

# BOOK OF PROGRAM

## ICONES 2019

International Conference on Natural and Environmental Sciences  
*"Sustainable Nature and Environment in the Industrial Revolution 4.0"*

Banda Aceh, 26-27 July 2019



SYIAH  
KUALA  
UNIVERSITY



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## **Advisory Board**

Prof. Dr. Ir. Samsul Rizal, M.Eng.	Rector of Universitas Syiah Kuala, Indonesia
Prof. Dr. Ir. Marwan	Vice Rector for Academic Affairs, Universitas Syiah Kuala, Indonesia
Dr. Taufik Fuadi Abidin	Head of Institute for Research and Community Services, Universitas Syiah Kuala, Indonesia
Dr. T. M. Iqbalsyah	Dean, Faculty of Mathematics and Natural Sciences, Universitas Syiah Kuala, Indonesia

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### Scientific Committee Chair

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## Welcome Speech from Rector of Universitas Syiah Kuala

*Assalamu 'alaikum warahmatullahi wabarakatuhu,*

In the name of Allah, the Most Beneficent and the Most Merciful. May peace, mercy, and blessings of Allah be upon you. *Sholawat* and *salam* may everlastingly be upon our adoration, Great Prophet Muhammad SAW who had guided and led us from darkness into the shining bright path.

Honorable keynote speakers  
Honorable the invited speakers  
Honorable the Dean of FMIPA Universitas Syiah Kuala  
Honorable the committee  
Honorable all participants

Our special thanks are delivered to the keynote speakers: Assoc. Prof. Dr. Hadi Susanto from the University of Essex (UK); Assoc. Prof. Masatoshi Kondo from Tokyo Institute of Technology (Japan); Prof. Dr. Khalija Awang from the University of Malaya (Malaysia), and Dr. T. M. Iqbalsyah from Universitas Syiah Kuala who have allocated their time to fulfil the invitation, and to share knowledge and experiences from their respective academic institutions.

On behalf of Universitas Syiah Kuala, I would like to express my high appreciation and welcome you to “**The 3rd International Conference on Natural and Environmental Science (ICONES) 2019**” under the theme “*Sustainable Nature and Environment in the industrial revolution 4.0*”. This quinquennial conference is hosted by Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Syiah Kuala (Unsyiah). Previously, the first ICONES was held in 2009 to celebrate 20-year anniversary of FMIPA Unsyiah and the second ICONES was held in 2014.

Natural and Environmental Sciences are essential in our life. They mainly deal with the interaction between human systems and natural system using integrated mathematical, physical, biological, and chemical approach to discover solutions to environmental problems. Moreover, Natural and Environmental Sciences allow us to sustain and utilize natural resources efficiently as well as conserve biodiversity.

It is hoped that all the research results disseminated during the conference can be recorded and published, for the least, in an international proceeding. Furthermore, it is also hoped that all parties involved in this international conference can benefit and apply the new ideas and knowledge they get in managing activities in their areas in the future.

I hope that this conference can bridge and enhance further cooperation and network among the committee, attendees, and keynote speakers in research, publication, or other future academic activities.

Finally, by the grace and permission of Allah, “**The 3rd International Conference on Natural and Environmental Science (ICONES) 2019**” is officially opened. I wish you a very productive, successful and enjoyable conference.

*Wassalamu 'alaikum warahmatullahi wabarakatuhu,*

Prof. Dr. Ir. Samsul Rizal, M.Eng.  
Rector of Universitas Syiah Kuala

## Welcome Speech from Chairman

*Assalamu'alaikum warahmatullahi wabarakatuhu,*

Honorable Rector of Universitas Syiah Kuala, Prof. Dr. Ir. Samsul Rizal, M.Eng.

Honorable Dean of FMIPA Universitas Syiah Kuala, Dr. T.M. Iqbalsyah

Honorable the keynote and invited speakers

Honorable all the International Conference committee

Honorable all the International Conference participants

Honorable all collaboration partners and sponsors

On behalf of the organizing committee, I would like to welcome all of you to Banda Aceh, Indonesia for the **“The 3rd International Conference on Natural and Environmental Science (ICONES) 2019”**.

Under the theme of the conference *“Sustainable Nature and Environment in the industrial revolution 4.0”* this conference features cutting edge research findings and advancements as well as latest trends and development in science from multidisciplinary fields, including Green and renewable energy, Sustainable food, Biodiversity Preservation, Advanced Material, Drug discovery and development, and Big data for better life.

