}, S A Muhammad⁴, N F Shuhaimi¹, S Narayanan² and Mokhtar Saidin²

¹Faculty of Creative Technology and Heritage, Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

²Center for Global Archaeological Research, Universiti Sains Malaysia, 18000 Gelugor, Pulau Pinang, Malaysia

³Institute for Poverty Research and Management (InsPeK), Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

⁴Faculty of Architecture and Ekistics, Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

*Corresponding author: athmar.h@umk.edu.my

Abstract

Augmented Reality (AR) is used within 4IR and applied to various fields, including education, tourism, business, services, and communications. In education, AR is applied as a pedagogical medium for heritage conservation by recreating physical monuments in a virtual environment. AR is using to preserve British pillboxes. This research focuses on two locations in the State of Kelantan, namely in Kampung Ger with coordinates 6 ° 00'00.4 ° N 102 ° 22'55.2 ° E and Kampung Tok Burung located at coordinates 6 ° 04'33.7 ° N 102 ° 23'45.5 ° E. Augmented Reality (AR) in teaching and learning improves delivering methods of lecturers to gain students interest in learning. AR in conservation courses may increase understanding of the artifacts in more detail and help view the exact form of the objects and monuments. The use of AR as a method was explored to facilitate learning about conservation and improve teaching methods to engage students in British pillboxes. The virtual experiences of the material, construction, fitting, and many more have assisted students in deciding the right choice of element, dimension, structure, and measurement to understand the fundamental conservation knowledge. Students have been given group tasks to create a 3D model about the simple fitting appliances of British Pillbox structures. The pillboxes are producing virtual using a marker in the form of an image of the pillbox. To access information about the British pillboxes, users only needed to scan the picture due to the Covid-19 pandemic. Students are prohibited from visiting historical sites. This research suggests that the use of AR can allow conservation courses to proceed. The study also found that students preferred to use AR during their learning. In the future, this approach would be effective in conservation education.

SM-018

Factors of Volunteerism Practice in Corporate Organization for Sustainable Development

M B Azni^{1,*} and I S M Radzuan¹

¹Faculty of Technology Management & Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Malaysia

*Corresponding author: bakhtiarazni@gmail.com

Abstract

The concept of volunteerism was introduced among Malaysians in the 19th century which was influenced by community revivals and religious mannerisms. Throughout the twentieth century, the trends and demands of volunteerism have continued to grow in many voluntary, public, and private human service agencies to enrich service delivery. Corporate volunteering refers to the situation in which a group of employees participate in social activities on a voluntary basis. It is also called as employee volunteering, which is a simple and effective way for an organization to contribute to the community. This study focuses on corporate participation in volunteering sustainable environment practices and programmes in Malaysia. It adapts 12 studies from current literature about factors influencing the volunteering practices in sustainable environment. The research findings extracted from the studies are classified into 4 groups based on the main category of factors influencing corporate volunteering including policy, environmental and sustainable practices, environmental awareness, and roles. The results then can be analysed and reviewed to act as a reference for further study on the relationship between corporate volunteering and sustainable environment. In a nutshell, various motivating factors, challenging factors, awareness levels, and attitudes that can have effects on the volunteering practices were identified and analysed to be used for further study on this topic.

SM-019

Social Return on Investment (SROI) for Government Flood Recovery Project: Case Study of “New Permanent Housing” (*Rumah Kekal Baharu*) RKB Project in Kg. Telekong, Kuala Krai, Kelantan

T W She^{1,*} and S T Wee¹

¹Faculty of Technology Management & Business, Universiti Tun Hussein Onn Malaysia (UTHM), 86400, Johor, Malaysia

*Corresponding author: weisheteo@gmail.com; tawee@uthm.edu.my

Abstract

In Malaysia, almost everyone agrees that flood recovery projects are perceived to improve the lives of communities and generate social impacts. However, there is insufficient evidence to support the case and there hasn't been any common agreement about what that return is, or how it might be measured. In this regard, Social Return on Investment (SROI) has the ability to present a clear and concise message about the government's project impacts by assessing social, economic and environmental values. Using the analysis of a specific case study as a guiding thread, this paper shows how the application of SROI methodology allows one to know in depth the social added value that the project brings and the changes experienced by the key stakeholders that interact with it. The authors carried out a step-by-step guide to implementing SROI on the government flood recovery project named “New Permanent Housing” (*Rumah Kekal Baharu*) RKB project in Kg. Telekong, Kuala Krai, Kelantan. This analysis assesses the social value generated by the intervention by combining the use of qualitative and quantitative data gathered and analyzing it. The results show that the RKB project in Kg. Telekong created an SROI ratio of 1:1.27. This means that every RM 1 spent on the project yielded a social value of RM 1.27. Based on the results, this study suggests that investment in the RKB project generates a positive return. The current study also revealed that the SROI methodology is appropriate to be adopted in an attempt to offer a structured and systematic basis for revealing and quantifying the social value that are often excluded from the discussion. The SROI method has just recently been used in the area of disaster management filed, and thus, further study is needed to promote its potential for policy-making bodies in the field.

SM-020

Conserving living heritage site in Portuguese Settlement, Melaka World Heritage Site: Issues and Conservation Elements

I S Jamaludin^{1,*}, T W Seow² and I S Mat Radzuan¹

¹Department of Real Estate, Faculty of Technology Management & Business, Universiti Tun Hussein Onn Malaysia, Batu Pahat, 86400, Malaysia

²Department of Construction Management, Faculty of Technology Management & Business, Universiti Tun Hussein Onn Malaysia, Batu Pahat, 86400, Malaysia

*Corresponding author: intan.syafinar@gmail.com

Abstract

A living heritage site symbolizes the integration between tangible and intangible cultural heritage. It has a traditional community, or a specific area in the environment of a traditional settlement. Rapid urban development poses significant threats to heritage sites, with deterioration and destruction of heritage by introducing pollution, political wars, growing tourism activities, and natural disasters. Conservation of living heritage is by accenting the role of the core community staying in traditional settlements within the heritage area. The city of Melaka was declared as World Heritage Site in 2008 and the government engaged in significant urban development to accommodate the increasing number of tourists landing, and it has threatened its heritage site. Such act jeopardised the core community of Portuguese Settlement with the risk of obliteration of its cultural heritage in the future and this is due to insufficient conservation of community's cultural heritage from soft infrastructure approaches. Hence, the purpose of this article is to highlight the issues faced by the Portuguese community and discuss elements of community participation, awareness, and stakeholder's involvement to conserve the community's cultural heritage. It is done by qualitative methods of interviews, and document analysis of relevant literature, reports and standards. The result reveals the main issues faced by the community are authenticity, vulnerability of modernisation and development hazard, and losing its community. The output of the paper would be beneficial to stakeholders, practitioners, and researchers to develop a sustainable community within the heritage site while maintaining its heritage value.

