



Universiti Malaysia  
KELANTAN

ICoST 2020

10<sup>th</sup> September 2020

# International Conference on Science and Technology 2020

UMK Virtual Conference Series 2020

## ABSTRACT BOOK

## Abstract Book

### Editors

Khomaizon Abdul Kadir Pahirulzaman  
Nurul Syaza Abdul Latif  
Sarizam Mamat  
Nor Fadhilah Kamaruzzaman  
Muhammad Firdaus Abdul Karim

### List of Sponsors



## **Preface**

### *WELCOME TO ICoST 2020!*

Due to the novel Coronavirus (COVID-19) global pandemic, Universiti Malaysia Kelantan (UMK) is organizing a virtual conference on International Conference on Science and Technology (ICoST) 2020. This conference is co-organized between four science-based faculties in UMK which are Faculty of Bioengineering and Technology (FBKT), Faculty of Earth Science (FSB), Faculty of Agro-Based Industry (FIAT) and Faculty of Veterinary Medicine (FPV).

ICoST 2020 is organized to provide International Forum for researchers, engineers, professors, educational scientists, technologists and students in the areas of Education, Science and Technology. It will be an excellent opportunity to present, demonstrate and discuss research and development, applications, and the latest innovations. All accepted original research papers will be published in the IOP Conference Series: Earth and Environmental Science (EES).

ICoST is scheduled to be held on 10th September 2020 and will feature both synchronous and asynchronous events to ensure wider participation of scientist from different field. This virtual conference includes pre-recorded presentation session for 100 research manuscripts that has been grouped according to their designated theme. Audiences are invited to view these recordings on the UMK Youtube Channel and join the live session to discuss the findings with the presenters and invited speakers. Virtual Poster Presentations are uploaded on the ICoST website and will include a discussion section for engagement between the audience and the presenter. The keynote and highlighted sessions will be live-streamed on UMK Official Facebook. The audience will have an opportunity to join the sessions, discover and connect with other presenter, and participate in discussions.

On behalf of the organizing committee, we hope that all ICoST 2020 participants will have an entertaining, fruitful and satisfying session during this virtual conference!

Thank you.

**ICoST 2020 Organizing Committee**

## MESSAGE FROM THE VICE CHANCELLOR, UNIVERSITI MALAYSIA KELANTAN

Assalamualaikum w.b.t.

The Universiti Malaysia Kelantan (UMK) is proud to host the International Conference of Science and Technology 2020 (ICoST 2020), virtually.



Since the inception of UMK, science and technology has been at the forefront and as a niche of research, highlighted through various agendas and measures in collaboration with different state and federal government agencies, non-governmental organizations and local communities. The development of technology along with the advancement in science helps to bring in a revolution in various fields such as medicine, agriculture, education, information and technology, which is parallel to the objective of this conference.

The primary goal of this conference which is to promote research and developmental activities in science and technology as well as to promote scientific information interchange between researchers, developers, engineers, students, and practitioners working in and around the world. This conference an ideal platform for people to share views and experiences in science and technology and related areas. The current pandemic issues of Covid-19 does not stop us to do research and exchanging our finding in science and technology.

I wish the organizing committee a great success and looking towards a collective resolution achieved through the presented papers.

**Prof. Dato' Ts. Dr. Noor Azizi Ismail**  
**Vice Chancellor, Universiti Malaysia Kelantan**

## MESSAGE FROM DEPUTY VICE CHANCELLOR OF RESEARCH & INNOVATION, UNIVERSITI MALAYSIA KELANTAN

Bismillahirrahmanirrahim,  
Assalamualaikum Warahmatullahi Wabarakatuh and good afternoon.

First and foremost, I would like to extend a warm welcome to all the participants of the International Conference on Science and Technology (ICoST) 2020, which is held virtually this year due to pandemic Covid19. I would like to congratulate the collaboration between four faculties in UMK; Faculty of Bioengineering and Technology, Faculty of Earth Science, Faculty of Agro-Based Industry and Faculty of Veterinary Medicine for organizing this meaningful event.



ICoST2020 is organized to provide an opportunity for all individuals and organizations who are involved and interested in Science and Technology to share their view and experience. Additionally, ICoST this year provides a platform in exchanging information, discussion of scientific problems and findings as well as fostering of friendship and partnership. The four main topics highlighted in this conference include Agriculture & Food Security, Natural Resources and Environmental Sciences, Bio Industry, Materials and Forest Resources Technology and Animal Health.

Congratulation for 100 research papers that have been accepted for either for oral or e-poster presentation. This conference is a great venue for participants not only for academics but also for industries or practitioners to present and discuss their recent findings related to the innovations, current applications or long-term solutions to some of the key business challenges arising in the globalized economy.

Once again, I would like to record my sincere appreciation to everyone who has contributed to ensuring the success of this event. I am confident this will be a gratifying experience for all of us. Finally, I hope that everyone will have an exciting and memorable moment throughout ICoST 2020. Even though in virtual mode, we still can do great communication in asking and get opinion as well as exchange our expertise among participants. Keep researching, enjoy the conference and keep publishing!

Thank you.

**Prof. Ts. Dr. Arham Bin Abdullah**

**Deputy Vice Chancellor of Research & Innovation, Universiti Malaysia Kelantan**

## MESSAGE FROM ICoST 2020 CHAIRMAN

Assalamualaikum, Salam sejahtera and very good day.

Dear ICoST 2020 delegates,

On behalf of International Conference of Science and Technology 2020 (ICoST 2020), I am particularly delighted to warmly thank the ICoST 2020 organizer, Universiti Malaysia Kelantan for giving me the privilege of welcoming and addressing all of you. Indeed for me it is an honor and a pleasure.



For your information, this conference related to science field is conducted virtually due to COVID-19 pandemic. This conference is collaborated between four faculties in UMK which are Faculty of Bioengineering and Technology, Faculty of Earth Science, Faculty of Agro Based Industry and Faculty of Veterinary Medicine. ICoST 2020 is organized to provide an opportunity to all individuals and organizations that are involved and interested in Science and Technology to share their view and experience. Additionally, ICoST 2020 provides a platform exchanging information, discussion of scientific problems and findings as well as fostering on networking and partnership. I am sure that each of you will benefit from interesting, fruitful and enriching discussions.

Lastly, recognition should go to the organizing committee, keynote speaker, invited speakers, oral and poster presenter who have involved in making this conference success. I hope, the new norm in executing virtual conference creating a great experience which benefited all delegates.

Thank you and hope you will enjoy your virtual conference.

**Prof. Ir. Ts. Dr. Ahmad Ziad Bin Sulaiman**  
**Chairman**  
**ICoST 2020**

## ICoST 2020 Program Schedule

Time	Activities
0900 -1000	<p>Doa Recitation</p> <p>Welcoming speech by the ICoST 2020 Chairman, Prof. Ts. Ir. Dr. Ahmad Ziad Bin Sulaiman</p> <p>Officiating speech by the Deputy Vice Chancellor of Research &amp; Innovation, Universiti Malaysia Kelantan Prof. Ts. Dr. Arham Bin Abdullah.</p> <p><b>Keynote Speech</b></p> <p>Prof. Dr. Mohd. Talib Latif, FASc Fakulti Sains dan Teknologi, Universiti Kebangsaan Malaysia (UKM) Title: COVID-19 Pandemic and Air Pollution</p> <p>Live on Official UMK Facebook <a href="https://www.facebook.com/OfficialUMK/">https://www.facebook.com/OfficialUMK/</a></p>
1000 - 1500	<p><b>Parallel Session 1</b></p> <p><b>Invited Speaker 1</b></p> <p>Dr. Ilham Alimudin Departmen Teknik Geologi, Universitas Hasanuddin Title: Mapping Geosites in Supporting Potential Geopark in South Sulawesi, Indonesia.</p>
1000 - 1500	<p><b>Parallel Session 2</b></p> <p><b>Invited Speaker 2</b></p> <p>Assoc. Prof. Dr. Arman Shah Bin Abdullah Fakulti Teknikal dan Vokasional, Universiti Pendidikan Sultan Idris (UPSI) Title: Enhanced Corrosion Resistance of Physical Vapor Deposition (PVD) Coated on Ti-13zr-13nb Alloy for Biomedical Application</p>
1000 - 1500	<p><b>Parallel Session 3</b></p> <p><b>Invited Speaker 3</b></p> <p>Dr. Ikarastika Rahayu Bt. Abdul Wahab Faculty of Agrobased Industry, UMK. Title: Mosquito Repellency and Toxicity Effects of Essential Oil from <i>Cinnamomum iners</i> Leaves and Barks.</p>
1000 - 1500	<p><b>Parallel Session 4</b></p> <p><b>Invited Speaker 4</b></p> <p>Dr. Zubaidah Aimi Bt. Abdul Hamid Faculty of Bioengineering and Technology, UMK Title: Production of Insecticide from Diclorine Content from <i>Discore hispida</i> (Ubi Gadong).</p>
1000 - 1500	<p><b>Parallel Session 5</b></p> <p><b>Invited Speaker 5</b></p> <p>Dr. Norrimi Rosaida Bt. Awang Faculty of Earth Sciences, UMK Title: Assessment of Night-Time Ground Level Ozone Concentration in Klang During Wet and Dry Month.</p>
1500 - 1600	<p><b>Closing Ceremony</b></p> <p>Closing speech by the Chairman of ICoST 2020, Prof. Ts. Ir. Dr. Ahmad Ziad Bin Sulaiman Award giving ceremony for best oral and poster presenter.</p> <p>Live on Official UMK Facebook <a href="https://www.facebook.com/OfficialUMK/">https://www.facebook.com/OfficialUMK/</a></p>

## Organizing Committee

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## KEYNOTE SPEAKER

**Prof. Dr. Mohd Talib Latif**

Department of Earth Sciences and  
Environment  
Universiti Kebangsaan Malaysia

### “COVID-19 Pandemic and Air Pollution”

**Abstract.** The spread of virus-related illnesses due to COVID-19 has been associated with the presence of the virus in water droplets released from infected individuals through processes such as coughing and sneezing. Recent studies also indicated the potential for airborne transmission of COVID-19 via fine aerosols. The level of air pollutants such particulate matter with aerodynamic diameter below than 2.5 micrometres ( $PM_{2.5}$ ) showed a significant relationship with the COVID-19 cases in many countries. On the other side, the lockdown due to COVID-19 pandemic has led to a notable decrease in atmospheric pollutants. Measurement of aerosols using satellite image in Southeast Asia shows a significant reduction of aerosols optical depth (AOD) during lockdown due to COVID-19 pandemic. In Malaysia, the concentration of  $PM_{10}$ ,  $PM_{2.5}$ ,  $NO_2$ ,  $SO_2$ , and  $CO$  concentrations have been decreased by 26–31%, 23–32%, 63–64%, 9–20%, and 25–31%, respectively, in the urban areas during the lockdown phase, compared to the same periods in 2018 and 2019. Surface ozone ( $O_3$ ) is the only gas that shows an overall increasing trend during the lockdown. Further investigation using diurnal patterns showed that  $NO_2$  and  $CO$  were both reduced significantly during the rush hours, indicating how a reduction in motor vehicles on the roads influences the levels of these pollutants.

## INVITED SPEAKER



**Dr Ilham Alimuddin**

Geological Engineering, Faculty of  
Engineering, Universitas Hasanuddin

### **“Mapping Geosites in Supporting Potential Geopark in South Sulawesi, Indonesia”**

**Abstract.** Amid the Covid19 Pandemic, Indonesian government is consistent putting tourism sector as one of the major development sectors in keeping up with the development of infrastructures. Providing better infrastructure especially transportation will boost the interconnection of areas in Indonesia, hence will also support the operation of tourist industry. Geotourism has been one of the backbone developments in supporting the involvement of local communities in Indonesia, but yet this is still needed to be pursued further. The idea of establishing geopark as proposed by UNESCO as one concept to support geotourism has made Indonesian Government within the tourism industry's stakeholders putting effort to prepare and recommending areas in Indonesia that suitable to become national geoparks. Geopark concept is an area that has outstanding geological elements including the archaeological, ecological and cultural values contained in it - where local people are invited to participate in protecting and enhancing the functions of natural heritage." (UNESCO, 2004). These geopark components are based on the sites, which is called geosites. These geosite contains 3 natural components in the geopark concept, namely Geodiversity, Biodiversity and Cultural diversity. Fostering this geopark concept, The Government of Indonesia with The President's Regulation No.9, 2019 on The Development of Geopark has been made and followed by the decree by The Minister of Mineral and Energy Resources providing the Technical Standard and Guidance of Assessing Geoheritage. Data per April 2018, there were 140 Global Geoparks spread across 38 countries. Currently in Indonesia there are 5 Global UNESCO Geoparks and 15 National Geoparks.

South Sulawesi Province in Indonesia are rich of geosites ranging from mountain landscapes to lowland areas like beaches, lakes and cities. One area that is being prepared to be proposed as global geopark is The Maros Pangkep Geopark that was inaugurated as a National Geopark by the Government of the Republic of Indonesia on 24

November 2017. This study explores how the geosites within the boundary of this proposed global geopark initiated by mapping the potentials of each geosites followed by steps taken in establishing the management with the involvement of multi stakeholders. The geosites mapping are still running while The Geopark Organizing Committee is preparing the submission of document to the Unesco Global Geopark Network to be proposed as one of the Unesco Global Geopark this year.

There are several strong arguments of choosing this area as potential global geopark. Among them are; Landscape with towering Karst Tower type composed of the very distinctive Tonasa limestone rock formations, Maros Pangkep Karst is one of the world class carcasses which has beauty, uniqueness, flora and fauna, with high scientific and socio-cultural values, and is the second largest karst area in the world after South China, The Bantimala complex comprise of 115 million years old rocks, was formed due to the tectonic process of bedrock tens of kilometers below the earth's surface, hundreds of caves that have been inhabited by prehistoric humans, the past culture is depicted through the remains of 40,000 years old prehistoric paintings (M.Aubert et al. 2014), older than Europe. This area is part of the Wallacea Region, Home to Endemic Flora Fauna, Hundreds of butterfly species, which have earned the nickname "Kingdom of Butterfly".



## INVITED SPEAKER

**Assoc. Prof. Dr. Arman Shah Bin  
Abdullah**

Fakulti Teknikal dan Vokasional, Universiti  
Pendidikan Sultan Idris

### **“Enhanced Corrosion Resistance of Physical Vapor Deposition (PVD) Coated on Ti-13zr-13nb Alloy for Biomedical Application”**

**Abstract.** Physical Vapor Deposition has been widely employed as a coating technique on titanium alloy due to low substrate temperature which is not affected by the bare sample during the heating process. However, this technique has drawbacks such as defect on the structure thus affected the substrate due to corrosion attack, especially in body fluids. Several researchers attempt to solve this problem via multilayer coating on the surface but it increases the production cost. The objective of this research is to propose the mechanical treatment technique on titanium coated with PVD for the enhancement of corrosion resistance for the biomedical implant. First, substrates were coated with TiN via PVD then applied the mechanical treatment through ultrasonic vibration. Results show that all coated samples treated with ultrasonic vibration improve the surface of the coated sample and produce a compact coating as compared with a substrate coated without mechanical treatment. The corrosion test evaluated by Potentiodynamic polarization and Electrochemical Impedance Spectroscopy indicated that all coated samples treated with mechanical treatment showed high corrosion resistance as compared with the untreated sample. It can be concluded that mechanical treatment which is a simple technic can be used as an alternative to improve the corrosion resistance thus reduce the implant and manufacturing cost for biomedical applications.



## INVITED SPEAKER

**Dr. Ikarastika Rahayu Bt. Abdul Wahab**

Faculty of AgroBased Industry  
Universiti Malaysia Kelantan



### **“Mosquito Repellency and Toxicity Effects of Essential Oil from *Cinnamomum iners* Leaves and Barks”**

**Abstract.** Synthetic mosquito repellents containing DEET (N, N-diethyl-3-methylbenzamide), DEPA (N, N-diethyl phenylacetamide), permethrin and deltamethrin as active components are known to be the most effective repellents. However, these types of repellents have contributed to numerous toxic effects on not only the environment, but also non-target organisms. The use of natural products such as essential oils is reported as a safe alternative. To date, the study on repellency activities against mosquitoes using Malaysian plants is rare. In the present study, essential oils from leaves and barks of *Cinnamomum iners* have been reported to show repellency activity, and the whole plant have been used by the local communities to repel mosquitoes and other blood-sucking insects. Repellency assay of the oils against *Aedes aegypti* was conducted using the percentage repellency bioassay method at three different concentrations: 1%, 5% and 10%. The results showed that the essential oils from barks had a significant percentage repellency ( $p<0.05$ ) when compared to essential oils from leaves. Two main compounds were identified using the GC-MS: 1-isopropenyl-4-methyl-1,2-cyclohexanediol and 2-octen-1-ol,3,7-dimethyl (geraniol) from the bark and leaf essential oils, respectively. The essential oils demonstrated promising insect repellency activity which has the potential for further development into formulations that may serve as alternatives to DEET or be used as natural bioinsecticides to kill mosquitoes.



## INVITED SPEAKER

**Dr. Zubaidah Aimi Bt. Abdul Hamid**  
Faculty of Bioengineering and Technology  
Universiti Malaysia Kelantan



### **“Production of Insecticide from Diclorine Content from *Discorea hispida* (Ubi Gadong)”**

**Abstract.** The ubi gadong or *Dioscorea Hispida Dennst* (*D. hispida*) is a carbohydrate plant that contain about 75.2 % in the form of starch in its tuber. In this study, two cultivars of *D. hispida* namely yellow tuber or ‘gadong pulut’ and white tuber or ‘gadong beras’ were identified. The starch content in two cultivars of *D. hispida* was extracted and analyse their chemical and physical properties by comparing their thermal analysis, granule morphology and others physicochemical properties. Observation on the texture of starch extract from yellow tuber shows that starch in yellow tuber is stickier and requires a long time for the drying process compared to the white tuber. The colour parameter of tuber was measured the yellowness colour (*b\**) using choma meter showed the yellow tuber is 52.88 more yellowish than white tuber which is about 34.16. Results showed, for both starch samples solubility and swelling power gradually increased with the increasing of temperature ranging from 75°C to 95°C. SEM analysis of the starch granules indicate the polyhedral shapes with size between 1.3µm to 4.3µm. The results obtained from DSC showed the both starches transition temperature (To, Tp and Tc) were in range 74.53 – 74.58°C, 79.34 – 79.39°C and 83.35 – 83.40°C while, the enthalpy of gelatinization ( $\Delta H_{gel}$ ) was in range 4.11 – 4.16 Jg<sup>-1</sup>.