The keynote speakers for this international conference are Assoc. Prof. Dr. Hadi Susanto from the University of Essex (UK); Assoc. Prof. Masatoshi Kondo from Tokyo Institute of Technology (Japan); Prof. Dr. Khalija Awang from the University of Malaya (Malaysia); and Dr. T. M. Iqbalsyah from Universitas Syiah Kuala. Additionally, we also asked some invited speakers to enhance this international conference, namely, Dr. Kerista Sebayang from University of North Sumatera (USU) Indonesia; Dr. Nur Aida Hashim from Universiti Malaysia Terengganu (UMT) (Malaysia); Dr. Mohd Hazwan Hussin from Universiti Sains Malaysia (USM) (Malaysia); and Assoc. Prof. Dr. Fitmawati from University of Riau (UNRI) (Indonesia).

I may report that there are 44 participants joining this conference originating from different affiliations or nationalities, i.e. UK, Japan, Malaysia, and Indonesia with different backgrounds, i.e. students, lecturers, professors, and researchers. They will present their research in plenary oral sessions. The papers submitted and presented in this conference will be reviewed by scientific committee and selected for publication in the 4<sup>th</sup> Quarter 2019 of forthcoming volume of IOP Conference Series: Earth and Environmental Science.

This international conference will be completed with the Banda Aceh City tour. The tour is scheduled to visit various popular spots in Banda Aceh, such as the Tsunami Museum, the Floating boat, and the tsunami mass cemetery.

This international conference is held by Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Syiah Kuala (Unsyiah) as part of its 30<sup>th</sup> anniversary with the involvement and supports from the collaboration partners. On behalf of the organizing committee and Universitas Syiah Kuala, I would like to express my sincere appreciation to all members of the organizing committee, the international scientific committee and the reviewers for their finest efforts to organize this conference successfully. I would also like to appreciate the Institute for Research and Community Service (LPPM) Universitas Syiah Kuala for funding this international conference.

I hope that all attendees enjoy and benefit from this conference and we look forward to having a successful conference.

*Wassalamu'alaikum warahmatullahi wabarakatuhu,*

Prof. Dr. Marwan, M.Si.

Chairman

## Keynote Speakers

### **Assoc. Prof. Dr. Hadi Susanto**

*Associate Professor in Applied Mathematics, Department of Mathematical Sciences, University of Essex, UK*

Assoc. Prof. Dr. Hadi Susanto was born and grew up in Lumajang, East Java province of Indonesia. He was an undergraduate student (BSc 2001) in the Department of Mathematics of Institut Teknologi Bandung and subsequently did his postgraduate studies (MSc 2003, PhD 2006) in the Department of Applied Mathematics of the University of Twente under the supervision of Stephan van Gils.

He was a Visiting Assistant Professor (September 2005-December 2007) at the Department of Mathematics and Statistics of the University of Massachusetts, Amherst, USA mentored by Panos Kevrekidis. He was then Assistant Professor in Applied Mathematics (January 2008-December 2013) at the School of Mathematical Sciences of the University of Nottingham, UK. From September 2013, he is Associate Professor in Applied Mathematics in the Department of Mathematical Sciences of the University of Essex. Per January 2018, he is also Adjunct (Honorary) Professor in the Department of Mathematics, Institut Teknologi Bandung.

His research interests are in theoretical and computational dynamical systems and analysis applied to the study of nonlinear waves in partial and ordinary differential equations. Of particular interest has been the study of Klein-Gordon equations, nonlinear Schrödinger equations, Fermi-Pasta-Ulam-Tsingou-type equations, and reaction-diffusion equations, modelling physical reality in many different fields, including biology, condensed matter physics and nonlinear optics.

### **Assoc. Prof. Dr. Masatoshi Kondo**

*Laboratory for Advanced Nuclear Energy Dept. of Mechanical Engineering, Tokyo Institute of Technology, Japan*

Assoc. Prof. Dr. Masatoshi Kondo earned his doctoral program of Science and Engineering Department of Nuclear Engineering Tokyo Institute of Technology in 2006. His lab, Laboratory for Advanced Nuclear Energy Dept. of Mechanical Engineering, Major in Nuclear Engineering, Tokyo Institute of Technology conducts research in Nuclear fusion studies (Fuel/Blanket, Fusion systems engineering, Low activation material, Inertial confinement fusion). He is actively involved in numerous committees, including the Japan Society of Plasma Science and Nuclear Fusion Research and Atomic energy society of Japan.