**Impacts of River of Life Project Towards the Conservation of Urban Heritage Quarter in Kuala Lumpur:
A Preliminary Study**

A S Zuraimi^{1,*} and I S M Radzuan¹

¹Faculty of Technology Management & Business, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, MALAYSIA

*Corresponding author: ainursyazwina.97@gmail.com

Abstract

The River of Life (RoL) is one project of Malaysia's Economic Transformation Programmes. RoL is a multi-year attempt that integrates high-impact programmes to help Malaysia achieve a status of a developed nation. This study discussed the components of the waterfront development packages in the River of Life (RoL) project implementation. As explained by urban planning theory, the growth of a city is affected by multiple factors. The word "urban regeneration" originated to define the social, economic, and environmental components that influence a city's growth. This study intended to examine the socioeconomic impact of the RoL project in the Kuala Lumpur heritage quarter in terms of development. A qualitative method approach combining interviews and document reviews were used in this study. The study revealed the impacts of RoL project within the heritage quarter from the perspectives of the local authorities, private sector as well as stakeholders involved in the project. The study findings will help numerous stakeholders to provide better urban living for the Kuala Lumpur heritage quarter.

THEME: SUSTAINABILITY

INVITED SPEAKER



**ASSOC. PROF. TS. DR.
AESLINA BINTI ABDUL KADIR**

Leaching of Heavy Metals from Waste Recycling In Building Materials

Aeslina Abdul Kadir^{1,*}

¹Faculty of Civil Engineering and Built Environment, Universiti Tun Hussien Onn Malaysia, Parit Raja 86400, Batu Pahat, Johor, Malaysia

*Corresponding author: aeslina@uthm.edu.my

Abstract

The most common masonry unit for construction materials is brick and concrete. Due to the demand, different types of waste have been investigated to be incorporated into building materials for example industrial waste, agricultural waste, sewage sludge, fly ash, bottom ash and other waste. The incorporation of these wastes in building materials usually has a beneficial effect such as lightweight building materials with improve shrinkage, porosity and strength, yet the potential of heavy metals being leached from waste utilization is often neglected. Unfortunately, most of the waste materials are evidently contaminated with heavy metals. Therefore, the environmental concern on the impact of building materials incorporated with waste should be observed cautiously. The analytical leaching testing procedure could be conducted in order to investigate on the potential release of heavy metals from building materials. Furthermore, to move towards developing sustainable building materials by recycling waste, emphasizing on environmentally friendly methods that could immobilize and encapsulate heavy metals that significantly pose a very high risk to the environment through leaching should be accentuated.

SS-001

Effect of photocatalyst dosage and air loading in photocatalytic degradation of metamifop

N R Nik Yusoff^{1,2,*}, P W Lim¹, N A B Azmi³, M Yusoff³ and M Muhammad¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Green Design and Manufacture Research Group, Center of Excellence Geopolymer and Green Technology (CEGeoGTech), Universiti Malaysia Perlis, 01000 Kangar, Perlis, Malaysia

³Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: nrainhan@umk.edu.my

Abstract

Excessive used of agrochemical product such as metamifop herbicide, besides having high crop yield production, it has resulted in runoff which later affected groundwater and give negative impact on the environment. Photocatalytic degradation is one of the Advanced Oxidation Process where it creates hydroxyl radicals ($\bullet\text{OH}$) in the presence of UV light. Performance of $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{carbon nanotube (CNT)}$ (10 mg and 20 mg) which was produced through a hydrothermal process was applied to degrading 5 ppm and 10 ppm of metamifop. The performance of $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{CNT}$ to degrade metamifop was evaluated statistically via a two-way analysis of variance (ANOVA) followed by a post-hoc Turkey's test. The average performance of photocatalytic degradation gave a significant result at confident level of 0.05 hence the null hypothesis (H_0) was rejected. The best performance was occurred in degrading 5 ppm of metamifop using 20 mg of $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{CNT}$ photocatalyst in the presence of air (2L/min) which resulted in 95.26% of percentage degradation. The addition of air assisted the photocatalytic degradation process from 84.54% to 92.44% and 83.62% to 91.47% when 10 mg of photocatalyst was used to degrade 5 ppm and 10 ppm of metamifop, respectively. When 20 mg of $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{CNT}$ photocatalyst was applied in degrading 5 ppm and 10 ppm metamifop, the percentage degradation increased from 86.94% to 95.26% and 85.88% to 94.62%, respectively when photocatalytic degradation was conducted in the absence of air to the presence of air. The inferential results show a significant difference in average performance of $\text{TiO}_2/\text{Al}_2\text{O}_3/\text{CNT}$ photocatalyst and concentration of metamifop solution. However, there is no interaction effect between dosages of photocatalyst used with consumption of air in degrading metamifop. The study also proved that the produced photocatalyst was performed very well and suitable to be used in degrading metamifop herbicide.