## INVITED SPEAKER

**Dr. Norrimi Rosaida Bt. Awang**

Faculty of Earth Sciences  
Universiti Malaysia Kelantan



### **"Assessment of Night-Time Ground Level Ozone Concentration in Klang during Wet and Dry Month"**

**Abstract.** Ground level ozone ( $O_3$ ) is the most significant secondary air pollutants in Malaysia, and this air pollutant exhibited different variations during daytime and nighttime due to differences in photochemistry. This utilizing seven variables ( $O_3$ ,  $NO_2$ , NO,  $SO_2$ ,  $PM_{10}$ , temperature, and relative humidity) secondary data acquired from the Air Pollution Division, Department of Environment Malaysia. The nighttime data (7 p.m. – 6 p.m.) on March and December 2015 were used to represent the dry and wet months, respectively. Box and whisker plots were used to show the variation of nighttime  $O_3$ ,  $NO_2$ , NO,  $SO_2$ ,  $PM_{10}$ , temperature, and relative humidity during the dry and wet months. Results suggested that there are variations among the selected variables between dry and wet month with temperature,  $O_3$ ,  $NO_2$ , and  $PM_{10}$  showed higher value during dry month compared to wet month. Meanwhile, relative humidity, NO, and  $SO_2$  showed the opposite result.

**List of Presenter**

<b>Scope: Agriculture and Food Security</b>	
<b>ID</b>	<b>Title</b>
AFS01	Removal of Cadmium, Copper and Nickel in <i>Thynnichthys thynnoides</i> using Chelation Technique
AFS02	Demetallisation of Heavy Metals from Indian Mackerel ( <i>R. kanagurta</i> ) Fish
AFS03	Agriculture Management Strategies Using Simple Logistic Growth Model
AFS04	Feed Formulation of Improved Egg Custard formulation as Feed for <i>Macrobrachium rosenbergii</i> Larvae using Response Surface Methodology (RSM)
AFS05	Physicochemical analysis of medicated ointment enriched with ginger ( <i>Zingiber officinale</i> ) oil
AFS06	Mosquito Repellency Effects of The Essential Oils from <i>Cinnamomum iners</i> Leaves and Barks
AFS07	On the Effects of Cold Temperatures and Solute Concentrations on the Solidification of Gelatine
AFS08	The intention of agro farmers towards the application of Kitosanplus in Kelantan
AFS09	Effect of Encapsulation-Dehydration Cryopreservation on Histological Analysis of Oncidium Golden Anniversary orchid PLBs
AFS10	The evaluation of antibacterial activity of fungal endophyte <i>Ceratobasidium ramicola</i> IBRLCM127 colonizing in rhizomes of medicinal plant, <i>Curcuma mangga</i> Valeton & Zijp
AFS11	Modification of Common Starch into Resistant Starch in Cassava through Optimisation of Physical and Chemical Treatments
AFS12	The response of woody borrharia ( <i>Hedyotis verticillata</i> Lam.) towards curry leaves ( <i>Murraya koenigii</i> (L.) Spreng.) aqueous extract at the vegetative growth
AFS13	Optimisation of Protease-Treated Black Soldier Fly Larvae (BSFL) using Response Surface Methodology (RSM) for Broiler Feed
AFS14	An Assessment of <i>In Vitro</i> Herbicidal Potential of Fungal Metabolites Against Parthenium Weed ( <i>Parthenium hysterophorus</i> L.)
AFS15	Adoption of Post-Harvest Practices Implemented by Fruit Farmers in Johor
AFS16	Effects of Fermentation on the Nutritional Composition, Mineral Content and Physical Characteristics of Banana Leaves
AFS17	Antibacterial properties of natural tropical fruit vinegars against <i>Propionibacterium acnes</i> , <i>Staphylococcus epidermidis</i> and <i>Staphylococcus aureus</i> bacteria
AFS18	Accelerated stability study of <i>Orthosiphon stamineus</i> standardised ethanolic extract and its solid dispersion
AFS19	Molecular Identification of Fungi Isolated from Infected Redclaw Crayfish, <i>Cherax quadricarinatus</i>
AFS21	Antioxidant, Antibacterial and Anti-Diabetic Activities of Stingless Bee Honey from

	Selected Areas in Peninsular Malaysia
AFS23	Characterization of Starch in Two Cultivars of Ubi Gadong ( <i>Dioscorea Hispida Dennst</i> )
AFS24	Effect of molasses level on hardness, storage durability and chemical composition of densified complete feed
AFS25	Phytochemical Screening and Toxicity Activities of <i>Eleiodoxa conferta</i> Plant Extracts
AFS26	Efficacy of Arduino based low-cost resistive sensor in evaluating soil moisture from different soil types collected in the Kelantan-Terengganu plain of Malaysia
AFS27	Comparative Efficacy of Estrus Synchronisation between Modified Herbs and Control Internal Drug Release (CIDR) in Goats
AFS28	Plant Cell and Callus Cultures as an Alternative Source of Bioactive Compounds with Therapeutic Potential Against Coronavirus Disease (COVID-19)

**Scope: Natural Resources and Environmental Sciences**

ID	Title
NRE01	Optimization and Modeling of the Removal of Groundwater Turbidity by Using a Nanomagnetic Adsorbent Composite
NRE02	Efficiency of Coconut Husk as Agricultural Adsorbent in Removal of Chromium and Nickel Ions from Aqueous Solution
NRE03	Preliminary Study on Mineral Identification in Sediment from Sungai Nal, Ulu Sat Forest, Kelantan, Malaysia
NRE04	Challenges in Creating Ecotourism in Rural Area: A Case of RK Eco Farm Business Venturing
NRE05	Paleontological Assessment of Malawa Formation, Padanglampe, Barru Regency, South Sulawesi
NRE06	Adsorption of Methylene Blue onto Iron Oxide Magnetic Nanoparticles Coated with Sugarcane Bagasse
NRE08	Heavy Metals Accumulation in River Water and Sediment Core at Kelantan River Tributaries of Gua Musang, Kelantan
NRE09	Explore the Rural Community Understanding and Practices on Sustainable Lifestyle in Kelantan, Malaysia
NRE10	Landslide Susceptibility Assessment Using Geographic Information System (GIS) Application of Putat Area, Gunungkidul, Yogyakarta, Indonesia
NRE11	Slope Failure Investigation in Weathered Granitic Rock Mass Using Electrical Resistivity Imaging: Case Study in Kg Bukit Selar, Jeli, Kelantan, Malaysia
NRE12	Traditional Processing Method of Smoked <i>Corbicula fluminea</i> (Etak): Case of Etak Vendor in Kelantan, Malaysia.
NRE13	Assessment of metal concentrations in <i>Polymesoda expansa</i> from Sungai Geting, Tumpat, Kelantan and associated health risk
NRE14	Four New Records of Zingiberaceae in Gunung Telapak Burok, Berembun Forest Reserve (Fr), Negeri Sembilan
NRE15	Determination of Microplastics in Sediment of Kelantan and Pattani Bay

NRE16	Trace Elements Concentration in Domestic Groundwater Wells in Northern Parts of Kelantan, Malaysia
NRE17	Kelantan Big Yellow Flood 2014: Statistical Analysis on Relationship between Rainfall Intensity and Water Level
NRE18	Adsorption of COD in wastewater by Activated Carbon from Rice Husk
NRE19	Assessment of Nighttime Ground Level Ozone Concentration in Klang During Wet and Dry Month
NRE20	AgNP <sub>s</sub> - <i>Azolla pinnata</i> Extract as Larvical against <i>Aedes aegypti</i> (Diptera: Culicidae)
NRE21	Short Notes on Traditional Vegetables Consumed by Jahai Tribe in Klewang Village, Royal Belum State Park, Malaysia
NRE22	Survey of People Perception on the Resulting Noise from the Sultan Ismail Petra Airport, Kelantan, Malaysia
NRE23	Wood-based industry in Kelantan
NRE24	Performance of TiO <sub>2</sub> /Al <sub>2</sub> O <sub>3</sub> /carbon nanotube nanocomposite on the photocatalytic degradation of metamifop
NRE26	Analysis of Oil Palm Tree Recognition using Drone-Based Remote Sensing Images
NRE27	Model Selection for Machine Learning Algorithm on Decision Making in Oil and Gas Upstream Project Malaysia
NRE28	Socioeconomic Temiar community in RPS Kemar, Hulu Perak
NRE29	The diversity of small mammals in a mixed fruit orchard at Bukit Bekong limestone massif, Merapoh, Pahang, Malaysia.

**Scope: Recent findings on Bio-Industrial, Materials and Forest Resources Technologies**

ID	Title
BMF01	Influence of Vulcanization System on the Mechanical Properties of CCTO/ENR50 Composite
BMF02	Optimization of torrefied oil palm empty fruit bunch biochar
BMF03	The Effect of Alkaline Treatment on Mechanical Properties of Polylactic Acid Reinforced with Kenaf Fiber Mat Biocomposite
BMF04	Characterization of biosurfactant production by indigenous bacteria from Sungai Dungun estuary, Terengganu by surface activity and emulsification test.
BMF05	Study of Cassava Starch Layer on Zinc Anode by Electrochemistry Method for Zinc-air Fuel Cell System
BMF06	The Study of Mambong Clay Properties Improvement with Calcium Carbonate Addition
BMF07	Dielectric Breakdown Strength and Energy Storage Density of CCTO-ZBS Electroceramic
BMF08	The Effect of Bismuth Addition on Sn-Ag-Cu Lead-Free Solder Properties: A Short Review
BMF09	Optimization of Binding, Washing and Elution Buffer for Development of DNA Isolation Kit
BMF10	Evaluation of long-term storage effects on buccal cell DNA from untreated cards for

	STR profiling
BMF11	Degradation Kinetics of Humic acid in Aqueous Solution by Ozonation Treatment under Different Parameter Conditions
BMF12	Optimal Hypochlorite Bleaching Duration for <i>Sesbania grandiflora</i> Pulp
BMF13	Production and application of thermostable protease 50a as liquid protein stain remover
BMF14	Preliminary Investigation of Delamination Factor for Drilling Wood Plastic Composites (WPC)
BMF15	Study of Beta vulgaris (Beetroot) Extraction in Polar Solvents as Photoabsorber in Dye-Sensitized Solar Cells Application
BMF16	Effects of Styrene Butadiene Rubber on Physical and Mechanical Properties of Kenaf Core Fiber Reinforced Polypropylene Composites
BMF17	Properties of unsaturated polyester-coconut shell composite with titanium oxide addition
BMF18	Recycling of Wood Saw Dust Waste as Green Pore Forming Agent for Porous Ceramic
BMF19	Recycling of Pineapple ( <i>Ananas comosus</i> ) Leaf Agro-waste as One of the Raw Materials for Production of Eco-friendly New Paper
BMF20	Effect of Portions and Particle Sizes on Proximate Properties of Oil Palm Fronds
BMF21	Synthesis of Sodium Alginate Graphene Oxide Thin Film for Adsorption Application
BMF22	Physical properties and soil degradation of PLA/PBAT blends film reinforced with bamboo cellulose
BMF23	Functional group <i>Cinnamomum porrectum</i> wood extractives by Fourier Transform Infrared
BMF24	Effects on MAPP Compatibilizer on Mechanical Properties of Kenaf Core Fibre/Graphene Nanoplatelets reinforced Polypropylene Hybrid Composites
BMF25	Box-Behnken-Design based optimization strategy for alkaline pretreatment of palm oil mill effluent for producing reducing sugar
BMF26	Observation of Arc Behaviour in TIG/MIG Hybrid Welding Process
BMF27	Potential of <i>Cinnamomum iners</i> wood as antimicrobial agent
BMF28	Performance of <i>P. betle</i> extraction as sensitizer in dye-sensitized solar cells (DSSCs)
BMF29	The Comparison between Samarium Doped Nickel Oxide and Samarium Added Nickel Oxide on Dielectric Properties
BMF30	Adsorption of Methylene Blue from Aqueous Solutions Using <i>Parkia speciosa</i> Pod-based Magnetic Biochar
BMF31	Optimization and characterization of chitosan extracted from <i>Mucor rouxii</i>
BMF32	Raw and acetylated Sugarcane Bagasse ( <i>Saccharum officinarum</i> ) and Rubber wood ( <i>Hevea brasiliensis</i> ) in oil spill sorption at Pantai Kuala Perlis
BMF33	Development and Characterization of Nanoemulgel Containing <i>Piper betle</i> Essential Oil as Active Ingredient
BMF34	Effect of alumina addition on physical and structural properties of ceramic porcelain
BMF35	Drying properties of Sentang ( <i>Azadirachta excelsa</i> ) dried under different

	temperatures
BMF36	Preparation & Characterization of Microcrystalline Cellulose from Agriculture Waste
BMF37	Ionizing Radiation as a Non-invasive Treatment for COVID-19 Patients – A Perspective Review
BMF38	Preliminary Study of the Potential Graphene Oxide as Radioactive Clinical Wastewater Adsorbability in Nuclear Medicine
BMF39	Effect Additions Zn on Sn-0.7Cu Lead-Free Solder: A Short Brief
BMF41	Synthesis of Zinc Oxide Nanostructures Growth by the role of pH variation
BMF42	Synthesis of Sodium Alginate Graphene Oxide-Silver Film for Antibacterial Activity
BMF43	Investigation of Chemical Analysis and Physical Properties of Bio-polymer Waste Banana Peel Fibre Composite
BMF44	Effect of ZnFe <sub>2</sub> O <sub>4</sub> Filler Loading on the Morphology and Mechanical Properties of Epoxidised Natural Rubber 25 (ENR 25)

### Conference Abstracts

## AFS01: Removal of Cadmium, Copper and Nickel in *Thynnichthys thynnoides* using Chelation Technique

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**Abstract.** *Thynnichthys thynnoides* is a freshwater fish that widely consumed by Malaysian society. Due to increasing in industrial activities, the presence of heavy metals in *T.thynnoides* has become a risk that can affect human health and environment. This research was studied on efficiency of chelation technique to remove heavy metals cadmium (Cd), copper (Cu) and nickel (Ni) from *T.thynnoides*. The treatment for chelation technique was observed under optimized conditions of trisodium citrate concentration of 400 ppm for five hours treatment at temperature of  $29.50\pm0.50^{\circ}\text{C}$ . Initially the concentration of Cd, Cu and Ni in *T.thynnoides* were  $0.74 \mu\text{g/g}$ ,  $3.18 \mu\text{g/g}$  and  $2.95 \mu\text{g/g}$  and successfully removed to 35.80%, 65.22% and 61.17% respectively.

## AFS02: Demetallisation of Heavy Metals from Indian Mackerel (*R. kanagurta*) Fish

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**Abstract.** Fish especially Indian Mackerel (*R. kanagurta*) provides protein, essential fatty acids and essential metals that are needed in the human diet, however high concentration of essential metals will cause adverse health effect towards human. Thus, the removal of heavy metals such as lead (Pb) and copper (Cu) from *R. kanagurta* (Indian mackerel) by using different types of natural waste adsorbents was implemented in this study. Initial concentration of heavy metals (Pb, Cu) in Indian mackerel (*R. kanagurta*) fish were above the permissible limit set by World Health Organization and Malaysia Food Regulation 1985. Thus, in this study, corncob and eggshell were applied as natural waste adsorbents to enhance the demetallisation process. The result showed only the corncob able to efficiently remove all the heavy metals in Indian Mackerel (*R. kanagurta*) up to 78.31% compared to the eggshell, which yielded about 71.34%. Besides, this study proved that using corncob; the Cd metal found to be wholly removed from (*R. kanagurta*) which met the permissible limit set by WHO and MFR.

## AFS03: Agriculture Management Strategies Using Simple Logistic Growth Model

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Abstract. Farm management involves the development of long-term strategies to increase the profitability and competitiveness of its agricultural business. In recent years, mathematical models have been extended to the agriculture sector as a decision-making tool to ensure continuous and optimum supply. One of the well-known mathematical functions by Pierre François Verhulst, the Logistic function, has been widely used in modelling population growth rates. Many processes in biology, ecology, and other areas follow this S-shaped logistic growth. This paper explores the application of a simple logistic growth model for agriculture management strategies. Two applications illustrated here; vegetative growth response of banana to foliar fertiliser and growth of grey mould disease infection on different drying tomato coating period. The model presented here quantitatively estimates the effectiveness of the procedure used.

## AFS04: Feed Formulation of Improved Egg Custard formulation as Feed for *Macrobrachium rosenbergii* Larvae using Response Surface Methodology (RSM)

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**Abstract.** Giant Freshwater Prawn (*Macrobrachium rosenbergii*) is crustacean species that can naturally be found in Malaysia. Developing alternative feed for *M. rosenbergii* larvae in order to lower the feed cost and improve growth rate were evaluated earlier. The aim of this study was to analyse the nutritive value of *M. rosenbergii* larvae formulated feed improved using chicken egg shell, *Curcuma longa* and *Moringa oleifera*. There were 13 different feed formulations by using Response Surface Methodology (RSM) in Design Expert Software version 10 which *M. oleifera* and *C. longa* were the variables coded while egg custard and eggshells were the based feed of the formulation. Proximate components were analysed to observe the nutrient composition of the formulated feed and compared with the nutrient requirement of *M. rosenbergii* larvae which were protein, lipid, mineral and carbohydrates requirement. The result by Design Expert Software version 10 revealed that *M. oleifera* and *C. longa* gave the significant effect to protein and mineral requirement but not to lipid and carbohydrate requirement. The software also suggested the optimised formulation that near to the nutrient requirement of *M. rosenbergii* was Formulation 9, suggested percentage of 17.10% *M. oleifera* and 1% *C. longa* with 0.738 desirability.

### AFS05: Physicochemical analysis of medicated ointment enriched with ginger (*Zingiber officinale*) oil

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**Abstract.** *Zingiber officinale* rhizome has been revered as a culinary and medicinal spice in many traditional cultures. The essential oil from this plant has been proven to cure diseases of fighting infections by decreasing cholesterol and enhancing weight loss. Therefore, the benefits of this plant must be fully utilised either using raw or ginger based-products. Thus, this study aims to formulate herbal ointments with different concentration of ginger oil as well as to investigate the effect of varying concentration of oil on the ointment properties. In this work, five different ointment formulations were evaluated with various ratios of ginger to virgin coconut oil. All formulated semi-solid ointments were tested for physicochemical properties including hardness, viscosity, pH and turbidity. In this study, the properties of the developed ointment were compared with the commercial product as a benchmark. The developed ointment showed a good result of pH values where all ointments are ranging from 6.03 to 6.19. The ratio of 5:95 of ginger to virgin coconut oil was the best formulation where the tested properties were almost similar to the commercial ointment. Accordingly, the developed ointment in this study can be considered as suitable to be used to the external human body such as chest and nose to heal and protect the respiratory problems.