### **Prof Dr. Khalija Awang**

*Department of Chemistry, Faculty of Science, University of Malaya, Malaysia*

Prof. Dr. Khalija Awang completed her doctoral degree at the Universite Rene Descartes, France in 1993 after finishing her master's degree from University of Malaya in 1991 and bachelor's degree from Waterloo University, Canada, in 1987. Her research interests are in natural Products and Medicinal Chemistry (natural products, NMR, alkaloids, biological activity, SAR/QSAR, Synthesis/ hemisynthesis. Her research involves the chemotaxonomy studies of plants from the Malaysian flora especially from the families of Annonaceae, Apocynaceae, Meliaceae and Rubiaceae. The biological activities, antiplasmodial, cytotoxicity, antihypertensive of the isolated compounds isolated were also investigated. Currently, she intensifies her investigations on Malaysian medicinal herbs/plants used in the traditional medicine practices leading to the standardization of medicinal plants and bioassay guided studies. Additionally, Dr. Awang is actively involved as a reviewer, PLoS ONE, Phytochemistry, Journal of Natural Products (Journal); a coordinator, French-Malaysian Collaborative Scientific Research Program; and a member, Natural Product Society of Malaysia Associate Member, Malaysian Institute of Chemistry (IKM).

### **Dr. Teuku M. Iqbalsyah**

*Department of Chemistry, Faculty of Mathematics and Natural Sciences, Indonesia*

Dr. Teuku M. Iqbalsyah is a senior lecturer in Biochemistry at the Faculty of Mathematics and Life Sciences. He got his PhD in Biochemistry from the University of Manchester, UK. His expertise is in the area of protein structure.

He teaches biochemistry-related courses at undergraduate and graduate levels, including Biochemistry, Fermentation Technology, Energy Metabolism and Biochemical Techniques. His current research focus is on novel primary and secondary metabolites produced from locally isolated thermo-halophilic microorganisms. He has authored and co-authored some international and national scientific papers.

## Invited Speakers

### **Dr. Nur Aida Hashim**

*School of Food Science and Technology, Universiti Malaysia Terengganu (UMT) Malaysia*

Dr. Nur Aida Hashim is currently a senior lecturer at the School of Food Science and Technology, Universiti Malaysia Terengganu (UMT). She received a PhD degree in Medical Entomology and minoring in Management Studies from the Universiti Sains Malaysia (USM) in 2013. She also received her MSc in Applied Entomology from the USM and graduated with BSc in Applied Science, majoring in Applied Entomology at the same university. Her current interests include Her current research projects in UMT focus on biology, ecology and control of agriculture and stored product insect pests such as sweet potato weevil, rice weevil, brown plant hopper, stem borer and leaf roller of paddy. She also currently conducting research on biology, ecology and behaviour of dengue vectors in Terengganu as well as insect pests associated with stingless bees.

### **Dr. Mohd Hazwan Hussin**

*School of Chemical Sciences, Universiti Sains Malaysia*

Dr. Mohd Hazwan Hussin is currently a senior lecturer at the School of Chemical Sciences, Universiti Sains Malaysia. He received his double PhD degree in Chemistry from Universite de Lorraine, France and USM. His current interests include lignocellulosic materials, valorization of chemical compounds extracted from biomass and corrosion protection.

### **Dr. Fitmawati**

*Department of Biology, University of Riau*

Dr. Fitmawati completed her doctoral program from Biology Department, Institut Pertanian Bogor (IPB) or IPB University, Indonesia after finishing her master program at the same university. Dr. Fitmawati is actively published scientific papers in reputable journals in international and national level.

### **Dr. Kerista Sebayang**

*Department of Physics, Faculty of Mathematic and Natural Sciences, Universitas Sumatera Utara, Medan, Indonesia*

Dr. Kerista Sebayang completed his doctoral program from Chemistry Department of Graduate School, University of North Sumatera (USU), Indonesia after finishing his master program in 1990 from Bandung Institute of Technology (ITB) and bachelor program in 1985 from University of North Sumatera (USU). Dr. Sebayang is actively published scientific papers in reputable journals in international and national level.