SS-002

Total phenolic content, total flavonoid content and antioxidant activity of ethanolic extract of *Rafflesia kerri* Meijer, Lojing Highlands, Peninsular Malaysia

M Z Norhazlini¹, J Mailina², M Shalini², M A Nor-Azah², Onrizal³ and H Zulhazman^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Natural Product Division, Forest Research Institute-Malaysia (FRIM), 52109 Kepong, Selangor, Malaysia

³Universitas Sumatera Utara, Medan, Indonesia

*Corresponding author: zulhazman@umk.edu.my

Abstract

Rafflesia kerri Meijer, is a species of genus *Rafflesia*, recognized as the biggest flower in the world. This species found distributed in tropical rainforest, Peninsular Malaysia and Thailand. The flower believed to have medicinal values and used as traditional herbs by aborigine ethnic group and locals. Herein, this study was aimed to evaluate the total phenolic content (TPC), total flavonoid content (TFC) and antioxidant activity of the flower by using several antioxidant assays, which includes 2,2-diphenyl-1-picrylhydrazyl radicals (DPPH) and ferric reducing antioxidant power (FRAP). The extract of female ethanolic extract exhibited highest antioxidant activity in all of the assays (FRAP = 4642.844 ± 10.777 mM/mg) and median inhibition concentration (IC_{50} = 49.850 ± 2.179). The same extract showed the presence of phenolic and flavonoid content with respective value of (Gallic acid equivalent, GAE) of 1634.731 ± 20.465 mg/100g and Quercetin equivalent (QE = 817.000 ± 69.282 mg/g) respectively with significantly differences ($p < 0.05$) compared to male ethanolic extract. Thus, the flower is highly valuable not only for ecotourism industry but also has potent medicinal value for human health improvement.

SS-004

Recovery of Au, Ag and Cu from Printed Circuit Board Leachate Using Activated Carbon Derived from Foxtail Fruit

N R Nik Yusoff^{1,2,*} and N N Maizatul¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Center of Excellence Geopolymer & Green Technology (CEGeoGTech), Universiti Malaysia Perlis (UniMAP), 01000 Kangar, Perlis, Malaysia

*Corresponding author: nrainhan@umk.edu.my

Abstract

Printed circuit boards (PCBs) are the e-waste generated from the end-of-life electronic equipment such as laptops and mobile phone. PCBs contain various metals including precious metals (gold, silver, copper) and detrimental heavy metals as well (arsenic, mercury) [9]. Recycling of e-waste is potentially to be one of the best mechanisms to overcome the human and environmental health threat hence, the valuable metals can be recovered and could avoid the depletion of our ore resources. In this paper, hydrometallurgical process on PCBs was carrying out to recover the precious metals. The PCBs were immersed into aqua regia leaching solution and later the targeted metals were leached out and extracted using activated carbon through adsorption process. The precious metals were then recovered by desorbing the spent activated carbon using hydrochloric acid (HCl) as desorbing agent. In this study, foxtail palm fruit was used to produce activated carbon for metals recovery process. Therefore, the objective of this study was to evaluate the efficiency of the prepared activated carbon derived from foxtail fruit for the recovery of Au, Ag and Cu contain in the PCB leachate. The effect of adsorbent dosage (1, 2, 3, 4, 5g), contact time (20, 40, 60, 80, 100 min) and desorption process of spent activated were investigated. The characterization of the prepared activated carbon was determined using field emission scanning electron microscope (FESEM) whereas the PCBs leachate solution before and after metal recovery process were quantified using flame atomic absorption spectrophotometer (FAAS). The obtained result showed that, the adsorption percentage of Au, Ag and Cu at high adsorbent dosage (5g) with longer contact time (100 min) were 65.51%, 30.30% and 62.51% respectively. However, the attained result for desorption percentage of the metals recovery for Au, Ag and Cu were recorded to be higher at shorter contact time (20 min) as the spent activated carbon could deteriorate at longer contact time with concentrated HCl. The percentage recovery values for 20 minutes desorption process were 99.77% (Au) when 5g of activated carbon was used, whilst 97.41% (Ag) and 98.83% (Cu) were obtained when 2g of activated carbon were applied, respectively. Thus, it can be concluded that the adsorption of Au, Ag and Cu were greater when higher dosage of activated carbon and longer contact time were applied. Meanwhile, shorter contact time were needed to recover the metals. Therefore, this study could be one of the finding in safeguarding our environment by minimizing the e-waste pollution as well as practicing metal recycling in community.

SS-007

Total phenolic content and antioxidant activity of limestone endemic Araceae species, *Alocasia farisii*

H M Puteri-Adiba¹, M Aurifullah², A A Nazahatul¹, T Sirikitputtisak³, S Klaiklay⁴, P Chumkaew⁵, S Chewchanwuttiwong⁵, M Z Norhazlini¹ and H Zulhazman^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³International Affairs & Cooperative Education, Prince of Songkla University, Surat Thani Campus, Thailand

⁴Department of Chemistry & Centre of Excellence for Innovation in Chemistry, Faculty of Science, Prince of Songkla University, Hat Yai, Songkla 90112, Thailand

⁵Faculty of Science & Industrial Technology, Prince of Songkla University, Suratthani Campus, Suratthani 84000, Thailand

*Corresponding author: zulhazman@umk.edu.my

Abstract

The changing environments are giving a rise to free radical, causing development of degenerative disease. A search for natural antioxidant is required as the synthetic antioxidant reported has carcinogenic effects on living organisms. Therefore, the aim of this study is to determine the total phenolic content and antioxidant activity of *Alocasia farisii* leaves and petioles using three different polarity solvent which are methanol, ethanol and ethyl acetate. The total phenolic content was evaluated using the Folin-Ciocalteu reagent with some modification and the antioxidant activity by 1,1-diphenyl-2-picrylhydrazyl (DPPH) scavenging assay. The methanolic extract attained the highest total phenolic content and antioxidant activity at 46.615 µg GAE/g and 66.43 %, respectively. Ethyl acetate with the lowest polarity had the lowest value, 34.769 µg GAE/g total phenolic content and 58.274 % in antioxidant activity. The IC₅₀ value shows methanol recorded the lowest value at 339.905 µg/mL, indicates high radical scavenging activity whereas ethyl acetate has highest IC₅₀ value (400 µg/mL) indicates low radical scavenging. These finding provide useful information on the total phenolic content and antioxidant activity of *A. farisii* that can be a reference for further research on this species of Araceae family. The leaves and petiole extracts of *A. farisii* may be exploited as natural sources of antioxidant.