## AFS06: Mosquito Repellency Effects of The Essential Oils from *Cinnamomum iners* Leaves and Barks

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**Abstract.** Synthetic mosquito repellents containing DEET (N, N-diethyl-3-methylbenzamide), DEPA (N, N-diethyl phenylacetamide), permethrin and deltamethrin as active components are known to be the most effective repellents. However, these types of repellents have contributed to numerous toxic effects on not only the environment, but also non-target organisms. The use of natural products such as essential oils is reported as a safe alternative. To date, the study on repellency activities against mosquitoes using Malaysian plants is rare. In the present study, essential oils from leaves and barks of *Cinnamomum iners* have been reported to show repellency activity, and the whole plant have been used by the local communities to repel mosquitoes and other blood-sucking insects. Repellency assay of the oils against *Aedes aegypti* was conducted using the percentage repellency bioassay method at three different concentrations: 1%, 5% and 10%. The results showed that the essential oils from barks had a significant percentage repellency ( $p<0.05$ ) when compared to essential oils from leaves. Two main compounds were identified using the GC-MS: 1-isopropenyl-4-methyl-1,2-cyclohexanediol and 2-octen-1-ol,3,7-dimethyl (geraniol) from the bark and leaf essential oils, respectively. The essential oils demonstrated promising insect repellency activity which has the potential for further development into formulations that may serve as alternatives to DEET or be used as natural bioinsecticides to kill mosquitoes.

## AFS07: On the Effects of Cold Temperatures and Solute Concentrations on the Solidification of Gelatine

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**Abstract.** The solidification phenomenon of gelatine is important in many applications especially as an ingredient in certain food products that requires particular textural characteristics. This work was aimed to study the effects of temperatures and solute concentrations on solidification kinetics of gelatine by using Avrami kinetic phase change model analyses. The extent of solidification/gelation was measured gravimetrically and the sigmoid solidification curves were able to be constructed. The Avrami plots were managed to be produced and the Avrami exponents, n, and the rate constant, K, were extracted from the linear equations obtained. It was found that, lowering the cooling temperatures lead to higher K and reduced n values depicting faster rate of solidification with smaller dimensions. It was also observed that increasing the solute concentration lead to larger K and lower n values portraying that solidification rates was increased, and higher dimensions of solids were achieved.

## AFS08: The intention of agro farmers towards the application of Kitosanplus in Kelantan

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**Abstract.** The Kitosanplus is an active molecule that finds many possible applications in agriculture to reduce or replace more environmentally damaging chemical pesticides. Thus, Kitosanplus could represent an innovative eco-friendly strategy for managing plant diseases and replacing copper. The effectiveness of Kitosanplus in protecting plants from biotic stresses by direct or indirect actions, but Kitosanplus interaction with pathogens and plants are still not fully understood. This study is to determine the agro farmer intention towards the application of Kitosanplus and the relationship between age and perceived behaviour of agro farmers towards the application of Kitosanplus. The location selected is in Kampung Bukit Jawa, Selising, Pasir Puteh. Most popular agriculture activities in this area are paddy plantation. The descriptive analysis and Pearson correlation analysis were used to analyze the data. The respondents indicated that Kitosanplus is an excellent organic fertilizer, and their application of chemical pesticides do not harm the crop. Instead, the attitude, perceived behaviour and social norm of agro farmers show they have a weak intention towards using Kitosanplus in their plantation.

## AFS09: Effect of Encapsulation-Dehydration Cryopreservation on Histological Analysis of *Oncidium Golden Anniversary* orchid PLBs

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**Abstract.** *Oncidium Golden Anniversary* is a hybrid orchid that has been grown as cut flowers, potted plant and is valued for its attractive flower shapes and colours. New hybrid orchids are difficult to maintain and cultivate easily; therefore, cryopreservation technology has been applied to conserve the orchid plant genetic resources. This study aims to evaluate the impact of encapsulation-dehydration as one of the cryopreservation techniques on histological analysis of *Oncidium Golden Anniversary* orchid PLBs using stock, cryopreserved and non-cryopreserved PLBs. Results from the histological analysis indicated that the degree of plasmolysis due to dehydration and ruptured cells after freezing were the main factors affecting the viability of PLBs.

**AFS10: The evaluation of antibacterial activity of fungal endophyte *Ceratobasidium ramicola* IBRLCM127 colonizing in rhizomes of medicinal plant, *Curcuma mangga* Valeton & Zijp**Muazzam, K.A.A.R. <sup>1\*</sup>, Darah, I.<sup>2</sup><sup>1</sup>Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Kelantan, Malaysia.<sup>2</sup>Industrial Biotechnology Research Laboratory, School of Biological Sciences, Universiti Sains Malaysia, Penang, Malaysia.

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**Abstract.** The current study was conducted to evaluate the antibacterial activity of fungal endophyte isolate, *Ceratobasidium ramicola* IBRLCM127 colonizing in rhizomes of a medicinal plant, *Curcuma mangga* Valeton & Zijp. Primary screening of its antibacterial potential was performed by employing agar plug assay, and the results revealed that the fungal isolate was capable to inhibit all the 11 test bacteria used in the study. All four Gram-positive bacteria (*Staphylococcus aureus*, *Bacillus cereus*, *Bacillus subtilis* and Methicillin-resistant *Staphylococcus aureus* ATCC 33591) showed the highest susceptibility degree to the fungal isolate with the size of inhibition zones of  $\geq 21$  mm. As for Gram-negative bacteria, 6 out of 7 tested bacteria (*Proteus mirabilis*, *Yersinia enterocolitica*, *Escherichia coli* IBRL 0157, *Salmonella typhimurium*, *Klebsiella pneumoniae* ATCC 13883 and *Acinetobacter antratus*) were the most susceptible species with inhibition zone size of  $\geq 21$  mm, whilst only *Pseudomonas aeruginosa* ATCC 27844 less susceptible to fungal isolate with the size of inhibition zone of 11 to  $\leq 20$  mm. Secondary screening using disc diffusion assay revealed that fungal ethyl acetate extract derived from fermentative broth (extracellular) demonstrated better potential of antibacterial activity compared to the methanol extract derived from fungal biomass (intracellular). The results showed that 8 out of 11 test bacteria were susceptible to fungal ethyl acetate extract with the diameter of inhibition zone ranging from  $8.0 \pm 0.0$  mm to  $13.0 \pm 0.0$  mm and  $8.3 \pm 0.6$  mm to  $11.7 \pm 0.6$  mm in Gram-positive and Gram-negative bacteria, respectively. Contradictorily, methanol extract only capable to inhibit *S. aureus* with inhibition zone of  $8.3 \pm 0.6$  mm in diameter. The minimal inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values of ethyl acetate extract towards Gram-positive bacteria were both in the range of 125.00 to 500.00  $\mu\text{g}/\text{mL}$ , whilst for Gram-negative bacteria were in the range of 125.00 to 250.00 and 250.00 to 500.00  $\mu\text{g}/\text{mL}$ , respectively. On the other hand, the MIC and MBC values for methanol extract towards Gram-positive bacteria were 250.00 and 500.00  $\mu\text{g}/\text{mL}$ , respectively. Both ethyl acetate and methanol extracts exerted bactericidal effects on test bacteria with the ratio of MBC/MIC  $\leq 4$ . The detail of the ethyl acetate extract effects on the bacterial cells was observed using scanning electron microscopy (SEM), in which the micrographs obtained from SEM revealed that the severity of the cell damages

caused by the extract were beyond repair, and the mode of action could possibly due to the disruption in the cell wall biosynthesis and cell membrane permeability.

## AFS11: Modification of Common Starch into Resistant Starch in Cassava through Optimisation of Physical and Chemical Treatments

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**Abstract.** This study found an optimised condition in modifying common starch into resistant starch content by conducting crystallinity index analysis using X-Ray Diffraction (XRD). The methodology involved the preparation of cassava sample, optimisation of parameters using Response Surface Methodology (RSM) and crystallinity index analysis using X-Ray Diffractometers. The results obtained from the analysis were recorded in RSM to observe the suggested and optimised parameters to modify the resistant starch content. RSM proved that the addition of oil had given the most significant effect to achieve the optimised crystallinity index, followed by the autoclave duration and the cooling duration, which gave the least significant effect towards the treatment.

## AFS12: The response of woody borreria (*Hedyotis verticillata* Lam.) towards curry leaves (*Murraya koenigii* (L.) Spreng.) aqueous extract at the vegetative growth

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**Abstract.** The massive used of synthetic chemical herbicides in crop production to meet the increasing demand had cause negative impacts on the environment and ecosystem. Allelopathy approach of potential crops is a suitable alternative that should be explored to have sustainable weed management. The present study was conducted to determine the phytotoxic effect of aqueous curry leaves (*Murraya koenigii* (L.) Spreng.) extract on the emergence and seedling growth of the bioassay species, woody borreria (*Hedyotis verticillata* Lam.) under laboratory and nursery condition. The seed and seedling of bioassay species were treated with different concentration of aqueous curry leaves extract at 0, 20, 40, 60, 80 and 100g/L (laboratory) and 0, 50, 100, 150, 200 and 250g/L (nursery). The results showed that the aqueous curry leaves extract possesses a significant inhibition on seed emergence, shoot fresh weight and radicle length of *H. verticillata* at 100g/L concentration, where it reduced by almost 100% when applied as pre-emergence under laboratory condition. Meanwhile, the curry leaves extract at highest concentration of 250g/L significantly reduced the weed shoot fresh weight by 31% as compared to control and 50g/L concentration when treated at soil surface as post-emergence under nursery condition. Conversely, there is insignificant reduction in shoot height and root length of *H. verticillata* across all the applicable rates. These results suggest that curry leaves can be a good source to develop pre-emergence natural herbicide for weed management which is also eco-friendly for the environment and human beings.

## AFS13: Optimisation of Protease-Treated Black Soldier Fly Larvae (BSFL) using Response Surface Methodology (RSM) for Broiler Feed

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**Abstract.** *Hermetia illucens* or black soldier fly larvae (BSFL) have recently been used as an alternative source of protein in the processing of feed for various types of animals. Monogastric animals such as broiler, however, unable to completely consume all nutrient sources upon ingestion of the meal. The protease was then developed and used to treat the BSFL so that protein can be converted into amino acids, thereby enhancing the absorption of nutrients from broiler. In this analysis, Response Surface Methodology (RSM) was used to investigate the optimum condition in obtaining the highest decrease in protein content (%) of the BSFL. A Central Composite Model (CCD) model with three variables: water volume (5-8 mL), protease volume (100-300  $\mu$ L) and incubation time (30-90 min) was used to investigate the response variable, which was a decrease in the protein content (%). At the end of this experiment, optimum conditions were established as 5 mL of water, 100  $\mu$ L of protease and 30 minutes of incubation time to treat BSFL to achieve a decrease in protein content of 10.5266%.

## AFS14: An Assessment of *In Vitro* Herbicidal Potential of Fungal Metabolites Against Parthenium Weed (*Parthenium hysterophorus* L.)

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**Abstract.** Weed control by herbicide is issued for environmental problems and the emergence of resistance herbicide; thus, researchers are looking for alternative methods including bioherbicide. Hence, this study aims to isolate the pathogenic fungi that associated with parthenium weed (a significant noxious weed as a threat to agriculture) and then extract the fungal mycelia for application on seed germination inhibition to be potential as bioherbicide to control parthenium. In this study, the fungus of *Aspergillus sp.* and *Valsa mali* were isolated from parthenium leaf and their mycelium were extracted to isolate secondary metabolites using ethyl acetate solvent from the culture of potato dextrose broth (PDB) and malt extract broth (MEB) mediums. In vitro, both fungal metabolites were applied on seeds in plate assay experiment. Original and diluted culture filtrates of *Aspergillus sp.* inhibited the seed germination by 51% and 20% in PDB and 48% and 39% in MEB respectively, over control. Similarly, Original and diluted culture filtrates of *Valsa mali* significantly suppressed the seed germination by 52% and 24% in PDB and 62% and 33% in MEB respectively, over control. Therefore, it indicated that fermented culture mycelia metabolites from these fungi able to inhibit seed germination efficiently and can be potentially used as bioherbicide to control parthenium weed.

## AFS15: Adoption of Post-Harvest Practices Implemented by Fruit Farmers in Johor

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**Abstract.** The post-harvest practice is important to maintain and prolong the shelf life of fruits and vegetable. However, farmer's adoption towards agriculture practices is still low. This research aims to determine post-harvest adoption among fruit farmers in Johor. The study employs a Unified Theory of Acceptance and Use of Technology (UTAUT) and Theory Planned Behaviour (TPB) to evaluate the factors that influencing post-harvest practice adoption. 150 fruit farmers in Johor were chosen by using a simple random sampling technique. This study indicates that the level of performance expectations ( $M=4.27$ ), effort expectations ( $M=4.36$ ), facilitating conditions ( $M=3.95$ ), attitude ( $M=4.09$ ) and post-harvest practices adoption ( $M=4.33$ ) have a high mean score. This study emphasises the importance of post-harvest practices adoption in improving and maintaining the quality of fruits. Post-harvest practices adoption could help to enhance the per capita availability of fruits because the adoption of post-harvest practises and technologies will affect the reduction in fruits losses, thus increasing the availability of fruits products.

## AFS16: Effects of Fermentation on the Nutritional Composition, Mineral Content and Physical Characteristics of Banana Leaves

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**Abstract.** Banana leaves are one of the most abundant agriculture wastes in Malaysia. However, it is not suitable to be given directly to ruminant as feed and need to be pre-treated. Therefore, the objectives of this study were to evaluate the nutritional composition of banana leaves fermented with different additives including molasses, effective microorganisms (EM) and urea on the nutritional composition, mineral content and physical characteristics. Samples of banana leaves were divided into three treatment groups; control (no additives), treatment 1 (3% of molasses + 3% EM + 0.5% urea) and treatment 2 (5% of molasses + 4% EM + 1% urea). Samples were fermented for 21 and 35 days. The pH value, nutritional composition, mineral content and physical characteristics were determined and subjected to analysis of variance. There is significance different ( $P<0.05$ ) in pH value for treated samples fermented for 35 days. Moisture and crude protein content were significantly higher ( $P<0.05$ ) for both treatment groups, fermented for 21 and 35 days. The aroma for treated samples were pleasantly acidic compared to the control. In conclusion, fermentation for 21 days with molasses, EM and urea improves the nutritional composition of banana leaves, therefore it can be considered as an appropriate pre-treatment method to produce an alternative material for animal feed.

## AFS17: Antibacterial properties of natural tropical fruit vinegars against *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Staphylococcus aureus* bacteria

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**Abstract.** Various researchers have found that vinegar has antibacterial effect on different types of pathogenic bacteria which make it useful for a varieties of application in medical, food preservation and as cosmetic ingredient. Many new emerging tropical fruits vinegars were not tested for antibacterial properties especially for skin and acne causing treatment. Therefore, this study aim is to test several tropical fruits vinegar in order to determine their ability against skin and acne causing bacteria ultimately could lead to application of effective vinegars in personal care and cosmetic products. Tropical fruit vinegars such as pineapple, mango, coconut, dokong and rambutan vinegars were tested for the presence of acetic acid, titratable acid, pH and anti-microbial properties against acne causing bacteria *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Staphylococcus aureus*. The presence of acetic acid content in the vinegar samples was determined using HPLC analysis against 100% glacial acetic acid standard and shown to be between 6.444, 6.959, 5.832, 6.484 and 6.373 min. Titratable acidity range lied between  $1.14 \pm 0.06\%$  to  $3.26 \pm 0.09\%$  of which rambutan vinegar showing highest acetic acid content while pineapple vinegar giving the lowest value. The pH value among five vinegar samples fell within the range of 3.06 to 3.65 of which pineapple vinegar has the lowest value and coconut vinegar had the highest pH. Antimicrobial properties of different tropical fruit vinegar samples with different percentage of acetic acid content in samples comprised of 0.5%, 1.0%, 1.5%, 2.0%, 2.5% and 3.0% were determined by antimicrobial disk diffusion assay on *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Staphylococcus aureus*. Clear zone of inhibition could be observed at 1% acetic acid in all samples, ranging from 7.8 mm to 8.6 mm against main acne causative bacteria, *Propionibacterium acnes* indicating that the vinegars has antibacterial properties against the bacterium.

## AFS18: Accelerated stability study of *Orthosiphon stamineus* standardised ethanolic extract and its solid dispersion

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**Abstract.** The objective of the present study is to develop accelerated stability of *Orthosiphon stamineus* standardised ethanolic extract (SEE) and its solid dispersion (ESD). The stability study of SEE and ESD has been performed using high-performance liquid chromatography (HPLC) and attenuated total reflection Fourier transform infrared spectroscopy (ATR-FTIR) analyses. The spectroscopic datasets of ESD were applied to the principal component analysis (PCA) to extract the maximum information of the ATR-FTIR spectra. SEE and ESD were stored at three different temperatures with two different humidity conditions (30 °C/75% RH, 40 °C/75% RH and 60 °C/85% RH) for six months. Overall, the degradation of marker compounds; rosmarinic acid (RA), 3'-hydroxy-5, 6, 7, 4'-tetramethoxyflavone (TMF), sinensetin (SIN) and eupatorin (EUP) at high temperature (60 °C/85% RH) was higher compared to low temperature (30 °C/75% RH) for both samples. Moreover, the degradation of RA, TMF, SIN and EUP in ESD was slower compared to SEE. The deterioration of marker compounds for both samples followed the first-order reaction kinetics. The shelf life of SEE and ESD is based on the estimated shelf life RA, TMF, SIN, and EUP present in the samples. The shelf life of RA, TMF, SIN, and EUP in ESD were significantly enhanced ( $p < 0.001$ ) compared to the same markers in SEE with EUP was showing the highest shelf life (15 months), while RA showed the lowest shelf life (7 months) when stored at the temperature below 30 °C. The shelf life of all marker compounds in SEE was less than two months when stored at the same temperature (below 30 °C). Based on ATR-FTIR fingerprinting datasets analysed with PCA, ESD kept at 30 °C/75% RH were still preserved of its chemical properties, which indicates that low temperature is better to keep the formulation.