## **Guidelines**

### **Official Language**

The official language for the 3rd International Conference on Natural and Environmental Science (ICONES) 2019 is English. All presentations including questions and answers (Q&A) must be delivered in English.

### **Guideline for Participants**

#### **Conference Venue**

*Opening, Keynote session, and Closing Ceremony:*

Main Hall Hermes Palace Hotel

Jl. T. Panglima Nyak Makam, Lambhuk, Kec. Ulee Kareng, Kota Banda Aceh, Aceh 23117

*Parallel Sessions:*

Main Hall Hermes Palace Hotel

Jl. T. Panglima Nyak Makam, Lambhuk, Kec. Ulee Kareng, Kota Banda Aceh, Aceh 23117

#### **Registration**

Time for registration: 07:30 - 08:30, Friday, July 26, 2019 in the registration/information Help Desk at Lobby of Hermes Palace Hotel

#### **Conference Kits**

Conference kit, which contain Book of Program, Participant Badge, Seminar Kits, and Official Receipt of Registration payment is provided to participants during check in on registration.

#### **Certificate**

The certificates are provided to the presenters and participants after the parallel sessions.

### **Guideline for Oral Presenters and Session Chairs (Moderator)**

- The presenters and sessions chairs are asked to keep to the paper sequence as shown in the Program Schedule.
- All session chairs are requested to attend to the session's room 10 minutes before the session begins.
- All presenters are requested to report their attendance to the session chair 10 minutes before the session starts.
- All participants present the paper within 15 minutes including question-answer session.
- Notebook/Desktop PC and LCD projectors are available.
- Presenters are recommended to prepare their files in Microsoft® PowerPoint® format on a USB flash drive and copy in the PC at session room before the session begins. Our volunteers shall assist the presenters to copy the files before presentation.

## Technical Program Schedule

### Day 1 (July 26, 2019)

Time	Activities
7:30 - 8:30	Registration
8:30 – 9:00	Opening Ceremony Reciting a Holy book, Al-Quran Opening Remarks by Chairman and Rector
9:00 – 9:40	Keynote Speaker I <b>“Medicinal Plants and Natural Products”</b> <b>Prof Dr. Khalija Awang (University of Malaya)</b> Moderator: <i>Dr.rer.nat Ilham Maulana</i>
9:40 – 10:20	Keynote Speaker II “Forefront of Liquid Metal Technologies for Fusion Reactors” <b>Assoc Prof Dr. Masatoshi Kondo, (Tokyo Institute of Technology)</b> Moderator: <i>Dr.rer.nat Ilham Maulana</i>
10:20-10:30	<b>Discussion for Keynote Speaker I and II</b>
10:30-10:45	<b>Coffee Break</b>
10:45 – 11:25	Keynote Speaker III “Mathematics of Phytoplankton Blooms” <b>Assoc. Prof. Dr. Hadi Susanto, (University of Essex)</b> Moderator: <i>Dr. Said Munzir</i>
11:25-12.05	Keynote Speaker IV <b>Dr. Teuku M. Iqbalsyah (Universitas Syiah Kuala)</b> Moderator: <i>Dr. Said Munzir.</i>
12.05-12.15	<b>Discussion for Keynote Speaker III dan IV</b>
12:15- 14:00	Lunch
14:00 – 17:30	Parallel Sessions
17:30 – 17:45	Closing Ceremony