Synergistic effect of *Alocasia longiloba* fruit's extract with ampicillin and tetracycline against bacteria

I S Nur-Alya¹, M Aurifullah², A A Nazahatul¹, T Srisawat³, P Permpoonpattana³, M Z Norhazlini¹, O Suhaimi⁴
and H Zulhazman^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Faculty of Science & Industrial Technology, Prince of Songkla University, Suratthani Campus, Suratthani 84000, Thailand

⁴FMC Agrochemicals Malaysia, 82, Persiaran Cinta Sayang, 08000 Sg. Petani, Kedah, Malaysia

*Corresponding author: zulhazman@umk.edu.my

Abstract

The inappropriate usage of antibiotic is one of the factors of the emergence of the antibiotic resistance bacteria that limit the effectiveness of the current antibiotic and lead to the treatment failure. The combination of plant extract with antibiotic approach may lead to the new ways in the treatment of the infectious diseases and this combination may reduce of bacterial resistance toward antibiotics. The objective of this study was to determine the synergistic effect of *Alocasia longiloba* fruit extract with Ampicillin and Tetracycline against *Staphylococcus aureus* and *Escherichia coli*. The synergistic effect of *A. longiloba* fruit extract and antibiotics was determined by using agar well diffusion and minimal inhibitory concentration (MIC) Resazurin 96-well micro-dilution methods. The results of this study showed the increasing in the inhibition zone when the plant extract was combined with Ampicillin against *E. coli*. The value of MIC only showed by Ampicillin on *E. coli* which was 12.5 µg/ml, and the combination of plant extract and Ampicillin (2000+12.5 µg/ml). These results indicated that the fruit extract of *A. longiloba* showed low antibacterial activity against *E. coli* and *S. aureus* and this plant extract may show the inhibition if the concentration is increase and test against the different microorganisms.

The Effect of Organic Amendments on the Growth of Gaharu (*Aquilaria malaccensis*)

A S Mohamad Amir Hamzah¹, M F Abdul Karim^{1,*}, H L Wong¹, K A Hambali¹, M N Mohd Yusoff², N A Amaludin¹, M C Leong¹, M A Abas¹, N H Hassin¹, L Ismail² and A Amir¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Yusuf Eco Farm, No 111 Felda Kemahang 1, 17500 Tanah Merah, Kelantan, Malaysia

*Corresponding: firdaus.ak@umk.edu.my

Abstract

Aquilaria malaccensis or commonly known as 'Gaharu' is famous for its heartwood that is fragrant and highly valuable. Since 2018, International Union for Conservation of Nature (IUCN) has reported a decline in the *A. malaccensis* population caused by agricultural and heartwood activities. Reforestation and transplanting of the *A. malaccensis* is essential in order to preserve the genetic diversity at species level. Previous studies on the production growth of *A. malaccensis* have been focussing on using different types and fertilizer regimes to enhance its growth for conservation and restoration effort. However, knowledge on the potential of enhancing the growth of *A. malaccensis* using soil amendments derived from organic is poorly elucidated. Therefore, this study aims to compare the effect of organic soil amendments derived from four different sources on the growth of *A. malaccensis*. Saplings of *A. malaccensis* were employed in a glasshouse experiment following a complete randomized-block design with 5 treatments × 4 replicates to ensure validity and minimise variability within treatments. The five treatments were saplings grown with no addition of organic amendments serving as control (C), forest litter (FL), chicken manure (CM), insect frass (IF) and empty fruit bunch mixed with *Azolla* sp. (EFBA). The saplings grown in polybags were placed randomly on a 9 x 9 grid within the nursery, 0.2 m apart and watered daily using an automatic sprinkler system. Physical characteristics of the saplings and other environmental parameters were measured. The saplings of *A. malaccensis* increased in average height 76.72 cm when grown in soil amended with IF. In contrast, the smallest saplings were those grown in soil amended with FL with an average height of 67.06 cm. In addition, saplings grown in EFBA amended soil had the highest average of stem diameter 8.9 mm but the lowest average of stem diameter 8.28 mm when grown in FL amended soil. This study indicated that that the organic soil amendments derived from different sources had a significant role on plant's resource allocation during the saplings stage. Further studies on the plant, organic amendments and soil physicochemical traits are needed to explain the interaction between these components for better conservation effort.

SS-013

Water Usage for Hygiene Practices among Tanjong Malim, Perak Community during Movement Control Order (MCO) Due to Covid-19

E R Aweng^{1,*}, M H Siti Maryam¹, S O Sharifah Aisyah¹, I Mohamad Zamzani² and H S Shukree³

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Department of Environment, Lot 322-324, Seksyen 27, Jalan Sri Cemerlang, 15300 Kota Bharu, Kelantan, Malaysia

³Faculty of Science and Technology, Prince of Songkla University, Pattani, Thailand

*Corresponding author: aweng@umk.edu.my

Abstract

Due to the Covid-19 pandemic, the Government of Malaysia, via the Ministry of Health and National Safety Council, has imposed the Movement Control Order (MCO). In that order, the Ministry of Health and National Safety Council has given best practices for personal hygiene during the outbreaks to ensure public health precaution among Malaysians. Thus, the objective of this study is to survey the personal hygiene practices among Tanjong Malim, Perak Community During Movement Control Order (MCO) Due to Covid-19. A survey technique with a set of questionnaires was used to collect the required data on 383 respondents. The data were collected using a cross-sectional descriptive study, and percentage were utilised to determine the level of association. The results show that most of Tanjong Malim community practice a good hand washing technique with a mean value of 4.36 and SD = 0.66. They are also practising good personal hygiene by taking a shower immediately after returning home from public places with a mean value of 4.05 and SD = 0.82. They also wash their clothes immediately after returning home from public places (mean value of 3.90, SD = 0.87). On the other hand, the practice of separating clothes during washing is also high, with a mean value of 3.95, SD = 0.93. The personal hygiene attitude, namely washing their hand before and after touching something inside and outside the house, is also high with a mean value of 4.55, SD = 0.7 and 4.67, SD = 0.5, respectively. It is found that, due to the Covid-19 pandemic crisis, most of the respondents wash their hands at least twice a day, with a majority of 5 to 7 times a day (51.2%), followed by twice to 4 times a day (21.1%) and more than ten times a day (9.9%). However, the practising shower for more than 15 minutes and more than three times per day was low, with a mean value of 2.44, SD = 1.32, and 2.48, SD = 0.98, respectively. Hopefully, the findings of this study can be used by authorities as a basis to craft new guidelines for hygienic practices during the virus pandemic outbreak.