## AFS19: Molecular Identification of Fungi Isolated from Infected Redclaw Crayfish, *Cherax quadricarinatus*

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**Abstract.** In Malaysia, the redclaw crayfish, *Cherax quadricarinatus* is widely known as freshwater lobster due to its lobster-like appearance and habitat. Even though the exact year in which the redclaw species was introduced into the country is unknown, commercial scale culturing activity of this species has been in record since 2003 in the southern part of Peninsular Malaysia. Crayfish plague is a water mould caused by an oomycete *Aphanomyces astaci* which contributes for high mortality rate in indigenous crayfish species throughout Europe. However, the effects of the plague can vary among species, regions and local populations. Traditionally, the crayfish plague agent was seen to have only the freshwater crayfish as hosts. The identity of the pathogen is only assumption and not confirmed by research because of difficulties in cultivation and ambiguous morphological characteristics. In this study, we demonstrate the use of ITS86F and ITS4 primer pair to amplify the ITS2 region in the isolated fungi from infected *C. quadricarinatus*. The primer aligned with sequences from a range of fungal species within the Ascomycota and Basidiomycota clades. A total of 14 fungi were isolated from the infected *C. quadricarinatus*. With the constructed neighbour-joining phylogenetic tree, 7 of the ITS2 sequences were identified to most closely related to 9 fungal species within the Ascomycota clade, 5 sequences in Basidiomycota clade and 2 sequences were closely related to endophyte culture collection. Results show fungi other than *A. astaci*, could cause crayfish plague. These isolated fungi might be linked to the *A. astaci*. Genetic analysis provides easy identification of the large majority of fungi at the species level, regardless when little DNA is available. Moreover, there are very low quantities of the pathogen DNA in the sample that are detectable by some of the molecular methods.

## AFS21: Antioxidant, Antibacterial and Anti-Diabetic Activities of Stingless Bee Honey from Selected Areas in Peninsular Malaysia

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**Abstract.** Stingless bee honey is one of the Malaysian honeys that has many benefits especially medically, due to the presence of enormous active phytochemical compounds. The active compounds in the honey vary depending on its geographical origin, especially the environmental conditions of the plant nectar. This study aims to analyze and compare the antioxidant, antibacterial and antidiabetic activities of stingless bee honey from different areas in Malaysia. The sample stingless bees' honeys were obtained from Kulim, Kedah (honey sample 1), Tanjung Malim, Perak (honey sample 2) and Kuala Selangor, Selangor (honey sample 3). The methods used for the analysis were DPPH free radical scavenging, Kirby-Bauer disc diffusion assay and alpha-amylase inhibition assay for the respective activities. An analysis of gallic acid content of the stingless bee's honeys were also performed using high-performance-liquid-chromatography (HPLC). Tukey's multiple comparison test was used for statistical analysis. The results indicated that honey sample 2 exhibited the highest antioxidant activity with IC<sub>50</sub> values of 89.04 ± 0.83 mg/mL, whilst honey sample 3 showed the highest inhibition capability on both *E. coli* and *S. aureus* at 16.33 ± 3.06 mm and 22.67 ± 0.58 mm respectively as compared to the other honey samples. Honey sample 3 also showed the highest inhibition against alpha amylase with an IC<sub>50</sub> value of at 15.80 ug/mL. The gallic acid content of honey sample 3 also the highest at 39.79 ug/mL. As a conclusion, honey sample 3 originated from Kuala Selangor, Selangor has better antibacterial and anti-alpha amylase activities. Meanwhile, honey sample 2 originated from Tanjung Malim, Perak has better antioxidant properties.

## AFS23: Characterization of Starch in Two Cultivars of Ubi Gadong (*Dioscorea hispida Dennst*)

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**Abstract.** The ubi gadong or *Dioscorea hispida Dennst* (*D. hispida*) is a carbohydrate plant that contain about 75.2 % in the form of starch in its tuber. In this study, two cultivars of *D. hispida* namely yellow tuber or ‘gadong pulut’ and white tuber or ‘gadong beras’ were identified. The starch content in two cultivars of *D. hispida* was extracted and analyse their chemical and physical properties by comparing their thermal analysis, granule morphology and others physicochemical properties. Observation on the texture of starch extract from yellow tuber shows that starch in yellow tuber is stickier and requires a long time for the drying process compared to the white tuber. The colour parameter of tuber was measured the yellowness colour (b\*) using choma meter showed the yellow tuber is 52.88 more yellowish than white tuber which is about 34.16. Results showed, for both starch samples solubility and swelling power gradually increased with the increasing of temperature ranging from 75°C to 95°C. SEM analysis of the starch granules indicate the polyhedral shapes with size between 1.3µm to 4.3µm. The results obtained from DSC showed the both starches transition temperature (To, Tp and Tc) were in range 74.53 – 74.58°C, 79.34 – 79.39°C and 83.35 – 83.40°C while, the enthalpy of gelatinization ( $\Delta H_{gel}$ ) was in range 4.11 – 4.16 Jg<sup>-1</sup>.

## AFS24: Effect of molasses level on hardness, storage durability and chemical composition of densified complete feed

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**Abstract.** Densified complete feed (DCF) is a formulated feed that produces through the blending of feedstuffs in the desired proportion to provide balanced nutrition for animals. The DCF gives a good impact on animal performance and reduce the feed cost for farmers. However, there is lacking of DCF production for goat consumption. Therefore, the aim of this study was to investigate the effects of different levels of molasses as binder on hardness, durability and chemical composition of DCF. In preparation of DCF, the locally available feed ingredients such as oil palm frond were collected and the making process of complete feed blocks was referred. The DCF was made manually including 3% and 6% molasses level, and then prepared to fulfil the nutrient requirement of growing goats as recommended by National Research Council. The durability was carried out on days 0, 7, 14 and 28 by comparing the hardness, dry matter (DM), and colony forming unit (CFU) of each molasses rate of DCF. Both molasses of DCF had shown a decreasing trend on durability from days 0 to 28. Regardless of durability, the DCF with 3% molasses had greater hardness ( $2.1 \text{ kg/cm}^2$ ), higher DM content (93.2%) and lower CFU count ( $1.3 \times 10^4 \text{ CFU ml}^{-1}$ ) than that of 6% molasses rate of DCF. Both different rates of molasses of DCF had no significant ( $p>0.05$ ) effect on crude protein, crude fibre, ether extract and ash contents. The present study suggests that 3% molasses of DCF is preferable in terms of longer storage, while 6% molasses of DCF may be more palatable for the ruminants.

## AFS25: Phytochemical Screening and Toxicity Activities of *Eleiodoxa conferta* Plant Extracts

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**Abstract.** Researchers are actively exploring the locally available fruits that may use for therapeutic remedies. *Eleiodoxa conferta* is an underutilized Malaysian fruit. This study was conducted to examine bioactive compounds and toxicity activities of different parts of *E. conferta* using 100% ethanol, 50% ethanol, and water for extraction. Results showed that Ethanol (50% v/v) was the best extraction solvent. The highest and lowest yield shown in the flesh extract and seed extract at 39.247% and 4.89%, respectively. The peel of *E. conferta* always showed higher Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) as compared to other parts of the plant. Phytochemical compounds such as flavonoids, phenol, tannin, to name a few, were abundantly present in most extractions. The toxicity screening revealed that the toxicity level was high in the seed part of *E. conferta* while low toxicity shown in the flesh of the fruit. Overall, this fruit is rich in bioactivities. Further studies can be done to uncover its true potential application, especially the application of those bioactive components as antimicrobial agents in preserving food.

## AFS26: Efficacy of Arduino based low-cost resistive sensor in evaluating soil moisture from different soil types collected in the Kelantan-Terengganu plain of Malaysia

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**Abstract.** This paper presents an experimental study on the effectiveness of using Arduino based low-cost resistive sensors to measure soil moisture content from five different soil types. In this experiment, the soil samples were filled in the vases and arranged in a completely randomized design with three replications. The soil samples from the vases were taken for soil moisture evaluation for 28 days. The experiment began with soil samples at fully saturation condition followed by field capacity condition and finished at the dry condition. The sensors used in this study were calibrated with a gravimetric method by using an oven. The results reveal that the Arduino based low-cost resistive sensor is highly capable of measuring suitable soil moisture content of fine sand, loamy soil, and sandy clay loam soil types. However, this type of sensor has poor performance for sandy loam and clay loam soil types due to the high content of organic matter and low bulk density. The performance of this sensor on peat and wetland soil can be further enhanced by using a distinctively developed empirical formula. The system developed in this work allows employing large-scale soil moisture measurement network for irrigation monitoring and controlling in future research due to its low-cost and great simplicity.

## AFS27: Comparative Efficacy of Estrus Synchronisation between Modified Herbs and Control Internal Drug Release (CIDR) in Goats

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**Abstract.** Estrus synchronisation promises proper breeding management where manipulation of the estrus cycle in animals was achieved at the same time. Control Internal Drug Release (CIDR) is a common practice and commercially used to obtain estrus in the female goats. Conversely, this method is expensive with several limitations. Alternatively, specific herbs were proved to have beneficial effects and therapeutic properties towards animals. Thus, the objective of the present study was to analyse the efficacy of estrus synchronisation using herbs and CIDR in goats. The female goats were divided randomly into two groups, (A) CIDR (n=4) and (B) herbs (n=4). The female goats were inserted with CIDR application devices, feeding with herbs and allow to response to estrus naturally for group (A) and (B) respectively. The estrus signs were observed four times daily (0900, 1200, 1500 and 1800 hours, respectively) after CIDR withdrawal (n=14 days) and feeding herbs (n=3 days) respectively. The results indicated that estrus detection was higher in herbs compared to CIDR (80.56% vs 77.78%, respectively) while conception and pregnancy rate was 100%, for both groups. Pregnancy was confirmed with ultrasound scanning at the second trimester of gestation. The onset of estrus was earlier in the females treated with CIDR than those in herbs (22.15h vs 24.4h, respectively). The maximum estrus duration in this study was recorded at 57.5h and 56h for CIDR and herbs, respectively. The estrus response for CIDR and herbs were higher in the morning 100%, for both compared to evening (66.67% vs 83.3%, respectively). In conclusion, the current study suggests that the utilization of herbs for estrus synchronisation is possible because both treatments gave similar result.

## AFS28: Plant Cell and Callus Cultures as an Alternative Source of Bioactive Compounds with Therapeutic Potential Against Coronavirus Disease (COVID-19)

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**Abstract.** Plant cell and callus cultures are important tools for the mass production of bioactive compounds (secondary metabolites) from plants cell or tissue under a controlled environment. From past few decades the bioactive compounds assumed to play a key role in the development of novel drugs against several viral diseases, causing serious threat and even death to thousands of human lives. The recent, pandemic coronavirus disease (COVID-19) outbreak upraised the importance of developing an effective therapeutic drug or vaccine as quick as possible to treat or prevent further spread. The research studies are in progress to find coronavirus therapeutics among existing antiviral drugs. Of these drugs, hydroxychloroquine and azithromycin have emerged as frontrunners and shown early promising results in treating COVID-19 in both *in vitro* and *in vivo* studies. However, these drugs have adverse side-effects and they became ineffectual due to eventual drug-resistance. Research is continuing by several means in search of potential therapeutics with minimal side-effects. The natural bioactive compounds from a plant sources generally have minimal toxicity can exert inhibitory capacity against coronavirus is of great interest. Up to now, various phytochemical compounds, namely arctiin, scutellarin, forsythoside, kaempferol, secoxyloganin, nicotianamine, saikosaponin, reported to have anti-SARS-CoV-2 activity. The mechanism of action appears to be inhibiting virus replication and blocking viral infection. Due to time taking cultivation, expensive extraction and isolation of bioactive constituents, it is essential to develop alternative techniques for the mass production of bioactive compounds in a less timeframe using *in vitro* methods of plant cell and callus culture methods. In the present work, we highlighted the importance of modern biotechnological approaches including cell or tissue or callus culture methods and plant-based antiviral compounds currently being tested to treat novel coronavirus.

## NRE01: Optimization and Modeling of the Removal of Groundwater Turbidity by Using a Nanomagnetic Adsorbent Composite

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**Abstract.** Groundwater pollution with turbidity problem is a matter of concern because at least 50% of the global population consumes groundwater. The presence of suspended particles with clay, silt, and organic and inorganic matter is the primary cause of water turbidity. A nanomagnetic adsorption composite was adopted in this study to purify turbid polluted groundwater. A three-level full factorial design was used to investigate five factors: dosage of adsorbent (0.02, 0.04, and 0.06 g), time of agitation (15, 30, and 60 min), rate of adsorption (150, 200, and 250 rpm), size of adsorbent (<45  $\mu\text{m}$  and >300  $\mu\text{m}$ ), and initial concentration of sample (<21.3 and <48.8 nephelometric turbidity units [NTU]). The optimum parameters were determined to be 0.02 g, 249 rpm, 46 min, <45  $\mu\text{m}$ , and <21.3 NTU, achieving 94.13% turbidity removal efficiency. The turbidity of purified groundwater complies with the National Drinking Water Quality Standard of the Ministry of Health of Malaysia.

### NRE02: Efficiency of Coconut Husk as Agricultural Adsorbent in Removal of Chromium and Nickel Ions from Aqueous Solution

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**Abstract.** Coconut husk is categorized as the agriculture waste product that can act as biosorbent material. In this study, coconut husk was used as an adsorbent to investigate the ability of this agricultural by-product to adsorb nickel and chromium. In this experiment, nickel and chromium ion were adsorbed in batch adsorption experiment using different parameters; effect of contact time (30, 60, 90, 120, 150) minutes, pH (3, 5, 7, 9, 11), adsorbent dosage (1.0, 1.5, 2.0, 2.5, 3.0) g. An optimum level of adsorption for chromium by using raw coconut husk occurred at 90 minutes of contact time, pH 3, and dosage of adsorbent of 1.5g. Meanwhile, optimum adsorption of nickel occurred at contact time of 90 minutes, with pH 5, adsorbent dosage of 1.5g. Statistical analysis showed that there was a significant mean difference between percent removal of chromium (Cr) and nickel (Ni). There was a significant mean difference between dosage and percent removal of chromium ions. In conclusion, both raw and acid-treated coconut husk can adsorb nickel and chromium ions from aqueous solutions.

## NRE03: Preliminary Study on Mineral Identification in Sediment from Sungai Nal, Ulu Sat Forest, Kelantan, Malaysia

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Abstract. Ulu Sat Forest, Kelantan is rich with various biodiversity and been protected and reserved from any illegal logging activity. Previous studies mainly focus to explore biodiversity of the forest, without any in-depth investigation to explore mineral distribution in soil. This paper is baseline study which investigated mineral distribution in sediments from different sites of *Sungai Nal* (Nal River), as well as different core depth, which were situated at Ulu Sat Forest, Kelantan, Malaysia. Total of five surface sediment and one core were analyzed with x-ray diffraction (XRD) phase analysis, it was found that despite of sampling location and sampling core depth, the soil merely consisted of quartz ( $\text{SiO}_2$ ) mineral, without any traces mineral been detected. However, concentration of the quartz mineral did vary with the sampling locations as well as core depth of the sampling. Thus, mineral distribution in the soil was consistent as only quartz was detected by XRD analysis.

### NRE04: Challenges in Creating Ecotourism in Rural Area: A Case of RK Eco Farm Business Venturing

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Abstract. The objectives of this article is to reveal the findings on the challenges encountered by a small business venture in the process of developing ecotourism that preserve the natural environment in rural area. Study on the natural resources and ecotourism has been indicated through the symbiotic relationship discourses. However, less research has been done on the lenses of business venturing that promote ecotourism and natural environment. The effective development of small business venturing that preserve the environment is significant for sustainability development for environment. Qualitative research methodology was adopted to understand this phenomenon utilising interpretive paradigm. Hence, this study is not mean for statistical generalization as indicated for objectivism paradigm. Six participants that contain of the founder, the manager, the workers, and three other participants are involved in this study. Accordingly, in-depth interview techniques as main data sources had been adopted for data collection to understand the phenomenon. Six participants with three times attempt for in-depth interview has been executed. To ensure the robustness of the information, direct observation and photograph also been utilised. Thematic technique was used for data analysis. The findings indicate that waste management, farm safety, and society awareness are the challenges that encountered by the entrepreneur in small business venturing that relates to ecotourism and natural environment. Future research should research further on this issue within the different context.

## NRE05: Paleontological Assessment of Malawa Formation, Padanglampe, Barru Regency, South Sulawesi

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**Abstract.** The study area is located at Padanglampe, Barru Regency, South Sulawesi, Indonesia. The objectives of this study are to identify the fossils occurrence and interpret the depositional environment together with age identification based on the fossils occurrence. There are four lithology units found in this study area; volcanic breccias, limestone, sandstone, and intrusion of andesite and trachyte unit. Most of the fossils are found in sandstones unit within the interbedded of limestone, coal, and claystone. The fossils had been soaked with hydrogen peroxide ( $H_2O_2$ ) for a night to disaggregate fossils from rocks. Seven species found from the phylum mollusks, which are *Cerithium salebrosum* Sowerby, *Cerithium tuberculatum*, *Cerithium zonatum*, *Oliva junghuhni*, *Vicarya* sp., *Septifer* sp. and *Ostrea* sp., while two species from Cnidaria phylum; *Cycloseris* sp. and *Discocyathus* sp. Based on these fossils identification, the age of the study area was ranged from early Triassic to Middle Neogene, and the depositional environment of the study area was interpreted as a shallow subtidal environment with a restricted area of lacustrine or lagoon.

## NRE06: Adsorption of Methylene Blue onto Iron Oxide Magnetic Nanoparticles Coated with Sugarcane Bagasse

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**Abstract.** The removal of dyes from coloured effluents, in particular from the textile industry, is currently one of the major environmental concerns. Current methods for removing dyes from wastewater are costly and cannot be used effectively to treat a wide range of such wastewaters. Thus, we investigated the removal of methylene blue dye from aqueous solution using iron oxide magnetic nanoparticles coated with sugarcane bagasse. This newly and low-cost adsorbent was analysed with Fourier Transform Infrared Spectrophotometer followed by optimisation of its physicochemical parameters such as contact time, initial dye concentration, adsorbent dosage, and pH of dye solution. The study showed that the adsorption of methylene blue was pH dependent and the highest removal (98%) was obtained at pH 7. The optimum conditions were also achieved by using 10 mg/L dye concentration, 0.6 gram dose of adsorbent and 60 minutes adsorption time. The results obtained followed the pseudo-second-order kinetics and the adsorption was fitted well to the Langmuir isotherm model where the maximum adsorption capacity ( $Q_m$ ) was 37.45 mg/g. It is suggested that iron oxide magnetic nanoparticles coated with sugarcane bagasse is a potential low-cost adsorbent for the dye removal from industrial wastewater.