### Day 2 (July 27, 2019)

Time	Activities
08:00 – 09:00	Registration
09:00 – 12:30	City Tour of Banda Aceh

## Parallel Session Schedule

<b>Room A</b>		
<b>Topic</b>	<b>: Green and Renewable Energy, Sustainable food</b>	
<b>Time</b>	<b>: Friday, July 26, 2019 / 14:00 – 17:30</b>	
<b>Session Chair (Moderator)</b>	<b>: Dr. Nasrullah Idris</b>	
<b>Time</b>	<b>Papers and Authors</b>	<b>Paper Code</b>
14:00 – 14:30	Cellulose Nanofiber/Graphene Oxide Bionanocomposite Film Production by Employing Coal from Sawahlunto, West Sumatera as Graphite Source <b>Dr. Kerista Sebayang</b>	IS01
14:30 – 14:45	Utilizing Sabang Sea Urchin Shell as An Inexpensive and Alternative Heterogeneous Catalyst for Biodiesel Synthesis <b>Zahratul Hayati, Muliadi Ramli, Rara Mitaphonna, Amraini Amraini, Yola Nadia, Surya Lubis, Rizky Wardani</b>	PS01
14:45 - 15:00	Effect of Stabilization Using Autoclave and Microwave on the Proximate Value of Rice Bran as Food Material <b>Refani Fazira Panjaitan, Febriani, Hira Helwati</b>	PS02
15:00 - 15:15	Interpretation of Gravity Satellite Data to Delineate Structural Features Connected to Geothermal Resources at Bur Ni Geureudong Geothermal Field <b>Deviyani Rusdiyanti Putri, Nazli Ismail, Rinaldi Idroes, Syamsul Rizal</b>	PS03
15:15 - 15:30	Preliminary Study of Bioethanol Production by <i>Saccharomyces cerevisiae</i> BTCC12 Utilizing Hydrolysis Products of <i>Dioscorea hispida</i> tubers <b>Irmayadani, Teuku M. Iqbalsyah, Yopi, Febriani</b>	PS04
15:30 - 15:45	Utilization of Bananas Peels Waste for Citric Acid Production by <i>Aspergillus niger</i> <b>Khairan Khairan, Aulia Makstum, Cut Yulvizar</b>	PS05
15:45 - 16:00	Effects of addition of natural ingredients as antimicrobial agents in <i>Dioscorea hispida</i> Dennts starch-based biofilm <b>Diana, Khairani, Marlina, Sitti Saleha, Hira Helwati</b>	PS06
16:00 – 16:15	Combustion characteristics of densified bio-char produced from Gayo Arabica coffee-skin <b>Adi Setiawan, Faisal, and Taufiq Bin Nur</b>	PS07
16:15 - 16:30	Coffee Break	
16:30 - 16:45	Analysis of Yellowfish Tuna Fisheries Management ( <i>Thunnus albacares</i> ) in North Aceh Water <b>Aprianty, Indra, Sofyan</b>	PS08
16:45 - 17:00	Wave Properties using Displaced Phase Amplitude <b>Dwi Fadhiliani, Marwan Ramli, Syamsul Rizal, and Mahdhivan Syafwan</b>	PS09
17:00 - 17:15	Fermentation of coffee beans with inoculation of <i>Bacillus cereus</i> and its impact on coffee's sensory quality <b>Murna Muzaifa, Dian Hasni, Febriani, Anshar Patria, Amhar Abubakar</b>	PS10
17:15 – 17:30	Chemical and Sensory Analysis of Several Sweet Potato ( <i>Ipomoea batatas</i> L.) Clones <b>Mardhiah Hayati, Sabaruddin, Efendi, Ashabul Anhar</b>	PS11

## Room B

**Topic** : Advanced Material  
**Time** : Friday, July 26, 2019 / 14:00 – 17:30  
**Session Chair (Moderator)** : Dr. Muliadi Ramli