SS-015

Optimisation of Treated Black Soldier Fly Larvae (BSFL) Using Acidic Salt to Improve Protein Digestibility of Giant Freshwater Prawn (*Macrobrachium rosenbergii*) Larvae

H C Harun^{1,2,*}, W Muhammad Amiruddin¹, O S Leng¹, S Z Abdul Malik¹, L S Yee¹, N D Rusli^{1,2}, K B Mat^{1,2}, M Mohd^{1,2}, S A M Sukri^{1,2} and S M Al-Amsyar¹

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: hasnita@umk.edu.my

Abstract

The high cost of *Artemia* sp. and the shorter shelf life of egg custard as the major aquaculture feed for *Macrobrachium rosenbergii* are giving burden to aquaculture farmers in financial support and labour force. In most studies, BSFL has proved to successfully replace commercial animal feed which BSFL has similar amino acid (AA) profile as fish meal (FM). Application of pre-treated BSFL introduced as an alternative feed for *M. rosenbergii* might be potential. Pre-treatment of BSFL was carried out by mixing 2 different types of acidic salt, potassium dihydrogen phosphate (MKP), KH₂PO₄ and sodium dihydrogen phosphate (MSP), NaH₂PO₄. Three different concentrations of each acidic salt were used to treat BSFL (5 %, 10 % and 15 %). Treated BSFL which has the highest percentage of protein decreases were selected and further identified biochemical composition through proximate analysis. Next, treated BSFL were used to partially replaced skimmed milk powder with 25% BSFL, 50% BSFL, 75% BSFL and 100% BSFL as protein source and formulated with grade A chicken egg, 1% moringa and 1% turmeric. Physical properties on treated diets and formulated egg custards are identity to determine the suitable feed for *M. rosenbergii* larvae. BSFL which treated with 15% KH₂PO₄ has highest protein decrease which is 17.39 % compared to BSFL that treated with 5% NaH₂PO₄, 10% NaH₂PO₄, 15% NaH₂PO₄, 5% KH₂PO₄ and 10% KH₂PO₄ (5.16 %, 12.98 %, 16.72 %, 10.38 % and 15.22 %). In addition, egg custard with 100% BSFL has higher protein content which is 33.88 % compared to egg custard with 25% BSFL, egg custard with 50% BSFL and egg custard with 75% BSFL (23.36 %, 27.88 %, 30.21 % and 32.66 %). It shows that the potential application of treated BSFL provides optimum nutrients to *M. rosenbergii* to replace current commercial feed.

SS-016

Active Design: Promoting Physical Activity through Building Layout

M R Khairuddin^{1,*}, I L Ibrahim¹, M A Mohd Jain¹, N Amin¹ and M F Maharimi¹

¹Faculty of Architecture and Ekistics, Universiti Malaysia Kelantan, 16300 Bachok, Kelantan, Malaysia

*Corresponder author: rizal.k@umk.edu.my

Abstract

According to World Health Organization (WHO), 60% of related factors to individual health and quality of life are correlated to lifestyle. Millions of people follow an unhealthy lifestyle which include bad food habits, physical inactivity, wrong body posture, and disturbed biological clock which directly contributes to lifestyle diseases. History has shown that environmental design can play a vital role in improving public health. Today, architects, urban designers, and planners can collaborate to address one of the most urgent and widespread epidemics of our time which are obesity and its related diseases. Hence, just as design professionals are increasingly embracing green building as an objective for environmental sustainability, they should thoroughly consider the potential effects of their designs on public health and wellbeing. Active Design is one of the approach that must been taken by the architecture field. It is an idea to design cities and buildings for eco-sustenance that in turn can encourage people to get more exercise. This is not about encouraging us to go to the gym and working out more, but instead, it's about giving citizens more of a workout through how we interact with our environment on a daily basis. There are a few countries that have been publishing their own Active Design Guidelines in promoting the use of this approach on the building design. However, the active design guidelines are not yet publish in Asia, but the active design approach has been implemented and adapted in the building design wether in a direct or indirect manner. The purpose of this study is to examine, evaluate and review the building layout design in Malaysian Architecture in relation with the active design sustaianable approach based on the literature and guidelines which can influence physical activities and health among Malaysian. Three selected building from Malaysia have been selected and analysed through qualitative and quantitative method. The finding of the research would provide deeper understanding of the necessary parameters and factors that are needed to be considered in implementing the active sustainable design approach in Malaysia.

SS-017

Molecular Identification and Phylogenetic Analysis of Fungi and Bacteria Associated to Common Spear Rot Disease in Malaysia

N D Roslan¹, I N A Mohamed Azni¹ and S Sundram^{1,*}

¹Malaysian Palm Oil Board, 6, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia

*Corresponding author: shamala@mpob.gov.my

Abstract

Common spear rot (CSR) also known as a crown disease (CD), is a disease affecting young oil palm (*Elaeis guineensis* Jacq.). There is limited information on common spear rot disease incidence reported in Malaysia. Hence, this study aimed to identify the pathogen which causes common spear rot disease in Malaysian oil palm. Palm showing severe lesions and rotting on unopened spear leaves were identified. Six fungal and 12 bacterial isolates were recovered from infected tissue, while three fungal and two bacterial isolates were from healthy tissue. Molecular identification was carried out using an internal transcribed spacer (ITS) and 16S primers through polymerase chain reaction (PCR). The identity of each isolate was determined using the BLASTN program through non-redundant database nucleotide collection. The sequence analysis showed most of the fungal isolates collected were identical to *Fusarium* genus with 99.4 to 100% identity when compared to sequences deposited in GenBank. *Fusarium solani* was one of the most frequently recovered fungal isolates from infected tissue. The species *Fusarium solani* was one of the most frequently recovered fungal isolates from the infected tissue. Meanwhile, one *Erwinia* sp., nine *Klebsiella* sp., three *Dickeya* sp. and one *Enterococcus* sp. were identified from the bacterial collection. Phylogenetic analysis revealed that all isolates of *F. solani* from the diseased palm clustered together with *F. solani* belonging to other hosts, validating the identity of the isolates. Apart from that, *Klebsiella* sp. was also isolated and could also be responsible for causing CSR but requires further validation through Koch's Postulate assessment. Nevertheless, this is the first study reporting the isolation of *Klebsiella* sp. in diseased CSR oil palm.