## NRE08: Heavy Metals Accumulation in River Water and Sediment Core at Kelantan River Tributaries of Gua Musang, Kelantan

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**Abstract.** Several rivers around Gua Musang had been suspected as polluted area due to waste discharge from ore mining and palm oil factories located near the rivers. However, more evidence is needed to support the statement. Therefore, this study had been carried out to determine the water quality of Aring, Lebir and Relai Rivers at Gua Musang, Kelantan via its physiochemical parameters. Elemental concentrations of Fe, Al, Mn, Zn and Pb were determined in both water samples and sediment cores collected from Aring, Lebir and Relai Rivers to evaluate the accumulation trend of the heavy metal. The pollution level of heavy metals in Aring, Lebir and Relai Rivers were then investigated by using geoaccumulation index. The heavy metals of sediment were analysed by Atomic Absorption Spectrometer (AAS) after being digested by an acid mixture of  $\text{HNO}_3/\text{HCl}$  (1:3; v/v). This study shows that Aring, Lebir and Relai Rivers need to treated before direct consumption. The horizontal spatial distribution of heavy metals in water and sediment suggests that the rivers were contaminated with Mn, Fe, Al and Zn. Although Aring Rivers shows the highest concentration of Mn in both water and surface sediment, the inconsistent trend of vertical profiling of heavy metals through sediment cores shows Lebir River has the highest Fe, Pb, Zn and Al geoaccumulation while Relai River has the highest Mn geoaccumulation.

## NRE09: Explore the Rural Community Understanding and Practices on Sustainable Lifestyle in Kelantan, Malaysia

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Abstract. This study aims to explore the understanding and practices of the rural community on sustainable living in Jeli District, Kelantan. A qualitative research approach was adopted in this study by using an in-depth interview. A total of 36 respondents from three (3) locations (Jeli, Kuala Balah, and Batu Melintang) participated in this study. This findings show the rural community of Jeli has a modest understanding of a sustainable lifestyle. Besides that, several sustainable initiatives are practiced by the Jeli community, like using energy-saving products and recycling. However, the number of people involved in any sustainable lifestyle is small as compared to the total population. However, the initiatives that have been conducted could be motivation for others to start practicing sustainable living.

## NRE10: Landslide Susceptibility Assessment Using Geographic Information System (GIS) Application of Putat Area, Gunungkidul, Yogyakarta, Indonesia

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**Abstract.** Gunungkidul is located in Central Java Province, Indonesia which is vulnerable to geological hazard such as floods and earthquake. However, it is also susceptible to landslide in some areas of Gunungkidul which contributes to damage and loss. The study area is located in Putat Area of Gunungkidul with the area covered of 25km<sup>2</sup> which aligned along latitude 7° 51' 04.35"S to 7° 51' 04.35"S and longitude 110° 30' 58.15"E to 110° 33' 41.72"E. This research aims to produce a landslide susceptibility map. The factors that triggered the landslide in Gunungkidul, Special Region of Yogyakarta such as rainfall intensity and earthquake were also analysed. The parameters that caused the occurrence of landslide were determined and the landslide susceptibility map was produced using Weightage Overlay Method (WOM) in ArcGIS software. Results showed that the susceptibility map was classified into three zones which is low, moderate and high zone. The factor that triggered the landslide were identified which is heavy rainfall intensity and earthquake. As a conclusion, the ability to detect landslide susceptibility lead to a better understanding of landslide mechanisms for the research area, thus leading to an enhanced identification of the most likely failure sites within a landslide-prone area.

## NRE11: Slope Failure Investigation in Weathered Granitic Rock Mass Using Electrical Resistivity Imaging: Case Study in Kg Bukit Selar, Jeli, Kelantan, Malaysia

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**Abstract.** The slope failure phenomenon is a common natural hazard in Malaysia in which due to the change in slope angle, weathering, heavy rainfall, and overloading. This research is focusing on analyzing the subsurface condition of slope failure in Kg Bukit Selar, Jeli, Kelantan by the electrical resistivity imaging (ERI) method. Geologically, the study area mainly composed of granitic rocks (microgranite and porphyritic granite). A total of five resistivity survey lines using Schlumberger and Pole-Dipole array with a 200m spread was conducted at the failed slope. ABEM Terrameter LS was used to collect field data, and processed by using RES2DINV software. The results were presented in the form of two-dimensional (2D) resistivity profiles providing a view of the subsurface distribution of the granitic rock, geological structures, and water content. The results show that the slope failed due to the presence of groundwater. The findings in this study show that the resistivity survey is a reliable method for slope failure investigation. The slope failures due to seepage problems were successfully being investigated using the ERI method.

## NRE12: Traditional Processing Method of Smoked *Corbicula fluminea* (Etak): Case of Etak Vendor in Kelantan, Malaysia.

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**Abstract.** Traditional knowledge is very synonymous with communities and tribes around the world, especially indigenous peoples or in Malaysia known as Orang Asli. This knowledge is borne out of the constraints faced by society in daily life and often passed down from generation to generation. All aspects of life in the community such as traditional medicines, pest and disease control, farming method, tools used in the preparation of soil and roads, methods of food preparation and so on are assisted by the traditional knowledge created by the community itself. Asian clams (*Corbicula fluminea*), locally known as "etak" in Kelantan dialect, Malaysia, has been consumed by the local community as a snack for a years. Smoked "etak" is prepared traditionally using freshly harvested "etak" from the river or natural habitat. Freshly harvested "etak" is then washed thoroughly and soak overnight to remove sand and dirt. Followed by, marinating with the previously prepared spices and soak for about 2 hours. The last process is to smoke the "etak" on the fire with medium heat. "Etaks" are placed on a platform made of bamboo with height of about one meter above the ground. Beneath it was lighted with firewood and before "etak" can be placed on a bamboo platform, it was necessary to make sure that the firewood is burned to the coals. This is to ensure that the "etak" shell is not opened as it is considered to be damaged and should not be eaten as a snack. "Etak" with shell open will dry and lose its juiciness and flavor. "Etak" should be stirred all the time when it is on a platform with medium heat fire. "Etak" is usually smoked for about 45 minutes and left to cool down before eating or selling. Based on an interview and observation conducted, it can be concluded that smoked "etak" which is prepared using traditional method is preferred by consumers, as it has a unique aroma and flavor. Hence, the current study aims to document this knowledge through informal

conversational interview with “etak” smokers and consumers in Kelantan as well as observing the working mechanism of this method.

### NRE13: Assessment of metal concentrations in *Polymesoda expansa* from Sungai Geting, Tumpat, Kelantan and associated health risk

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**Abstract.** The spatial distribution of lead, zinc, cadmium, copper, and arsenic in *Polymesoda expansa* from Sungai Geting, Tumpat Kelantan were determined with inductively coupled plasma – mass spectrometer, in comparison to the levels in their surrounding water body. The objectives of this research was to determine the possible health risks associated with heavy metal accumulation via consumption of *Polymesoda expansa* by using Target Hazard Quotient (THQ). The data indicate have associations between the concentrations of metal measured in study sampled and the levels observed at the sites. The results suggested that the concentration of arsenic in *Polymesoda expansa* was relatively higher than those studied elements. The concentration of arsenic in studied sample demonstrate the sources of the antropogenic inputs. In terms of risk assessment, concentrations of metals in *Polymesoda expansa* were significantly below the Malaysian Food Regulation 1985.

## NRE14: Four New Records of Zingiberaceae in Gunung Telapak Burok, Berembun Forest Reserve (Fr), Negeri Sembilan

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**Abstract.** A short survey on Zingiberaceae family was done in selected trails of Gunung Telapak Burok (1193m), Berembun Forest Reserve (FR), Negeri Sembilan. This botanical inventory for ginger family produced a list of 10 genera and 14 species, including four new records for Berembun Forest Reserve (FR) and Negeri Sembilan. Most gingers species found were from genus *Alpinia* and followed by *Globba*. *Alpinia vitellina* (Lindl.) Ridl. Four species namely Meistera ochrea (Ridl.) Skornick & M.F.Newman (*Amomum ochreum* Ridl.), *Camptandra ovata* Ridl., *Zingiber longibracteatum* Theilade and *Conamomum utriculosum* Ridl. (*Amomum utriculosum* (Ridl.) Holtum) were not listed during previous botanical survey and were additional new records for Berembun Forest Reserve and Negeri Sembilan. The previous record also found *Haniffia cyanescens* var. *cyanescens* which is a hyper-endemic wild ginger in Bukit Tangga. In this survey, the species was collected in Gunung Telapak Burok. This flowering species was found to be a rare sighting in Gunung Telapak Burok. Some of the species found in Gunung Telapak Burok were found in less localities (less than five) especially *Z. longibracteatum* in Peninsular Malaysia. Thus this forest area must be preserved for its species richness especially in wild gingers.

## NRE15: Determination of Microplastics in Sediment of Kelantan and Pattani Bay

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**Abstract.** This study was conducted to determine the presence of microplastics in sediment of Kelantan and Pattani Bay. Sediment samples were collected from Sri Tujuh Beach, Tumpat and Talo Kapo Beach, Pattani Bay in between May and July 2019. Microplastics were isolated from sediment samples using wet peroxide oxidation (WPO) followed by density separation. Microplastics were sorted visually according to their shapes and colors after being examined under photographed microscope. A total of 52 pieces of microplastics were identified and the most abundant particle found in this study was threadlike shape. Fourier Transform Infrared (FTIR) spectroscopy has been used to identify functional groups in the composition of microplastics. This study shows that degraded of large plastic materials to microplastics due to some factors such as weathering can impact abundance of microplastics in both places, as these locations are well known for fishing activities, industrial areas and also as tourism area.

## NRE16: Trace Elements Concentration in Domestic Groundwater Wells in Northern Parts of Kelantan, Malaysia

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**Abstract.** Groundwater is one of the major alternatives of freshwater supply in rural as well as in urban areas in Kelantan. The need for groundwater has been rising day by day for irrigation purposes. The degree of trace elements pollution and the suitability of groundwater for drinking purpose were assessed through analysis of 32 groundwater samples of shallow aquifer. A total of 15 trace elements investigated includes As, Pb, Sr, Ba, Mn, Co, Ni, Cu, Cd, Fe, Zn, Cr, B, Se, and Al. The study reveals that most of the samples analysed contain marginally low concentrations of trace elements. The majority of toxic elements (As and Pb) are found to be in minute quantities and thus assumed to be inattentive in the wells. The concentration of all the elements except Fe and Mn were found far well within the permissible limits of WHO, thus pointing to the unpolluted source of water supply in the area. The concentration of Fe is higher in eight samples whereas Mn is on the higher side in twelve samples during post-season. Overall, all the elements show higher concentrations during post season owing to the less intensity of rainfall. Overall, the water in the area is safe for various purposes, but the source and contamination levels of Fe and Mn needs to be evaluated in detail. Moreover, appropriate use of law and regulations and effective water management is required amid rising population to preserve the quality of this resource for future generations.

**Keywords:** Groundwater, Trace element concentration, Kelantan, Malaysia

## NRE17: Kelantan Big Yellow Flood 2014: Statistical Analysis on Relationship between Rainfall Intensity and Water Level

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**Abstract.** This paper interpreted statistically the relationship between event of weather activities and flooding in the affected area of Kelantan State in Malaysia during the Big Yellow flood event in December 2014. This is an extreme flood event in Kelantan since 1927 with the return period approximately 1 in 1000 years. The rainfall intensity and river discharge dataset from Department of Irrigation and Drainage (DID) Malaysia in four selected study areas were descriptively analysed and interpreted using hyetograph and hydrograph. Furthermore, this descriptive results have been validated inferentially using Chi-Square statistical test that are applied into the primary data gathered from observation and distribution of a questionnaire to flood victim during a field visit at the same selected study area used in analyzing secondary data from DID. The results from descriptive analysis using hyetograph and hydrograph showed two phases of extreme rainfall in the Kelantan river basin. The first phase from 15 to 19 December 2014 pointed out that the heavy rainfalls contribute to the increase of water levels in Galas, Lebir, and Kelantan rivers. Areas of affected flooded are Kota Bharu, Tualang, Kursial, and Kuala Krai from 17 to 19 December 2014. The second phase from 20 to 24 December shows higher intensities of rainfall, especially at the upstream of the River basin in Gunung Gagau and the flooded situation become more severe due to the full capacity of soils, river, and drainage. This study also shows that the flood depth that occurred in the flood-prone area has a significant association with rainfall intensity but not with the distance of the area from the river. The findings can significantly conclude that the Kelantan big yellow flood 2014 is totally influenced by heavy rainfall.

## NRE18: Adsorption of COD in wastewater by Activated Carbon from Rice Husk

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**Abstract.** Organic pollution occurs due to the presence of organic compound that will causing oxygen depletion and gives potential adverse impacts on human health and the environment. Wastewater from the fish cracker industry typically has high chemical oxygen demand (COD) and it is needed to be treated before release to water bodies in order to reduce the organic pollution. The treatment of COD was done using rice husk activated carbon (RHAC) that produced from agricultural wastes that contributed to waste minimization and reduce the environmental pollution. Therefore, this study emphasized on the feasibility of rice husk activated carbon for removing the COD from fish cracker wastewater. It was also to identify the optimization factors (pH, flow rate and initial concentration of COD) that affecting adsorption by rice husk activated carbon. RHAC was produced by chemical activation using phosphoric acid, H<sub>3</sub>PO<sub>4</sub> and a real wastewater from fish cracker industry was collected, characterized, and treated by using continuous fixed bed column adsorption method. The result shows that the adsorption of COD by RHAC was optimum at pH 2, flow rate 5 ml/min and 5 % v/v initial COD concentration with the COD removal at 31.8% (150 mg/L) which comply with Standard B. Thus, RHAC could be used to develop an alternative method and suitable carbonaceous substances that was used to treat water and wastewater.

## NRE19: Assessment of Nighttime Ground Level Ozone Concentration in Klang During Wet and Dry Month

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**Abstract.** Ground level ozone ( $O_3$ ) is the most significant secondary air pollutants in Malaysia, and this air pollutant exhibited different variations during daytime and nighttime due to differences in photochemistry. This utilizing seven variables ( $O_3$ ,  $NO_2$ , NO,  $SO_2$ ,  $PM_{10}$ , temperature, and relative humidity) secondary data acquired from the Air Pollution Division, Department of Environment Malaysia. The nighttime data (7 p.m. – 6 p.m.) on March and December 2015 were used to represent the dry and wet months, respectively. Box and whisker plots were used to show the variation of nighttime  $O_3$ ,  $NO_2$ , NO,  $SO_2$ ,  $PM_{10}$ , temperature, and relative humidity during the dry and wet months. Results suggested that there are variations among the selected variables between dry and wet month with temperature,  $O_3$ ,  $NO_2$ , and  $PM_{10}$  showed higher value during dry month compared to wet month. Meanwhile, relative humidity, NO, and  $SO_2$  showed the opposite result.

## NRE20: AgNPs - *Azolla pinnata* Extract as Larvical against *Aedes aegypti* (Diptera: Culicidae)

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**Abstract.** The widely used synthetic insecticide in the operation of mosquito control could result in unfavourable impacts to the environment, human health and non-target organism. Considering these issues, environmentally friendly insecticides from plant extract have been used as green alternatives by recent researchers. Unfortunately, the method of using plant extract as insecticide requires a large amount of raw plants to be used. In relation to this problem, the use of nanoparticles that possesses unique characteristics including small size and potential in changing physical, chemical and biological properties of organisms were studied. Nano-synthesized silver particles (AgNPs) from *Azolla pinnata* extract were thus investigated in this study in order to determine its efficacy as *Aedes aegypti* larvicide. AgNPs particles from *A. pinnata* extract were prepared in six different concentrations and set in plastic cups. Late third instar larvae of *Aedes aegypti* were being used in all tests. Based on the findings of the experiment, there was no mortality of larvae recorded in control groups after 24 hours of exposure. The lowest mortality recorded was at 10 ppm with only 7.5% mortality, while 95% mortality was recorded for the highest concentration which was 250 ppm. Meanwhile, the LC50 and LC95 obtained at 95% confidence interval after 24 hours of exposure were 121.570 ppm and 369.438 ppm respectively. Further studies should be done to determine the mechanisms of AgNPs in aiding *A. pinnata* as an effective larvicide in the future.

## NRE21: Short Notes on Traditional Vegetables Consumed by Jahai Tribe in Klewang Village, Royal Belum State Park, Malaysia

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**Abstract.** Indigenous people are known for their lives blended with the environment. The resource for their survival was procured from their surrounding nature, including the traditional vegetables. Not much is known about the traditional vegetables species that they consumed and the ones they don't. A simple survey was conducted among the Jahai aboriginal community in Klewang Village, Royal Belum State Park, on 5<sup>th</sup> March 2020. The study was conducted randomly using face-to-face interviews and surveys to identify the traditional vegetables found and consumed in the villages. The habitats of these traditional vegetables were recorded and the plants were collected and photographed for identification and live specimens were planted at Agro Techno Park, Universiti Malaysia Kelantan, Jeli Campus. All species were identified using spot characters such as inflorescence and leaf morphology. Survey results showed that there were seven species of traditional vegetables including planted and wild grown, namely, sweet potato (*Ipomoea batatas*), cassava (*Manihot esculenta*), purple milletia (*Morus atropurpurea*), torch ginger (*Erlingera elatior*), pigweed (*Amaranthus viridis*), Indian mulberry (*Morus citrifolia*) and wild eggplant (*Solanum torvum*). Out of these seven traditional vegetables, there are only three vegetable species that are not consumed by this tribe: pigweed (*A. viridis*), Indian mulberry shoots (*M. citrifolia*) and purple milletia shoots (*M. atropurpurea*).

### NRE22: Survey of People Perception on the Resulting Noise from the Sultan Ismail Petra Airport, Kelantan, Malaysia

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Abstract. Around the Sultan Ismail Petra Airport, Pengkalan Chepa, Kelantan, Malaysia there are housing areas, educational institutions, schools, hospitals and even houses of worship that are categorized as sensitive recipients. They've been receiving noise from the airport for decades and they are still there. They may feel uncomfortable but have no choice, or are they no longer aware of the disruption they receive on a daily basis or they can already accept the noise with an open heart. To answer this question an informal conversational interview was conducted. A total of 120 respondents were selected, 40 respondents per contour (500m, 1000m and 1500m). Results of the survey found that 50% (60 people) of respondents said the noise effect of the flight was strong, while another 25% said that the noise effect was moderate (30 people) and low (30 people). Most of the respondents who said the noise impact from the airport are strong came from respondents who sited within 500m from the airport. Meanwhile, for those who answered moderate and low was from 1000m and 1500m radius from the airport. As a conclusion, people who are leaving within 500m from the airport was badly affected by aircraft noise, So it needs to be rectified to avoid permanent hearing damage and stress problems for the residents.