Time	Papers and Authors	Paper Code
14:00 – 14:30	Natural Plant Extracts as Green Corrosion Inhibitor for Metal <b>Dr. Mohd Hazwan Hussin</b>	IS02
14:30 – 14:45	Mechanical and physical properties of rice straw fiber-reinforced polypropylene composite <b>Ismail Ismail</b>	PS12
14:45 - 15:00	High Photocatalytic Activity of TiO <sub>2</sub> /Fe <sub>2</sub> O <sub>3</sub> Nanocomposite Prepared by Impregnation Method for Degradation of Indigo Carmine <b>Surya Lubis, Lelifajri, Sheilatina, and Khalidinul Ihsan</b>	PS13
15:00 - 15:15	Physical and Chemical Properties of Particleboard Made of Rice Straw and Plastic Waste <b>N Fitri, Mursal, and I Ismail</b>	PS14
15:15 - 15:30	<i>Ruellia tuberosa</i> L Anthocyanin Extract as a pH Sensitive Substance <b>Eka Safitri, Nurul Afifah, Khairi, Lelifajri, Nazaruddin, Susilawati, Diyana Sani</b>	PS15
15:30 - 15:45	Analysis of Mercury Concentration and Its Distribution Patterns in Water and Sediment Samples in the River area of Krueng Sabee, Krueng Panga and Krueng Teunom, Aceh <b>Siti Wahidah, Lelifajri, Khairi, Rinaldi Idroes, Rahmadi, Andi Lala, Mahmudi, Muslem, Aidil Fikri Japnur</b>	PS16
15:45 - 16:00	Energy dependence of Cl emission lines in TEA CO <sub>2</sub> laser induced breakdown spectroscopy <b>A M Sari, N Idris, M Ramli, K Kurihara</b>	PS17
16:00 – 16:15	Infrared Spectroscopy Characteristics of Mount Sinabung Volcanic Materials, North Sumatra, Indonesia <b>Nasrullah Zaini, Irwandi Irwandi</b>	PS18
16:15 - 16:30	Coffee Break	
16:30 - 16:45	Experimental investigation of a cold storage box with Aceh locally produced hydrated salt as phase change materials: effect of salt treatment <b>Gunawati, Nasruddin Noor, Kerista Sebayang, Adi Setiawan</b>	PS19
16:45 - 17:00	Analysis of Temperature and Column Variation in Gas Chromatography to Dead Time and Retention Time of n-alkane homologous series using Randomized Block Design <b>Rinaldi Idroes, Irfadatul Husna, Muslem Muslem, Mahmudi Mahmudi, Asep Rusyana, Zuchra Helwani, Ghazi Mauer Idroes, Rivansyah Suhendra, Novi Reandy Sasmita</b>	PS20
17:00 - 17:15	Preparation and characterization of cellulose acetate from cotton <b>E Huda, Rahmi, Khairan</b>	PS21
17:15 – 17:30	Study on the effect of mesh ratio to the potential distribution of RC cathodic protection using BEM <b>I. Tanjung, S. Fonna, S. Huzni</b>	PS22



## Room C

**Topic** : Biodiversity Preservation and Drug Discovery and Development  
**Time** : Friday, July 26, 2019 / 14:00 – 17:30  
**Session Chair (Moderator)** : Dr. Betty Mauliya Bustam

Time	Papers and Authors	Paper Code
14:00 – 14:30	The Conservation Efforts of Wild Plant Species with Revealing Its Therapeutic Potential, Case in Wild Mango in Sumatra. <b>Dr. Fitmawati</b>	IS3
14:30 – 14:45	Morphological Identification of <i>Fusarium</i> Species Isolated from Infected Sea Turtle Nests in Peninsular Malaysia <b>Noorkhalilie Che Abd. Aziz, Siti Nordahliawate Mohamed Sidique, Nik Mohd Izham Mohamed Nor</b>	PS23
14:45 - 15:00	Endophytic fungi from leaves of <i>Syzygium cumini</i> , <i>Senna siamea</i> and <i>Annona muricata</i> and its potential as antimicrobial agents <b>Nurhaida, Tong Woei Yenn, Darah Ibrahim</b>	PS24
15:00 - 15:15	Effect of Silicon Nutrient on the Plant Growth of Pepper Plant ( <i>Piper nigrum</i> ) <b>Nur Ainu Farhah Rabae, Siti Nordahliawate Mohamed Sidique, and Xiaolei Jin</b>	PS25
15:15 - 15:30	Flowers Preferred by Stingless Bee, <i>Heterotrigona itama</i> and The Association of The Flowers and The Bee's Mouth Morphology <b>Norasmah Basari, Sarah Najiah Ramli, Nur Adawiyah Abdul Mutalid, Nur Fariza M. Shaipulah</b>	PS26
15:30 - 15:45	Free Radical Scavenging Activity of Methanolic Extract of Temurui ( <i>Murraya koenigii</i> L. Spreng) Collected from Langsa, Aceh <b>Rahayu Rahayu, Silvia Ningsih, Fatira Golda Nehru, Ulil Amna, Halimatussakdiah Halimatussakdia</b>	PS27
15:45 - 16:00	Indigenous Knowledge of Postnatal Mother Care Using Plants by Acehnese <b>Zumaidar, Saudah, Saida Rasnovi, Essy Harnelly</b>	PS28
16:00 – 16:15	Isolation and activity antioxidant test of cocoa pod husk ethyl acetate extracts ( <i>Theobroma cacao</i> L) <b>Ratna Juwita Umri, Ilham Maulana, Binawati Ginting</b>	PS29
16:15 - 16:30	Coffee Break	
16:30 - 16:45	Mud-Puddling Behaviour of Butterflies in the Soraya Research Station, District of Subulussalam, Aceh, Indonesia <b>Suwarno, Saida Rasnovi, Sri Dewi Utami, Dahelmi</b>	PS30
16:45 - 17:00	Diversity of gastropods epifauna Based on Substrate in Littoral Zone in Mesjid Raya, District of Aceh Besar, Indonesia <b>Hasballah, Muhammad Ali Sarong, Suwarno</b>	PS31
17:00 - 17:15	Model of Virus Therapy and Chemotherapy for Cancer <b>Evi Safitri, Tarmizi, Marwan Ramli</b>	PS32
17:15 – 17:30	Initial Effect of The Glutathione on The Motility and Viability of African Catfish <i>Clarias garipinus</i> Spermatozoa After Cryopreservation <b>Raudhah Mahfudhah, Kartini Eriani, Z. A. Muchlisin</b>	PS33