SS-018

Managing and protecting of endangered Rafflesia species in Kelantan, Peninsular Malaysia

M Fauzan¹, A M Muhammad-Hapiz¹, R Azizul¹, S Rosilan¹, A H Hamidi¹, I Zahari¹, E R Aweng², M A Mohamad-Faiz², A Muhamad-Azahar², H Kamarul-Arifin², H Nor-Hizami², A K Mohammad-Firdaus², A Susatya³ and H Zulhazman^{2,*}

¹Kelantan Forestry Department, Block 5, Level 1, Kompleks Kota Darulnaim, 15503 Kota Bharu, Kelantan, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Department of Forestry, Faculty of Agriculture, Universitas Bengkulu, Jl. Raya Kandang Limun, Bengkulu, 38371, Indonesia

*Corresponding author: zulhazman@umk.edu.my

Abstract

Rafflesia is the most magnificent and largest flower in the world. In Southeast Asia, the species becoming endangered due to anthropogenic activities such as logging, conversion of forest into large-scale agricultural areas, urbanization and unsustainable ecotourism. This paper has specifically highlighted the efforts that have been taken by the Kelantan State Forestry Department (KFD) in ensuring the sustainability and survival of this gigantic flower in its natural habitat. A survey by Universiti Malaysia Kelantan (UMK) shows that many populations of Rafflesia were situated in the forest reserves under the administration of KFD, such as in Lojing, Mt. Chamah, Mt. Basor and Mt. Stong. A lot of initiatives have been implemented by KFD such as organising scientific expeditions and the establishment of the High Conservation Value Forest (HCVF). In July 2011, the State Government of Kelantan declared an area of 404 ha (1,000 acres) bordering Sg. Berok Forest Reserve in Lojing Highlands as the Rafflesia Preservation Area. This recognition by the state government resulted from collaboration efforts of UMK, KFD and South Kelantan Development Authority (KESEDAR). To date, KFD has established a total of two HCVFs in Kelantan and a new area of 50 ha in Compartment 1, Lojing Forest Reserve has also been dedicated for the protection of Rafflesia. This paper was also briefly discussed several issues and challenges in conserving Rafflesia in Kelantan such as the expansion of large-scale agricultural plantation, participation of local community, tourism and income generation, international and internal funds for conservation works, and provide an integrated tourism and management plans. Hopefully, this effort will lead to the establishment of a centre of excellence in nature conservation, ecotourism and scientific research of Rafflesia in Kelantan.

SS-019

Comparison of Chemical Compositions Between Two Fast Growing Species: *Acacia mangium* and *Leucaena leucocephala*

M S M Rasat^{1,2,*}, M F M Amin², M I Ahmad¹, A M Noor¹, S A Sobri¹, A Hermawan¹, M H M Amini¹, B J Geng¹, M A M Amin³ and A Chotikhan⁴

¹Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Verdastro Sdn Bhd, Kawasan Perindustrian Gebeng, Kuantan, Pahang, Malaysia

⁴Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani, Thailand

*Corresponding author: sukhairi@umk.edu.my

Abstract

Acacia mangium and *Leucaena leucocephala* are both exotic species known to be planted in Malaysia. Both species are well known to possess high growth rate, therefore made as reforestation species as well as a popular resource for pulp and paper industry. The main objectives of this study are to determine the chemical compositions of small diameter wild *Acacia mangium* and *Leucaena leucocephala* species and to compare that properties between of them at three (3) different stem portions (bottom, middle and top) and two (2) different parts (bark and wood). All analyses were done according to TAPPI standard method, except hemicellulose (Wise *et al.*) and holocellulose (formula). All the data and results were statistically analyzed using ANOVA and Tukey's Post Hoc test. Results revealed alcohol-toluene solubles was highest in bottom portion of *Acacia mangium* bark (14.98%). Holocellulose can be found highest in middle portion of *Leucaena leucocephala* wood (90.61%). For α -cellulose, highest was in *Leucaena leucocephala* bark (69.36%). Hemicellulose was most abundant in *Acacia mangium* top portion of wood (36.14%), while highest lignin was in its bottom portion of bark (31.18%). ANOVA indicates there are statistically high significance between species for all chemical composition, but between portions, only alcohol-toluene soluble and holocellulose are significant. For parts, all chemical composition is significant, except for lignin. This study proved that small diameter wild *Acacia mangium* and *Leucaena leucocephala* as a viable resource for pulp and paper industry.

Spatial Framework of Zero Covid 19 Outbreak for Sustainable Health in Kelantan

A N Muhamad Nor^{1,*}, R Muhammad Jamil¹, H Abdul Aziz¹, N Ibrahim², M A Abas¹, S A Nawawi¹ and N H Rafeai³

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Institute of Environment and Development, University Kebangsaan Malaysia, Bangi Selangor

*Corresponding author: amalnajihah@umk.edu.my

Abstract

The Kota Bharu city in Kelantan Malaysia was reported with the highest cases of COVID-19 among other districts. Kota Bharu is the main development for Kelantan, which acts as the administrative, commercial and financial. A large population pool may become a potential carrier of disease transmission to become an epidemic. However, the spatial-temporal pattern of the COVID-19 outbreak is still unknown and undiscovered. Therefore, this study investigates the impact of COVID-19 on population density and its drivers as potential virus transmission carriers. The chance to formulate new strategies on combating the COVID-19 is higher when the driver of transmission potential of COVID-19 is identified. This study analyzes and models by using the ERDAS Imagine 2014, ArcGIS, and Land Change Modeler (LCM). The simulation maps of COVID-19 are derived by using Markov Chain model and Logistic Regression Model. By the end of this study, new potential drivers of transmission COVID-19 outbreak and spatial distribution map of COVID-19 in three different zones can be identified for future strategic planning. The outcome of the study can develop a new spatial analytical model map for strategic planning of Zero COVID-19 for securing the public health, wellness, social and economic by the researchers, scientists, planners, resource managers and decision-makers.