### NRE23: Wood-based industry in Kelantan

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Abstract. Forest in Kelantan contributes a significant commitment to economy earnings through the wood-based industry sector. Desktop and field survey was carried out to investigate the current status of the wood-based industry in this state. Surveys and secondary data analysis was done in term of the number of licenced wood-based factories that actively operated in the study area. There are 136 wood factories involved in wood-based industry production that distributed throughout ten main districts in Kelantan. Kuala Krai is the utmost and active area for wood-based sector. The wood-based industry includes sawmills, plywood and veneer mills. The sawmills cover of 45.1% from the overall wood-based factories in Kelantan which commonly produce a product from sawn timber for heavy-duty purposes as well as light application decking, step boards and door frames. The wood-based industry in Kelantan had offered vast job opportunities and increase Malaysia's export earnings. Therefore, strategic management aims to conserve and sustain the natural resources are required to ensure the adequate source for future production.

## NRE24: Performance of TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>/carbon nanotube nanocomposite on the photocatalytic degradation of metamifop

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**Abstract.** The photocatalyst of TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>/CNT nanocomposite was prepared by hydrothermal process. Its performance was evaluated based on the efficiency in degrading metamifop, an active ingredient in the commercial formulation herbicide. The effect of initial concentration metamifop, the dosage of photocatalyst used during photocatalytic degradation of metamifop and the effect of air flow rate were investigated for the evaluation of its performance. The highest percentage degradation of 10 mg/l metamifop obtained from this study was 95.0% using 20 mg of TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>/CNT nanocomposite photocatalyst with the air flow rate of 2 l/min. The prepared photocatalyst can be potentially used in environmental application.

## NRE26: Analysis of Oil Palm Tree Recognition using Drone-Based Remote Sensing Images

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Abstract. The oil palm tree, or scientifically called as *Elaeis guineensis* is native to West Africa, where it grows in the wild, transformed into a crop that later was introduced to Malaysian industry. The cultivation of oil palm improved rapidly under the agricultural sector causes degradation, particularly when the oil palm plantation goes uncontrolled. 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 a 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. Conventional method for tree counting can be carried out by manually marked on images or carry out field surveying using GPS to collect the positions of oil palm trees and display their position on image. Developing easier, simpler and cheaper method for tree counting is needed. The aim of this study is to analyse oil palm trees using drone-based remote sensing images. The algorithms used in this research study including Gray-Level Co-occurrence Matrix (GLCM), wavelet transform and template matching. The database of oil palm tree been developed with a total of 131 oil palm trees and 161 of non-oil palm trees have been collected. The window size of oil palm tree been analysed where 250 x 250 pixels which GLCM showed the best overall accuracy of 73.10% for both oil palm and non-oil palm. In this specific window, the oil palm crown can be covered and the result given is more accurate compared to other window sizes. The resulting analysis shows that wavelet transform algorithm gives the highest overall accuracy value which is 82.07%. The other eight statistic parameters can also used to modify the GLCM in order to observe the accuracy and identify which give the best classification accuracy. The availability and ubiquity of drone technologies with high resolution images and regular basis monitoring, new techniques in image and pattern recognition using drone-based remote sensing images let the idea of high accuracy oil palm tree detection become a reality.

## NRE27: Model Selection for Machine Learning Algorithm on Decision Making in Oil and Gas Upstream Project Malaysia

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**Abstract.** Model selection is a crucial element in data analysis to get reliable and reproducible statistical inferences or predictions. It is a long history of model selection method arising from research in statistics, information theory, and signal processing. The purpose of this study is to address the problems related to big data in contributing the strategies to make decisions on new investments for upstream Oil and Gas projects in Malaysia. It also discusses the use of machine learning methods for big data processing and highlights current scenarios in a model selection perspective. Machine learning algorithms have proven to work well for statistics used to make decisions. The selection of the machine learning algorithm model does not make drastic assumptions about data, and it can help optimise the exploration process and allow the computer to analyse large amounts of data quickly and accurately. The results show that k-fold cross-validation of the developed model options intended to make subsequent decisions because it is an integral portion of big data processing to gather unexpected new insights, discover new knowledge and improve efficiency.

## NRE28: Socioeconomic Temiar community in RPS Kemar, Hulu Perak

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Abstract. Forest is significant to Orang Asli communities, the exploitation of forest and transition in the trend of land use will be affected on the livelihoods of indigenous communities who once relied heavily on the forest are the most impacted. The Orang Asli rely on the forest in many aspects of their livelihood. Forest-related activities are the activities that they are involved in for their source of income. This study was conducted to identify the forest-related activities carried out by the Temiar community and determine their income from such activities. Data was collected from a structured questionnaire, in-depth interviews, government document, journal, books, and articles. The study site was selected based on the priority concerning the increase in such activities in Perak. The study was conducted at the *Rancangan Pengumpulan Semula* (RPS) Kemar, Hulu Perak. The findings show that the involvement of Orang Asli in forest-related activities at RPS Kemar, Hulu Perak is still strongly based on the most famous job that frequently does by respondents is forest product gathering either for their main revenue or side revenue.

## NRE29: The diversity of small mammals in a mixed fruit orchard at Bukit Bekong limestone massif, Merapoh, Pahang, Malaysia.

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**Abstract.** The increasing forest fragmentation due to human encroachment has isolated and scattered forest patches and limestone karsts. Agroforestry has been touted as a sustainable solution for the agriculture sector to yield crops and also provide alternative habitats for wildlife outside protected areas and linking forest patches and isolated limestone karsts. This initial survey was conducted to evaluate small mammals (bats and non-volant) assemblages present in a mixed fruit orchard bordering Bukit Bekong limestone massif in Merapoh, Pahang. We captured 193 individuals from 28 species (13 for bats & 15 for non-volant) using mist nets, harp traps and cage traps. This orchard contains *Nycteris tragata* and *Kerivoula pellucida*, listed as Near Threatened plus *Maxomys rajah* as Vulnerable in the IUCN Red List, revealing the fact that this small area in comparison to protected areas possesses unprecedented conservation value. Furthermore, 15 out of 28 small mammal species captured are habitat generalist may provide a cause of concern for the loss of forest specialists. Nonetheless, our results show that less intensively managed agroforest like mixed fruit orchard can also support forest specialists that are sensitive to disturbance. Moreover, the presence of limestone karst nearby contributes to bat diversity, especially cave-roosting bats. In summary, the diversity of small mammals in agroforest is worth to be studied as the species accumulation curve in this one mixed fruit orchard has yet to reach an asymptote. We hope future biodiversity data in agroforest will be incorporated in agriculture management strategies to stimulate sustainable agriculture and promoting mammal diversity.

## BMF01: Influence of Vulcanization System on the Mechanical Properties of CCTO/ENR50 Composite

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**Abstract.** A study on vulcanization systems consist of conventional (CV), semi-efficient (SEV) and efficient (EV) was carried out by fabricating the CCTO/ENR50 composites. The rubber compound was mixed in internal mixer at 60°C and 60 rpm rotor speed for 13 min. Then, followed by hot pressing at 160°C. The effect of the vulcanization system of the composites was closely monitored on mechanical properties (stress versus strain, tensile strength, elongation at break and hardness. As a result, the CCTO/ENR50 composites with the SEV system exhibit higher modulus strength, which is related to the stiffness of the composite. Hence, it reduced the elongation at break (%) from 591 (CV system) to 495% (SEV system). It also gives high tensile strength, 5.47 MPa, and 47.74 Shore A in hardness compared to other vulcanization systems.

## BMF02: Optimization of torrefied oil palm empty fruit bunch biochar

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**Abstract.** This study was conducted to optimize the torrefied oil palm empty fruit bunch (OPEFB) biochar yield from torrefaction process as an alternative renewable energy sources. The influence of three major torrefaction parameters namely particle size, holding temperature and residence time on calorific values was investigated. By using the response surface method (RSM), Box-Behnken model had been applied for generating shortest experiment run, and analysis of variance (ANOVA) had been utilized for optimization analysis. From ANOVA, the suggested parameters were the torrefaction at 300°C of holding temperature and 90 minutes of residence time in case to obtain the highest calorific value.

## BMF03: The Effect of Alkaline Treatment on Mechanical Properties of Polylactic Acid Reinforced with Kenaf Fiber Mat Biocomposite

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**Abstract.** Kenaf fiber mat (KFM) reinforced polylactic acid (PLA) biocomposite have been developed by using film stacking and compression molding. In order to achieve the composite with good mechanical properties, the effect of processing parameters such as processing temperature and heating time on mechanical properties of PLA was studied. The optimum values of processing temperature and heating time on mechanical properties of PLA that were obtained were then being used to produce PLA/KFM biocomposite. PLA and kenaf fiber has distinct properties as natural fiber is hydrophilic whereas the polymer matrix is hydrophobic. In order to improve the fiber matrix adhesion, the KFM was chemically treated at different concentrations of NaOH for 3 hours at room temperature. Mechanical properties such as tensile and flexural strength, tensile and flexural modulus and elongation at break of untreated and alkali-treated PLA/KFM biocomposite were studied and compared. The obtained results showed that the alkali treatment have impact on the mechanical properties of PLA/KFM biocomposite. The study has demonstrated that the optimum alkali concentration was 4% NaOH concentration.

## BMF04: Characterization of biosurfactant production by indigenous bacteria from Sungai Dungun estuary, Terengganu by surface activity and emulsification test.

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**Abstract.** Natural surface-active agents or biosurfactants are derived particularly from bacteria and yeasts. These natural bio compounds have several advantages over synthetic surfactants such as more environmentally friendly, biodegradable, biocompatible, and low toxicity. Therefore, many efforts have focused on investigating biosurfactants including the isolation of new potent biosurfactant producers. In the present study, twelve potent biosurfactant producing bacteria were successfully isolated from oil-contaminated water and sediment samples from Sungai Dungun estuary by using Minimal Salt Media (MSM) with the addition of 1 % (v/v) engine oil. From characterization tests, one isolate named as DSB7 demonstrated the highest activity among others by semi-quantitative tests i.e., oil spreading technique and drop collapse test. Besides, it has the lowest value of 38.48 mN/m in water surface tension measurement and emulsification index of 53.57 % and 30.0 % for kerosene and used engine oil respectively. As for the molecular identification of the isolate, it showed the highest similarity to *Pseudomonas aeruginosa* based on 16S rRNA sequence analysis.

## BMF05: Study of Cassava Starch Layer on Zinc Anode by Electrochemistry Method for Zinc-air Fuel Cell System

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**Abstract.** In this study, cassava starch was prepared as conductive biodegradable material on zinc anode in zinc-air fuel cell system by using electrochemistry method. Successful formation of cassava layer on zinc anode was determined by its conductivity values by using four-point probe instrument and the enhancement of conductivity of anode after the deposition of cassava starch was proven. The optimization of conductivity study was further carried out in different concentrations of cassava. It was shown the increment about 30% from 0.079 to 0.105 Scm<sup>-1</sup> of conductivity values from original conductivity of pure zinc. Moreover, SEM analysis exhibits the morphology of cassava coated on zinc plate with distinct particle structure was observed, proving the successful formation of cassava layer via electrochemical method. Hence, the discharge profile analysis highlighted the composition of C3 of CS performed best performance in ZAFC system.

## BMF06: The Study of Mambong Clay Properties Improvement with Calcium Carbonate Addition

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**Abstract.** Mambong pottery is a unique heritage of Kelantan state with its own identity and features. However, the fabrication technique of this pottery can be improved to gain the product quality in terms of its properties. The addition of CaCO<sub>3</sub> as an additive opens the opportunities to improve the properties of this pottery. Four different compositions which are 0%, 5%, 10%, and 15% of CaCO<sub>3</sub> were used in 12 hours firing duration. The slip casting method was used in this research as the modern fabrication technique. The aim of this research is to study the Mambong clay properties improvement with different compositions of CaCO<sub>3</sub> addition.

**BMF07: Dielectric Breakdown Strength and Energy Storage Density of CCTO-ZBS Electroceramic**

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**Abstract.** The effect of ZnO-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> (ZBS) glass additives to the microstructure and electrical properties of CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub> (CCTO) electroceramic has been successfully investigated in this research. CCTO and ZBS glass additives were prepared via solid state reaction and melt quench techniques, respectively. Raw materials of both CCTO and ZBS were wet mixed separately for 24 hours, dried overnight and the CCTO powder was calcined at 900 °C for 12 hours using an electrical carbolite furnace. After that, the ZBS powder was melted at 1400 °C for 2 hours using an elevator hearth furnace. The ZBS glass was grinded to form fine powder. Different weight percentages (0, 1, 3, 5, 7 and 10 wt%) of ZBS glass powder were added into CCTO (CCTO-ZBS powders), then the powders were wet mixed for 24 hours. The CCTO-ZBS mixtures were dried overnight, compacted at 300 MPa using hydraulic pressure of 6 to 9 mm diameter and 1 to 2 mm thickness (for dielectric properties test) and at 200 MPa of 50 mm diameter and 3 mm thickness (for dielectric breakdown strength test), then sintered at 1040 °C for 10 hours using an electrical carbolite furnace. The addition of a small amount of ZBS glass about 1 wt% was able to increase the dielectric constants (33.99%) and reduce the dielectric loss (5.14%) of CCTO measured at 1 MHz. This addition has also increased the relative density to the maximum value (95.90%), helped the formation of single phase of CCTO, increased the grain size (0.35%) and reduced the porosity as compared to pure CCTO. Meanwhile the dielectric breakdown strength (58.0%) and volumetric energy storage density (80.9%) has also improved with 7 wt% of ZBS glass addition.

## BMF08: The Effect of Bismuth Addition on Sn-Ag-Cu Lead-Free Solder Properties: A Short Review

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**Abstract:** Sn-0.7Ag-0.5Cu lead-free solder is an alternative solder material suitable to replace Sn-Pb solder in electronic manufacturing. In this review, the change in the microstructure, elements, the structural and melting point of Sn-0.7Ag-0.5Cu after the addition of different compositions of bismuth were discovered. Besides, the influence of bismuth in lead-free solder alloys attracts to be studied due to its capability to improve the wettability and solder spread.

## BMF09: Optimization of Binding, Washing and Elution Buffer for Development of DNA Isolation Kit

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**Abstract.** DNA isolation is one of the most crucial part in DNA analysis and is reflected by the abundance of ready-to-use DNA isolation kits available in the market. However, the chaotropic salts used in conventional kits during the binding step has been known to inhibit the downstream process of PCR and deteriorate when exposed to air. This study aims to design a better and faster DNA isolation process with better DNA isolation performance to replace the conventional one. This study aims to replace the chaotropic salt in binding buffer with organic acids or salt and improve the buffer used during the wash step. Sodium perchlorate and several other salts and acids were chosen as candidates for the binding buffer. Simultaneously, 10Mm NaCl and 10Mm Tris-Cl with varying concentrations of organic solvents were selected as candidates for the wash buffer. The performance of the selected buffers was then compared to the readily available commercial kit. Organic acid B was among the best candidates for binding buffer with 81.91% and 83.20% recovery rates. For wash buffer, it was observed that the DNA recovery increases with an increasing organic solvent concentration in 10Mm NaCl and 10Mm Tris-Cl. Wash buffer with 90% organic solvent shows the best compromise of DNA yield and purity compared to 70%, 80%, and 100% organic solvent concentration in 10Mm NaCl and 10Mm Tris-Cl. A combination of organic acid B in binding buffer and 90% organic solvent A in wash buffer were tested against a commercial DNA extraction kit. The combination of organic acid B and 90% organic solvent yielded 72.81 ng/ul compared to 28.46 ng/ul by the commercial kit. The combination of the binding buffer organic acid B and 90% organic solvent in 10Mm NaCl and 10Mm Tris-Cl can replace the current commercial kits without the problems posed by the presence of chaotropic salt.

## BMF10: Evaluation of long-term storage effects on buccal cell DNA from untreated cards for STR profiling

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**Abstract.** The success of DNA profiling using long-term stored samples depends on the amount and quality of their recovered DNA templates. Physical and biochemical factors such as microbial activity, humidity and temperature contribute to DNA degradation. In this study, we used genomic DNA extracted from buccal cell samples that were stored for more than 4 years on Bode Buccal DNA Collector™ cards (Bode Technology, Virginia, USA) for typing 27 and 24 short tandem repeat (STR) loci using Powerplex® Fusion 6C system (Promega Corporation, Madison, USA) and Globalfiler™ Express kit (Thermo Fisher Scientific, USA), respectively. Our results demonstrated that the Buccal DNA Collector can be used as collection medium for buccal swab samples that are not immediately analyzed or those that need to be retrospectively analyzed. There is a sign of DNA degradation which might well be expected because buccal cell samples were deposited on untreated filter paper and have been stored for a long period (> four years) at room temperature. However, STR allele calls were obtained from most of the buccal cell samples, especially when typed using Powerplex® Fusion 6C system kit.

## BMF11: Degradation Kinetics of Humic acid in Aqueous Solution by Ozonation Treatment under Different Parameter Conditions

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**Abstract:** This study evaluated the kinetics of humic acid (HA) degradation in aqueous solution by ozonation process under different parameter conditions. The effect of initial HA concentration (5 to 100 mg/L), solution pH (2 – 12) and initial ozone doses (1.6– 4.9 mg/L) of HA degradation were evaluated through batch ozonation processes at ambient temperature for 2 hours. The HA degradation followed pseudo-first order kinetics where the rate constant changed based on these parameters effect. Results showed that, the HA degradation by ozonation process was more effective (98% degradation) at 20 mg/L initial HA concentration, initial pH 7 and 4.9 mg/L of ozone dose. These finding suggest that the ozonation process can be effectively used in wastewater treatment for improving the biodegradability of recalcitrant organic compounds.

## BMF12: Optimal Hypochlorite Bleaching Duration for *Sesbania grandiflora* Pulp

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**Abstract.** *Sesbania grandiflora* is a fast growing species with 3 to 4 years of harvest rotation. Meanwhile, high cellulose content of the plant has made it a potential commercial pulpwood in Malaysia however the information is limited. Bleaching is an important process in pulp and paper manufacturing. Sodium hypochlorite was commonly used as the bleaching agent due to its strong oxidising bleaching in brightening the pulp. To reveal potential of *S. grandiflora* as pulpwood, this research was carried out to determine the optimal duration by bleaching the *S. grandiflora* with sodium hypochlorite. *Sesbania* pulp was treated with 5.00wt% of sodium hypochlorite solution in the water bath under the temperatures of 50°C. Three bleaching durations were taken: 20mins, 40mins and 60mins. The procedures of laboratory handsheets making and testing were conducted according to modified TAPPI standard. The results proved that 60mins was the optimal bleaching duration which showed the highest brightness percentage and the least lignin content. The reduction of lignin content also the kappa number had contributed to the brightness of the pulp. However, the overall strength properties of the *Sesbania* handsheets such as bursting test, tearing test and folding endurance test were decreased due to the fibre degradation when bleaching. The optical properties and strength properties of bleached handsheets showed significantly difference as compared to the unbleached handsheets and the differences become obvious as the bleaching duration increase.

## BMF13: Production and application of thermostable protease 50a as liquid protein stain remover

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**Abstract.** Proteases are important enzymes involved in many vital physiological processes and has wide potential for industrial applications. Previously, thermostable alkaline protease 50a was reported and had potential as laundry detergent additive and eco-friendly enzymatic dehairing of animal hides. Thus, exploration of this enzyme potentials' need to be done in order to prove that it plays an important role in diverse industrial application. This study aimed to investigate the potential of the thermostable alkaline protease 50a as a protein stain remover. One formulation has been developed as liquid spray protein stain remover containing the enzyme and tested its ability to remove protein stain through washing performance. Four different types of fabric which were jersey, cotton, koshibo and crepe has been stained with blood as the protein source. Blood-stain on the fabrics were then removed with four different solution; using distilled water only, distilled water with enzyme, formulated liquid spray with enzyme, and formulated liquid spray without enzyme. The formulated liquid spray with enzyme exhibited better removal bloodstains action by showing faintness of the blood stained on the fabrics after it was sprayed. The stains removal evaluation on different types of fabric with formulated liquid spray protein stain remover obtained are as followed order: crepe > jersey > cotton > koshibo. This study proved that the formulated liquid spray with addition of enzyme showed the most effective stain removal on crepe fabric.

## BMF14: Preliminary Investigation of Delamination Factor for Drilling Wood Plastic Composites (WPC)

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**Abstract.** This study examines the effect of the delamination factor on wood composite drilling. Drilling is one of the most important machining operations in the manufacturing process, operating in a variety of ways to make life better every day. The preliminary experiment focuses on the implementation of three drilling strategies to determine the most appropriate for drilling composite and to identify the effect of the machining parameters of wood plastic composite (WPC) drilling. The CNC machining centre is used at the factory of the local company to assist them in the provision of certain production inputs. It is observed that the single step drill peck is the best suited strategy for drill WPC with less delamination at the entrance and exit holes compared to the other two methods, 2-peck and 4-peck drills. Hole tends to create a peel-up and to force the delamination down heavily along the hole edge when using the 4-peck process while the least peel-up pattern happens when using a single-step method. The findings also show a large amount of peel-up delamination as the feed rate increases. Therefore, the final results are also useful in understanding the relationship between the drilling parameters and the cutting experiments.

**BMF15: Study of Beta vulgaris (Beetroot) Extraction in Polar Solvents as Photoabsorber in Dye-Sensitized Solar Cells Application**

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**Abstract.** Over the last two centuries, energy needs have increased substantially until non-renewable resources nearly come to depletion. Therefore, the application of renewable energy resources like solar energy is absolutely appointed favorable due to its economical impact and improved technology. Dye-sensitized solar cell (DSSC) being the type of solar cell that utilize dye as light sensitizer for the operation and become the best alternative rather than toxic chemical dyes. Betalains is one of the pigment of natural dyes that can be extracted from fruit and vegetables which majorly available in beetroot (*Beta vulgaris*). To get the pigment for solar cell application, the optimum extraction is crucial. Hence, in this study, several polar solvents such as distilled water, methanol, ethanol, isopropanol, n-butanol, formic acid and acetic acid were used to extract betalain pigment from *Beta vulgaris* (BV). Then, several characterizations were carried out to analyze the photoabsorber properties using Ultraviolet-visible Spectroscopy (UV-Vis), Fourier-Transform Infrared Spectroscopy (FTIR), High Performance Liquid Chromatography (HPLC) and Scanning Electron Microscopy (SEM). The energy bandgap of BV in different solvents (ITO/TiO<sub>2</sub>/BV) are 2.19, 2.35, 2.65, 2.73, 2.78, 2.98 and 3.00 eV for methanol, n-butanol, formic acid, ethanol, acetic acid, water and isopropanol respectively. Whilst, FTIR spectrum shows the presence of functional group of O-H, C=O and C-O-C and HPLC analysis depicted the existence of betacyanin pigment all in samples. SEM images show the presence of porous structure of TiO<sub>2</sub> and irregular pits formed due to the formation of BV layer on TiO<sub>2</sub>. In conclusion, overall findings suggested that methanol is the best solvent for extraction of betalain pigment, answering it has best photoabsorber properties among the sample series. Further detailed study is recommended to maximise the potential of *Beta vulgaris* pigment as photoabsorber in DSSC application.

## BMF16: Effects of Styrene Butadiene Rubber on Physical and Mechanical Properties of Kenaf Core Fiber Reinforced Polypropylene Composites

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**Abstract.** In this research, the kenaf core fiber (KCF) reinforced polypropylene (PP) in the presence of styrene butadiene rubber (SBR) were melted blending with PP using Brabender internal mixer. The composites then fabricated using compression molding to form a sheet of PP and KCF reinforced PP (KCFPP) composites. Pure polypropylene (PP) matrix was used to serve as control whilst SBR was functionalized as impact modifier to improve the toughness properties of PP. The mechanical properties were determined by tensile test using Universal Testing Machine (UTM) according to ASTM D5803. The results show that the increment in SBR content has given an improvement in impact related properties (elongation at break) but at the expenses of strength and modulus properties.

## BMF17: Properties of unsaturated polyester-coconut shell composite with titanium oxide addition

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**Abstract.** Unsaturated polyester based composite is a strong composite. Adding natural fiber and inorganic filler into polyester produce a hybrid composite. The fiber and filler are added approximately 5wt% to 40wt% and 5wt% to 20wt% of composite total weight, respectively. Utilization of different filler content facilitate for future application of the composite. This study investigates the properties of UPE-CS composite using titanium oxide ( $TiO_2$ ) as filler by compression molding. Different concentration of coconut shell (CS) and  $TiO_2$  were used. The composite mixture were mixed and cold compressed with 200, 300, 400 and 500 MPa. The result showed UPE-CS- $TiO_2$  composite density increased with increasing amount of  $TiO_2$  as a result of  $TiO_2$  particles dispersion in the composite. The composite with 40 wt% of CS fiber and high concentration of  $TiO_2$  (20wt%) has higher flexural and strength properties compared to that of other composites. The composite with 20 wt% CS and 20wt%  $TiO_2$  exhibit higher thickness swelling, water uptake and moisture content reduction. Modulus of rupture and modulus of elasticity was increased with compaction pressure while thickness swelling, water absorption and moisture content was decreased.

## BMF18: Recycling of Wood Saw Dust Waste as Green Pore Forming Agent for Porous Ceramic

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**Abstract.** Porous ceramic fabrication using natural pore forming agents have received more and more attention in the past few years. However, researchers have encountered an issue with an inconsistent particle size, which led to uneven pore distribution. Considering waste material as pore forming agent, this research seeks to explore the potential application of wood sawdust in porous ceramic production. Moreover, the effects of wood sawdust weight percentage (wt.%) and firing temperature towards the physical and mechanical properties of porous ceramic will also be investigated. Porous ceramic was fabricated by introducing two different proportions of wood sawdust (10 and 20 wt.%) into China clay, followed by drying at 110°C and firing at 900°C. The characterization analyses were performed by means of Fourier Transform Infrared spectroscopy, water absorption, apparent porosity, bulk density, and X-Ray Diffraction. The results showed that the compressive strength appears to decrease as the composition of the waste wood sawdust increases. Relatively, the water absorption value increases as the wood sawdust incorporation increased. This is because more porosity formation is observed at a higher sawdust ratio, leading to a lower density of the ceramic.

## BMF19: Recycling of Pineapple (*Ananas comosus*) Leaf Agro-waste as One of the Raw Materials for Production of Eco-friendly New Paper

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**Abstract.** This project aimed to recycle pineapple (*Ananas comosus*) leaf agro-waste and wastepaper into new paper using simple processing routes that involve pulping, mixing, sieving, compaction and drying. Subsequently, physical and mechanical properties, as well as the morphology of the pineapple leaf fiber (PALF) -based paper were investigated accordingly. Two different samples were prepared whereby the first sample is pineapple leaf fiber mixed with wastepaper, and another sample is pure pineapple leaf fiber paper. The samples were tested for tensile properties by using the universal testing machine, morphological analysis using scanning electron microscopy, and density measurement using a densitometer. It was found that the sample consist of pineapple leaf and wastepaper shows a higher tensile strength than the sample containing only PALF. Moreover, the density of paper with pineapple leaf fiber and wastepaper mix was higher than the paper with only pineapple leaf fiber. In the future, further modification of body formulation is necessary to further improve the properties of the pineapple leaf fiber-based paper.

**BMF20: Effect of Portions and Particle Sizes on Proximate Properties of Oil Palm Fronds**

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**Abstract.** The purpose of proximate analysis is basically to evaluate the fuel characteristics of raw materials. So, the aim of this study is to evaluate the effect of portions and particle sizes on proximate properties of oil palm fronds. The moisture analyser mx-50 machine was used in the identification of moisture content (MC) in the samples. Meanwhile, volatile matter (VM) was analyze based on BS EN 15148:2009 standard. Ash content (AC) was obtained using BS EN 14775:2009 standard. On the other hand, fix carbon (FC) was obtained through the summation of percentage in all three (3) different values of moisture content, ash content and volatile matter subtracted from 100%. The average percentage of MC of bottom, middle and top portion of oil palm fronds for smaller particle size (0.5mm) were  $11.91\pm0.25\%$ ,  $12.23\pm0.14\%$ ,  $12.59\pm0.23\%$  respectively. On the other hand, the average percentage of MC of the same portion of oil palm fronds for bigger particle size (1.5mm) were  $10.67\pm0.41\%$ ,  $11.25\pm0.12\%$ ,  $11.53\pm0.23\%$  respectively. Meanwhile, the average percentage of VM of the same portion of oil palm fronds for smaller particle size (0.5mm) were  $81.02\pm0.28\%$ ,  $80.68\pm0.33\%$ ,  $80.15\pm0.19\%$  respectively. The average percentage of VM of the same portion of oil palm fronds for bigger particle size (1.5mm) were  $82.48\pm0.32\%$ ,  $82.48\pm0.32\%$ ,  $81.26\pm0.26\%$  respectively. The average percentage of AC of the same portion of oil palm fronds for smaller particle size (0.5mm) were  $2.48\pm0.15\%$ ,  $2.63\pm0.16\%$ ,  $2.85\pm0.70\%$  respectively and for bigger particle size were  $2.23\pm0.11\%$ ,  $2.46\pm0.71\%$ ,  $2.67\pm0.50\%$  respectively. Last but not least the average percentage of FC of the same portion of oil palm fronds for smaller particle size were  $4.59\pm0.26\%$ ,  $4.46\pm0.60\%$ ,  $4.41\pm0.11\%$  respectively and for bigger particle size were  $4.62\pm0.33\%$ ,  $4.57\pm0.15\%$ ,  $4.54\pm0.02\%$  respectively. Based on the results of proximate analysis above, it can be concluded that, oil palm fronds has a potential to be utilized as solid fuel.

## BMF21: Synthesis of Sodium Alginate Graphene Oxide Thin Film for Adsorption Application

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**Abstract.** This paper essentially describes the synthesis of sodium alginate graphene oxide silver (SA-(GOAg)) composite thin film for adsorption of methylene blue. The composite thin film is synthesized using simple solvent casting method by varying the amount of GOAg (20 ml, 40 ml, 60ml, 80ml and 100 ml) into SA solution. The thin film then characterized by using UV-Visible absorption spectroscopy (UV-Vis), Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) analysis. The degradation of methylene blue was observed by using UV-Vis and recorded in every 5 minutes for one hour. The results reveal that the combination of SA and 100 ml GOAg shows the highest adsorption rate in one hour compared to other value of SA-GOAg thin films. The SA-GOAg thin film is believed to have a huge potential in adsorption application such as water treatment.

## BMF22: Physical properties and soil degradation of PLA/PBAT blends film reinforced with bamboo cellulose

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**Abstract.** Cellulose is known as the most abundant organic molecule that is renewable and suitable to replace synthetic polymers in the production of plastics with a formula of  $(C_6H_{10}O_5)_n$ . Cellulose from plants is the most excellent material for reinforcing fillers. The percentage of cellulose in bamboo is range 45-55%. In this research cellulose from bamboo were incorporated with PLA and PBAT to produce cellulose film. The cellulose film produced with different amount of cellulose which are 0%, 3%, 6% and 9%. The findings showed that PLA/cellulose with 9% content of cellulose showed a higher mass loss with 12.39%, followed by the PLA/PBAT/cellulose 9%, which was 9.69%. Meanwhile, the cellulose film with 0% cellulose content for both types of plastic showed the lower biodegradability of 0.57% (PLA/cellulose bioplastic) and 0.44% (PLA/PBAT/cellulose bioplastic). It shows that biodegradability in the natural environment is the benefits of the film with a high content of cellulose. This analysis revealed the degradation of cellulose film in the soil. Usually, conventional plastic cannot easily be biodegraded by the organisms. Based on this study, it is showed that the increase of the cellulose content also encourages the film to degrade quickly. It is thus revealed that the study on bamboo's cellulose, provides the scientific information for the application and implementation of bamboo cellulose as an effective biodegradable plastics.

## BMF23: Functional group *Cinnamomum porrectum* wood extractives by Fourier Transform Infrared

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**Abstract.** Extractive from *Cinnamomum porrectum* wood was obtained using Soxhlet extraction with five different types of solvent, which are distilled water, ethanol, acetone, chloroform, and benzene. From the result, ethanol extraction shows the highest extractives yield which are 2.692%, following by acetone (1.461%), chloroform (0.940%), benzene (0.109%) and distilled water (0.005%). Extractive make a major contribution to the characteristics of wood or non-wood species. These extractives are low-molecular weight compounds, and the different classes of extractives have different chemical behaviours. In this study, the FT-IR was used to analyse the extractive of the *C. porrectum* wood with ethanol, distilled water, chloroform, benzene and acetone. From the result shows that, the analysis revealed 5 different types of functional group which are O-H stretching in presence of phenolic group, C-H stretching in presence of alkane group, C-F stretching in presence of alkyl halide group; C-O stretching in presence of aldehyde group and C=C stretching in presence of alkene group.

## BMF24: Effects on MAPP Compatibilizer on Mechanical Properties of Kenaf Core Fibre/Graphene Nanoplatelets reinforced Polypropylene Hybrid Composites

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**Abstract.** Natural fibre has high potential to be used as reinforcement due to more save, greener and environmentally friendly compared to synthetic fibre. In this research, kenaf core fibre (KCF)-graphene nanoplatelets (GNP) reinforced polypropylene (PP) composites were melt blending using Brabender internal mixer and fabricated by compression moulding. This research aims to fabricate and study the effect of different amounts of MAPP on the mechanical properties of the PP/KCF/GNP composites. The difference amount of maleic anhydride grafted polypropylene (MAPP) as a compatibilizer in hybrid composite was added to enhance the mechanical properties by improving the interfacial adhesion of matrix and KCF. The pure polypropylene (PP) matrix was used as a control. The mechanical properties (tensile and flexural test) were determined using Universal Testing Machine (UTM). Overall, the results show that the presence of MAPP compatibilizer successfully enhanced the mechanical properties as a result of improvement of the fibre-matrix adhesion between the KCF and PP matrix.

## BMF25: Box-Behnken-Design based optimization strategy for alkaline pretreatment of palm oil mill effluent for producing reducing sugar

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**Abstract.** Alkaline pretreatment is used as a substrate prior to the subsequent biological processes for palm oil mill effluent (POME). Sodium hydroxide (NaOH) was used in this study to reduce sugar recoveries from POME. Important process parameters, such as reaction time (min), reaction temperature (°C), and concentration (%) (w/v), were optimized using Box-Behnken Design in Response Surface Methodology (RSM). POME treated with NaOH yielded the reducing sugar of up to 3640.84 mg/L under the optimum conditions of 58.78 min, 77.06 °C, and 2.58% (w/v) for reaction time, reaction temperature, and concentration of NaOH, respectively. The analysis of variance (ANOVA) showed that the quadratic model of reducing sugar had an  $R^2$  coefficient of 0.979. Conformity testing for optimum conditions proved the validity of the model, yielding an increased reducing sugar at 9.35%, compared to that in an untreated POME. This study verified the importance of statistical tools, such as RSM, for enhancing reducing sugar recoveries from the industrial waste stream (POME) and its usefulness and efficiency in energy conversion.

## BMF26: Observation of Arc Behaviour in TIG/MIG Hybrid Welding Process

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**Abstract.** In this project, the influence of TIG currents's variation on arc stability of TIG/MIG hybrid welding was studied by comparing with MIG welding process. The welding current-voltage waveform was analyzed to characterize the arc stability of the MIG arc. From the observations, the introduction of TIG arc as low as 60 A of current significantly change the MIG arc stability in TIG/MIG hybrid welding. The length of MIG arc in TIG/MIG welding increased with the introduction of the TIG arc as compared with MIG welding. The increase of arc length was due to the arc interaction between the TIG arc and MIG arc, which is affecting the wire melting rate. At the maximum TIG current, the diameter of the molten droplet decreased with the increment of droplet transfer frequency.