Spatial and Temporal Changes of Urban Forest in Jeli, Kelantan

N Z Baharudin¹, A N M Nor^{1,*}, S A Nawawi¹, H A Aziz¹, R M Jamil¹, N Ibrahim² and N H Rafeai³

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

³Institute of Environment and Development, Universiti Kebangsaan Malaysia, Bangi Selangor, Malaysia

*Corresponding author: amalnajihah@umk.edu.my

Abstract

The rapid growth of urban development in a country affects vegetation and ecosystem area. Nowadays, Jeli was facing the fact of losing its forest cover that had been a substitute with other purposes such as plantation and development. Therefore, this study was conducted to classify the land use change of Jeli and analyze the urban forest changes of Jeli in year 1994, 2006 and 2018. In this study, three satellite images of the study area in year 1994, 2006 and 2018 were processed and analyzed using Remote sensing and Geographical Information System (GIS). The landscape patterns were analyzed using landscape metrics that were calculated by FRAGSTATS software. The analysis showed that the largest patch index (LPI) of Jeli in 2006 is higher, with 66.32% compared to the year 1994 (60.86%) and 2018 (65.44%). The mean patch area (MPA) decreases throughout the year with 5.96 ha, 4.27 ha and 3.97 ha, respectively. The higher of LPI and increase of MPS indicating that the patches is become fragmented. Moreover, the Euclidean nearest neighbor (ENN) value increased from year 2006 to year 2018, from 93.91 m to 109.42 m indicating that the distance patches is increased. The ANOVA test conducted within ENN and AREA's value shows that the ENN value of year 1994 is more significant ($p < 0.05$) compared to year 2006 and 2018. Oppositely, the AREA's value was found significant for year 2006 and 2018. The results show that the green cover class was increased through years due to the changes of land use purpose where the land use such as vegetation and cleared land classes were replaced with green cover. The outcomes from this study can be used to construct and improve a new and existing landscape planning by the decision-makers, stakeholders and sustainable planners.

SS-022

Pre-treatment of Black Soldier Fly Larvae (BSFL) using Neutral Salt to Improve Protein Digestibility of *Macrobrachium rosenbergii* Feed

W Muhammad Amiruddin¹, A M Siti Zarin Sofia¹, S M Al-Amsyar¹, N D Rusli^{1,2}, K B Mat^{1,2}, S A Muhamad Sukri¹, M Mohd^{1,2} and H C Harun^{1,2,*}

¹Faculty of Agro-Based Industry, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

²Institute of Food Security and Sustainable Agriculture, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Malaysia

*Corresponding author: hasnita@umk.edu.my

Abstract

Macrobrachium rosenbergii (*M. rosenbergii*) is one of the economically driven freshwater aquaculture species in many countries. The production of *M. rosenbergii* has been increased over the year. Along with the growth of production of aquaculture species, feed production also rises. *Artemia* nauplii are the main live feed with partial replacement with egg custard. However, the application of live feed is costly. Black Soldier Fly larvae (BSFL) is a high potential source of protein that can be applied as *M. rosenbergii* larvae feed. Meanwhile, pre-treatment of BSFL using neutral salt (NaCl and KCl) is essential to improve the protein digestibility of *M. rosenbergii* larvae. This study aims to produce feed that can help in producing fast-growing and healthy *M. rosenbergii* larvae. Different percentages of salt were at 5%, 10%, and 15% were used for BSFL pre-treatment, while BSFL without the addition of salt was used as a control diet. The present study showed that pre-treated BSFL with 15% KCl had a higher protein decreased among the other treatments, followed by 10% KCl and 15% NaCl. In addition, egg custard with 100% BSFL has the highest crude protein and lipid content, which was higher than control (without BSFL), which has the lowest crude protein and lipid content. This study shows that the formulated egg custard has the optimum nutrient that meets the *M. rosenbergii* larvae requirement.

SS-023

Sustainable Living: Did Gender Influence Psychological Wellbeing?

L S Palupi^{1,2,3,4,5,*}

¹Departmen Psikologi, Fakultas Psikologi, Universitas Airlangga, Surabaya, Indonesia

²Addiction Study Centre, Universitas Airlangga, Surabaya, Indonesia

³Health and Environmental Sustainability (HES) Research Group, Universitas Airlangga, Surabaya, Indonesia

⁴Psikologi Perubahan Sosial & Teknologi (Technology and Psychology of Social Change) Research Group, Universitas Airlangga, Surabaya, Indonesia

⁵Direktorat Riset dan Pengabdian Masyarakat (DRPM) RISTEKDIKTI Indonesia Penelitian Dasar Unggulan Perguruan Tinggi (PDUPT) Research Funding Scheme 2021 (No. 529/UN3.15/PT/2021)

*Corresponding author: listyati.palupi@psikologi.unair.ac.id

Abstract

Psychological well-being measured by a diverse set of attributes includes: life satisfaction, environmental mastery, self-efficacy, hope, happiness, and quality of life. Previous study shown that Javanese people associated their psychological wellbeing with the value of mawas diri (self-aware) and rasa bebas (feeling free) that they have been internalized. Besides, it is also found that the psychological wellbeing of Javanese men and women was indifferent. However, other studies on psychological wellbeing found that the difference was significant. Therefore, the aim of this study was to search for gender differences in psychological wellbeing. Survey research was applied in this study and the participants involved were 44 Javanese live in Surabaya. Purposive sampling was applied to select a subset of the population. This study found that there are differences in psychological wellbeing of men and women. The findings in this study could be utilized in designing policies and strategies which intend to increase the well-being of the population and to achieve sustainable living.

SS-024

Conceptual Framework of Smart Fertilization Management for Oil Palm Tree Based on IoT and Deep Learning

N A N Mohd Adib¹ and S Daliman^{1,*}

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: shparas@umk.edu.my

Abstract

Oil palm trees contribute economic income to the national and community by generating various types of productions. This will cause an expansion of the area for the plantation of oil palm seeds, then contributes to the stability in distributing good quality oil to accommodate the growing population. Furthermore, degradation occurs when the planting of oil palm trees increases rapidly, especially the occurrence of uncontrolled oil palm cultivation. The degradation can cause loss of soil nutrients due to soil erosion. The lack of macronutrients, Nitrogen (N), Phosphorus (P), Potassium (K) and Magnesium (Mg) on oil palm tree may impact on its growth which includes the quality of crops. Traditional approach to detect macronutrients, can also lead to some improper control in turn leads results in reduction in yield. The existing system has given limited information of dataset and slower classification performance due to limited functions. With the adaptability of Internet of Things technologies, oil palm tree growth data and fertilization management can be utilizing effortlessly and effectively. The context of conceptual framework comprises the IoT technologies, image processing, machine learning and deep learning which focuses on environmental factors that affecting the young oil palm tree growth that involve temperature, humidity, soil moisture content, light and nutrient. Thus, a study of IoT, machine learning and deep learning for smart fertilization management of oil palm trees is suggested helping and raise the efficiency of oil palm trees management in Malaysia.

SS-025

Above Ground Biomass Estimation of Oil Palm Plantation in Jeli, Kelantan Using Drone-Based Remote Sensing Image

S Daliman^{1,*} and N N Abu Khori¹

¹Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: shparas@umk.edu.my

Abstract

Biomass is a critical variable for carbon cycles, soil nutrient allocations, fuel accumulation and habitat environments in terrestrial ecosystem and served as an important indicator to assess the role of plantations in the global carbon cycle, particularly its contribution towards carbon sequestration. Aboveground biomass (AGB) is one of the main factors through which the control of vegetation on hydrodynamics and sediment deposition is exerted. Estimation of AGB in oil palm plantation is essential as it serves as an important indicator to assess the role of oil palm plantations in the global carbon cycle, particularly whether it serves as carbon source or sink. In recent years, rapid progressing in drone based remote-sensing platforms have boosted the use of near-earth aerial imagery to estimate crop AGB. Drone based remote sensing systems are easiest to acquire crop data at the farm scale within the sufficient weather condition because large temporal-spatial resolution. This is significant indicators to delineate the growing condition of the crop, plant height (PH) was being broadly used to AGB estimation. In addition to PH, vegetation indices (VIs) which able to furnish reliable data about crop growing condition, such as green canopy cover and PH, have also used to investigate as a reliable source for AGB estimation. The various vegetation indices (VIs) toward AGB estimation of crops were derivational from RGB imagery. In this study, the five VIs that will be assessed including the normalized green-red difference index (NGRDI), excess green index (ExG), excess green minus excess red (ExGR), color index of vegetation (CIVE), vegetation index (VEG), and the combination of ExG, ExGR, CIVE and VEG (COM) will also be evaluated. The relationships of the PH and VIs in estimating the AGB shows that the drone-based remote sensing images offers a significant, inexpensive and low cost of AGB estimates.

Evaluation on Mechanical Properties of Plywood from Two Fast Growing Species: *Neolamarckia cadamba* and *Paraserianthes falcataria*

W M N W A Rahman^{1*}, N Y Yunus¹, M F Sa'ad², M F M Amin³, M A N Mohamad⁴, A Chotikhan⁵, M I Ahmad⁶ and M S M Rasat^{3,6,*}

¹Faculty of Applied Science, Universiti Teknologi MARA Pahang, Bandar Tun Razak Jengka, Pahang, Malaysia

²Faculty of Applied Science, Universiti Teknologi MARA Shah Alam, Shah Alam, Selangor, Malaysia

³Faculty of Earth Science, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

⁴Verdastro Sdn Bhd, Kawasan Perindustrian Gebeng, Kuantan, Pahang, Malaysia

⁵Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani, Thailand

⁶Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan Jeli Campus, 17600 Jeli, Kelantan, Malaysia

*Corresponding author: wmdnazri@uitm.edu.my; sukhairi@umk.edu.my

Abstract

Neolamarckia cadamba (Laran@Kelampayan) and *Paraserianthes falcataria* (Batai) are both fast growing species known to be planted in Malaysia for their high growth rate, therefore made as reforestation species. This study had been done in evaluating the mechanical properties of these species as a new wood material for plywood production as an alternative and discovering used for the depleting supply of big diameter log from virgin forest. The tree samples were harvested from trial plot in UiTM Pahang, Bandar Tun Razak Jengka, Pahang, Malaysia and sent to plywood mills nearby for plywood production. Plywood was composed in five layers and seven layers with 12 mm thickness and used melamine urea formaldehyde (MUF) as their binder based on commercial industry production. Panels were cut and tested according to Japanese Agriculture Standard for plywood (JAS 2014) at Forest Research Institute Malaysia (FRIM), Kepong, Selangor, Malaysia. Based on minimum standard requirement, results show that both species were suitable to be used in plywood production for general use and structural (decorative) purpose. In addition, increased veneer layers were improved the panel strength. This study shows those species had potential to be an alternative wood material for plywood industry in Malaysia thus can reduce independency of wood species from virgin forest.

ACKNOWLEDGEMENT



DIRA RESOURCES (002133852-D)

Pt 1496-A, Kg. Beris Jambu, Pengkalan Chepa, 16100 Kota Bharu, Kelantan Darul Naim
Tel : 011 - 1074 8800 / Fax : 09 - 773 8800 / E-mail : diraresources@gmail.com



Secretariat,
Conference on Tropical Resources and Sustainable Sciences (CTReSS 3.0),
Faculty of Earth Science,
Universiti Malaysia Kelantan,
17600 Jeli, Kelantan, Malaysia
Email : ctress@umk.edu.my
Tel : +609-947 7343/ 09-947 7346 (ext. 11178)