**BMF27: Potential of *Cinnamomum iners* wood as antimicrobial agent**

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**Abstract.** The wood of *Cinnamomum iners* (Medang Teja) believe in giving multiple beneficial, especially in traditional usage. However, due to the lack of studies regarding this species made this species unable to express its full potential being commercialised by the industry. Thus, this study is prosecuted with the objectives to evaluate the chemical composition and analyse the biological activity of extractive and essential oil derived from *Cinnamomum iners* (Medang Teja) wood. The samples that evaluated comprises of 100%, 1%, 2%, 3% essential oils and extractive of chemical composition are conducted through Fourier Transform Infrared Spectroscopy (FTIR) and Gas-Chromatography Mass Spectrometry (GCMS) analysis. Meanwhile analysing of its biological activity is made through antifungal and antimicrobial activity. The results found that the functional group presents in all the samples shared one similar functional groups which are aliphatic hydrocarbons. For 100% essential oil, the functional groups are aliphatic propionate ester, aliphatic hydrocarbons and tertiary aliphatic alcohols. 1%, 2%, and 3% essential oil consist of the same functional groups which are olefins, aliphatic hydrocarbons and aliphatic acetate esters. Extractives have aliphatic hydrocarbons and primary aliphatic alcohols. Through GCMS, the major compounds found in the samples are 2(1H)-Naphthalenone, octahydro-, trans-Linalool,. beta. Fenchyl alcohol, Camphor, Benzene, ethyl- (CAS) EB. The similar compound found in all samples are Linalool, terpinene-4-ol, Terpineol, Copaene, Cadinene. From the antifungal analysis, it is proved that all of the samples can hold the antifungal traits, as all the samples show the effects of inhibitory on both brown-rot, *Coniophora puteana* and white-rot fungi, *Pycnoporus sanguineus*. The most susceptible organisms are the *Coniophora puteana* which showed a lower average diameter of inhibition zone for all the sample. Lastly, the samples shown a positive result in being antimicrobial agents for both gram negative, *Escherichia coli* and gram positive, *Staphylococcus aureus*.

## BMF28: Performance of *P. betle* extraction as sensitizer in dye-sensitized solar cells (DSSCs)

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**Abstract.** Natural dyes extracted from *Piper betle* (*P. betle*) pigment, was utilized and researched as sensitizer in DSSCs application. The optical characteristics of the extracted dye and photovoltaic performance of the cells were studied. The extracts showed UV-vis absorptions in the range of 530–560 nm with broad maxima absorption at~ 430 nm. For *P. betle* the photovoltaic performance of the sample with 3.16 $\mu$ m-thick ZnO produced the best results with open-circuit voltage (V<sub>oc</sub>), short-circuit current density (J<sub>sc</sub>), fill factor (FF), and energy conversion efficiency ( $\eta$ ) values of 0.33 V, 6.35 mA/cm<sup>2</sup>, 0.52, and 1.09%, respectively.

## BMF29: The Comparison between Samarium Doped Nickel Oxide and Samarium Added Nickel Oxide on Dielectric Properties

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**Abstract.** In this research, the effect of Samarium Oxide (Sm) doped (mol%) NiO as a dopant and added (wt%) in NiO as ceramic composite were investigated. The comparison of both doped and added ceramic in their dielectric properties was studied. Both electroceramic  $\text{Ni}_{(1-x)}\text{Sm}_x\text{O}$  and  $\text{NiSmO}_3$  were prepared by using a solid-state reaction method. Samarium was added with five different concentrations, which are 0.01, 0.02, 0.03, 0.05, and 0.10 mol% for dopant and another five different concentrations which are 1, 2, 3, 4, and 5 wt% for addition in NiO. The XRD results show that both ceramic doped and added samples did not change the NiO cubic structure. Besides, a high concentration of  $\text{Sm}^{3+}$  causes the lattice parameter of NiO to increase. The dielectric behavior was observed in a frequency range of 100 to 100 000 Hz. The optimum composition for  $\text{Ni}_{(1-x)}\text{Sm}_x\text{O}$  and  $\text{NiSmO}_3$  was obtained at  $x = 0.01$  mol% and 5.0 wt% sample with highest  $\epsilon'$  ( $2.4 \times 10^4$  and  $9.3 \times 10^4$ ) respectively but at the same time, they exhibit high dielectric loss ( $\tan \delta$ ) with value 4.9 and 10.5 respectively.

## BMF30: Adsorption of Methylene Blue from Aqueous Solutions Using *Parkia speciosa* Pod-based Magnetic Biochar

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**Abstract.** This study was aimed to investigate the use of *Parkia speciosa* pod (petai pod) in the form of magnetic biochar as an efficient bioadsorbent to remove methylene blue (MB) in batch mode. The adsorption onto the magnetic biochar achieved about 99% of removal for all the initial concentrations studied (25 mg/L – 250 mg/L). The adsorption processes were studied using the adsorption isotherms, which were analysed using Langmuir and Freundlich model. The adsorption using magnetic biochar followed Freundlich model, indicating the heterogeneous surface of the magnetic biochar. Thus, the study showed that the *P. speciosa* pod (PSP) as agricultural waste has the potential to be used as a low-cost adsorbent.

## BMF31: Optimization and characterization of chitosan extracted from *Mucor rouxii*

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**Abstract.** Chitosan is a non-toxic, biodegradable and biocompatible biopolymer comprising of (1,4)-linked amino-deoxy- $\beta$ -D-glucan. The unique characteristics of biodegradability and non-toxicity led to versatile application of this biopolymers in various fields. The aim of this study was to identify factors which could optimize the yields and physicochemical characteristics of chitosan extracted from *Mucor rouxii* using different incubation period and temperature. Three combinations of incubation temperatures (98°C, 110°C and 121°C) and three incubation periods (15 minutes, 20 minutes, 25 minutes) were used in the alkaline treatment and the extracted chitosan were analysed for the dry weight, molecular weight and degree of deacetylation. Results shown that incubation temperature had a significant effect on the yield of chitosan ( $p<0.05$ ). Kruskal-Wallis test shown that, different incubation temperatures and periods had no significant effects on the molecular weight and degree of deacetylation ( $p>0.05$ ).

## BMF32: Raw and acetylated Sugarcane Bagasse (*Saccharum officinarum*) and Rubber wood (*Hevea brasiliensis*) in oil spill sorption at Pantai Kuala Perlis

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**Abstract.** In this research, raw and modified (acetylated) sugarcane bagasse (SGB) (*Saccharum officinarum*) and rubber wood (RB) (*Hevea brasiliensis*) were used as sorbents in oil sorption to absorb the used oil in the seawater sample at Pantai Kuala Perlis. The research is done using different time which are 5, 10 and 15 minutes with different thickness of oil layer which are 10 and 20 ml, using 2 g of sorbents. In the percentage of oil removal and oil sorption capacity, 15 minutes was chosen as optimum adsorption time and 10 ml as optimum oil thickness. In term of effect of adsorption time, for overall results, the longer the adsorption time, the higher the sorption capacity and percentage removal of oil. Meanwhile, in term of effect of oil layer thickness, the lower the thickness of oil layer, the higher the sorption capacity and percentage removal. For Fourier Transform Infrared Spectroscopy (FTIR), the spectroscopic data shown that both modified SGB and RB had O-H, CH<sub>3</sub> and C=O functional group at the range of 3000-3500, 2500-3000 and 1500-2000 cm<sup>-1</sup> respectively. These shown that modified RGB and RB had successfully synthesized. For salinity test, there were no significance different between the initial salinity and after-adsorption salinity of the seawater sample.

## BMF33: Development and Characterization of Nanoemulgel Containing *Piper betle* Essential Oil as Active Ingredient

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**Abstract.** This study aims to formulate and characterize a stable nanoemulgel containing *Piper betle* essential oil as the active ingredient for topical drug delivery. Nanoemulgel is a mixture of nanoemulsion and a gelling agent. Nanoemulsion was prepared by mixing the oil phase that containing soybean oil and *Piper betle* essential oil at different ratios, tween 80 as the surfactant and glycerol as the co-surfactant with the aqueous phase (distilled water). The essential oil of *Piper betle* was extracted by using a steam distillation method. The droplet size of nanoemulsion was in the range of 28 to 161 nm. The sizes were confirmed by dynamic light scattering method. Carbopol 940 was used as the gelling agent to increase the viscosity of the nanoemulsion and turn it into nanoemulgel. Nanoemulsion and nanoemulgel were characterised by using the Tyndall effect, spreadability test, and pH test. The pH of nanoemulgel with essential oil was in the range of 7 to 6, which is safe to be used on the skin. Nanoemulgel can be a suitable carrier for the active ingredient (essential oil) to be penetrated with ease into the skin because of its small droplets size. In conclusion, *Piper betle* nanoemulgel has shown great potential in helping the transdermal delivery.

### BMF34: Effect of alumina addition on physical and structural properties of ceramic porcelain

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**Abstract.** Porcelain usually made up of kaolin, feldspar, silica and alumina have properties as an electrical insulator. The effect of adding different amounts of alumina into the porcelain composition has revealed the positive possibility in the production of the ceramic insulator. The different types of raw materials which are feldspar, silica, kaolin and alumina used in the production of porcelain insulator samples by varying their composition. The properties of the porcelain sample after being sinter at 900 °C were identified according to their physical and structural properties. The porcelain sample properties were investigated using XRD, XRF and density test. The presence of corundum, quartz, albite and mullite phases was believed to increase the physical and structural strength of the porcelain sample.

## BMF35: Drying properties of Sentang (*Azadirachta excelsa*) dried under different temperatures

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**Abstract.** In this study, we investigated the drying properties of Sentang (*Azadirachta excelsa*) dried at different temperatures. Sentang tree planted in Kelantan, Malaysia, was used in this study. Drying specimens with dimensions of  $30 \times 150 \times 500$  mm were dried under air-drying conditions, a constant temperature of 60, 80, 100, and 120 °C until the moisture content (MC) of the specimens reaches an equilibrium moisture content (EMC) at each drying condition. The drying properties of the specimens were then examined. The results confirmed that drying temperature had a significant effect on drying time. As expected, drying Sentang under air-drying conditions demanding considerable time than the other drying conditions.

## BMF36: Preparation & Characterization of Microcrystalline Cellulose from Agriculture Waste

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**Abstract.** In this work, microcrystalline cellulose was prepared from oil palm trunk by water treated fibre process and alkali bleaching. The prepared samples were characterized by using Fourier-transform infrared spectroscopy attenuated total reflectance (FTIR-ATR), Scanning Electron Microscopy (SEM) and X-ray diffraction (XRD). FTIR-ATR spectra analysis indicates the presence of the hydroxyl group, alcohol, alkane/alkene and imine group. XRD patterns revealed the amorphous nature of the samples and the crystallinity index for extracted cellulose is 48.7 %. SEM images showed the fibrous structure of the microcrystalline cellulose with a size of 50  $\mu\text{m}$ . This research proved that the synthesized microcrystalline cellulose could be potentially used as reinforcement in biocomposite for better performance and ductility.

## BMF37: Ionizing Radiation as a Non-invasive Treatment for COVID-19 Patients – A Perspective Review

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**Abstract.** The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a single-stranded positive RNA virus surrounded by four structural proteins which are envelope, membrane, spike and nuclear capsid. This virus was identified at the end of 2019 and caused respiratory illness (i.e. coronavirus disease 2019: COVID-19). There is no specific vaccine or medication for the COVID-19 and current treatment relies on existing drugs including anti-viral and anti-inflammatory agents. Here, we describe the potential use electromagnetic radiation to treat COVID-19 infected individuals. The electromagnetic radiation, particularly UV-C has so far proved to be highly effective as coronavirus disinfectant method on medical instruments and material surfaces. Photochemical mechanisms of UV-C with human cell could alter the single strand RNA and effective to obtain photodimeric lesions in nucleic acid of the virus. Inactivation mechanisms by photodimers induced in genome commonly lead to mutagenesis, where base pairing during viral RNA replication will be interfere usually at pyrimidine dimers. Therefore, application of UV-C at moderate intensities within periodical irradiation on patient might be useful to inactivate RNA of SARS-CoV-2 and can be used as an alternative for non-invasive treatment of COVID-19 patients.

## BMF38: Preliminary Study of the Potential Graphene Oxide as Radioactive Clinical Wastewater Adsorbability in Nuclear Medicine

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**Abstract.** This paper reports the ability of graphene oxide (GO) as a radionuclide adsorbent material for an alternative approach in nuclear medicine radioactive waste management. Notable physicochemical properties of GO mainly consist of oxygen-containing functional groups on its basal plane and edges site in the form of epoxy, hydroxyl, and carboxyl groups, making it a promising candidate for radionuclide extraction material from aqueous solution. Herein, GO was synthesised via a simplified Hummers method. The radioactive clinical waste, which is urine, was collected right after the scanning procedure and mixed with GO in various concentrations: 1 mg/ml, 1.5 mg/ml, 2 mg/ml, 2.5 mg/ml, and 3 mg/ml. The mixture was then filtered using micropore filter paper, leaving sediments on the filter paper and wastewater residues. The radioactivity of sediment and water residue was determined by using a well counter after 3, 6, 9, and 12 hours of filtration process. The activities of the sediment and water residues were found to be decreased with increasing GO concentrations. The FESEM image revealed high agglomeration structure when the sample was treated with GO of 3 mg/ml concentration. Further analysis via EDX showed the presence of other elements in the urine, which led to its attraction to the GO-layered sheets. This analysis also confirmed the presence of oxygen-functioning group in GO that facilitated the agglomeration process and solidified the radionuclide waste.

## BMF39: Effect Additions Zn on Sn-0.7Cu Lead-Free Solder: A Short Brief

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**Abstract:** Sn-0.7Cu lead-free solder is an alternative solder material that suitable to replace Sn-Pb solder in electronic manufacturing. However, it has a weakness of high melting temperature and lower mechanical strength. In this study, the change in microstructure, elements, the structural and melting point of Sn-0.7Cu after the addition of different compositions of Zn element was discussed. The result shows that after adding a small amount of Zn, a refinement microstructure of Sn-0.7Cu-xZn solder alloy was obtained, and the melting point of the solder decreased from 227.7 °C to 225.7 °C. Besides, the formation new phase of was investigated by scanning electron microscope (SEM) followed by energy-dispersive x-ray spectroscopy (EDX) and x-ray diffraction (XRD). Besides, the behaviour of Sn-0.7Cu-xZn solder alloy can be further studied via open circuit potential (OCP) to determine the corrosion potential.

## BMF41: Synthesis of Zinc Oxide Nanostructures Growth by the role of pH variation

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**Abstract.** In this paper, we studythe morphology variation of zinc oxide (ZnO) nanostructures by varied the pH of precursor via the hydrothermal method. The Zinc chloride and ammonium hydroxide were used as a precursor, which was heated at 180°C for 24 hours. The pH of the precursor was varied from 7, 8, 9, 10 to 11 by the controlled amount of ammonium hydroxide. The samples were characterized with X-ray diffraction (XRD), Scanning electron microscope (SEM) and Ultraviolet-Visible (UV-Vis) spectroscopy. XRD pattern shows that the ZnO nanostructured exhibit the hexagonal wurtzite structure and average crystallite size is calculated. The morphology images revealed the rod and flower like structure for all samples. UV-Vis spectroscopy (UVs) shows the absorption or reflectance peaks of zinc oxide was around 350 to 450 nm. pH value was found key to the structure control of study.

## BMF42: Synthesis of Sodium Alginate Graphene Oxide-Silver Film for Antibacterial Activity

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**Abstract.** A facile synthesis of graphene oxide silver alginate film (GO-Ag) has been developed for the antibacterial activity. Graphene oxide (GO) was used as a substrate towards formation of unagglomerated silver nanoparticle (AgNPs) by a simple microwave irradiation on mixture of GO and silver complexes in the presence of alginate. The obtained nanocomposite were characterized by using Ultraviolet-visible spectroscopy (UV-Vis) and Xray Diffraction to confirm the formation of film composite. AgNPs with spherical-shape structure loaded on the GO Alginate layer showed a good antibacterial towards *E.Coli* and *Staphylococcus aureus*.

## BMF43: Investigation of Chemical Analysis and Physical Properties of Bio-polymer Waste Banana Peel Fibre Composite

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**Abstract.** The present work has investigate the conversion of waste banana peel fiber (WBP) a raw a material in the form of food industry wastes into value added bio-polymer which can be replaced synthetic plastics. WBP represent around 85% of the total by products generated from the brewing industry and is available in large quantities throughout the year; however its primary application has been limited to animal feed. Despite this, due to its chemical composition, it has value as lignocellulosic rich material. In this paper, raw WBP has undergone physical and chemical characterisation to determine the composition analysis of extractives, cellulose and lignocellulose of WBP. WBP fiber contains a high moisture content (approx. 75 wt. %). Then, it will be process into form of composite by added of variety glycerol content (0, 10, 20, 30 and 40 grams) mixed on a dry weight basis of WBP. The solution was premixed and then heated from room temperature to 80°C, where it was maintained for 1 h while being constantly mixing. The solution was then allowed to cool at 40 °C, and then, the glycerol was added to the gelatinized suspension. The suspension was then vigorously mixing for 45 min. The mixed suspensions were immediately poured onto a aluminium-nylon mesh mold to form a composite thin film. The films were then pressed with heat press machine at 120°C for 5 minutes. The composites will dried for 24 h in an ambient room temperature in dessicator at about 37 °C until they reached a constant weight. The thickness of the films was controlled by the addition of the same weight of suspension into a dish of same size. The final thickness of the film was about 0.20 mm. This research was focus on the chemical analysis of WBP fiber where it can determine the extractives, halocellulose, lignin and  $\alpha$ -cellulose. Then, the WBP fiber composite film were tested for physical properties analysis which were the thickness and density, moisture content, water solubility, water absorption and thickness swelling, porosity and contact angle (CA). This work shows that glycerol can strongly affect the functional properties of WBP fiber based composite

## BMF44: Effect of ZnFe<sub>2</sub>O<sub>4</sub> Filler Loading on the Morphology and Mechanical Properties of Epoxidised Natural Rubber 25 (ENR 25)

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**Abstract.** In this study, the effect of ZnFe<sub>2</sub>O<sub>4</sub> loading on the morphology and mechanical properties of epoxidised natural rubber 25 (ENR 25) was intensively investigated. The composite densities were measured using a density meter. The morphological analyses were characterised by scanning electron microscopy. The mechanical properties, including hardness, stress-strain behaviour, tensile strength, elongation at break, and tensile modulus were also investigated. The present rubber ferrite composite showed a particulate dispersion of ZnFe<sub>2</sub>O<sub>3</sub> on its morphological surface. The composite also presented characteristic of high density (1.592 g/cm<sup>3</sup>), hardness (44.63 Shore A at 120 phr), high tensile strength (14.09 MPa at 80 phr), high elongation at break (648.79 % at 120 phr), and high tensile modulus (100% modulus: 1.05% at 120 phr, 300% modulus: 1.93 MPa at 80 phr) compared to the ENR 25 without filler which is 1.006 g/cm<sup>3</sup>, 28.13 Shore A, 8.49 MPa, 615.18%, 0.65 (100% modulus) and 1.38 (300% modulus) respectively.

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