## Room D

**Topic** : Big Data for Better Life  
**Time** : Friday, July 26, 2019 / 14:00 – 17:30  
**Session Chair (Moderator)** : Dr. Yulia Sari Ismail

Time	Papers and Authors	Paper Code
14:00 – 14:30	Assessing Dengue Vector Abundance in Penang Island by Cluster Analysis <b>Dr. Nur Aida Hashim</b>	IS4
14:30 – 14:45	The Potential Use of Satellite Gravity Data for Oil Prospecting in Tanimbar Basin, Eastern Indonesia <b>Muhammad Yanis, Marwan</b>	PS34
14:45 - 15:00	Dead Time Determination of 2-Alkanones and Alkylarylketones Homologues Series using Methanol/Water Eluent in High Performance Liquid Chromatography System by Indirect Methods <b>Rinaldi Idroes, Muslem Muslem, Saiful Saiful, Mahmudi Mahmudi, Ghazi Mauer Idroes, Rivansyah Suhendra, Irvanizam Irvanizam, Zamzami Zamzami, Maria Paristiwati</b>	PS35
15:00 - 15:15	The determination of depth anomaly in Archaeo-magnetic using euler deconvolution; case study in Kuta Lubok Fortress <b>Muzakir Muzakir, Muhammad Yanis, Dian Darisma, Marwan Marwan, Nazli Ismail</b>	PS36
15:15 - 15:30	One-dimensional magnetotelluric inversion using least-square approach and particle swarm optimization algorithm <b>Dian Darisma, Marwan Marwan</b>	PS37
15:30 - 15:45	The 2D Resistivity Modelling on North Sumatran Fault Structure by using Magnetotelluric Data <b>Masykur Rizal, Muhammad Syukri Surbakti, Muzakir Muzakir, Nazli Ismail Mail</b>	PS38
15:45 - 16:00	Surface Water Quality Assessment and Monitoring in Aceh Jaya Disctric <b>Saiful, Abduh Ulim, Asri Gani</b>	PS39
16:00 – 16:15	Wind Disturbance Elimination on Dual Axis Solar Tracker Using Fuzzy Logic Control <b>M.Ikhwan, S Rizal, Marwan, Muchlisin Z A, Mardlijah</b>	PS40
16:15 - 16:30	Coffee Break	
16:30 - 16:45	Picturing Diphtheria Outbreak in Indonesia using National Annual Report Data: What are the lessons learned? <b>Tristia Rinanda, Mudatsir Mudatsir, Raihan Raihan, Sakdiah Sakdiah</b>	PS41
16:45 - 17:00	Simple Combination Method of FTIR Spectroscopy and Chemometrics for Qualitative Identification of Cattle Bones <b>Yola Nadia, Muliadi Ramli, Aidil Fikri Japnur, Asep Rusyana, Ghazi Mauer Idroes, Rivansyah Suhendra, Novi Reandy Sasmita, Rinaldi Idroes</b>	PS42

Time	Papers and Authors	Paper Code
17:00 - 17:15	The Spatial Distribution of <i>Bactrocera dorsalis</i> after 15 Years of the 2004 Indian Ocean Tsunami in Banda Aceh, Indonesia <b>Cut Januarita, Alfi Rahman, Suwarno, Saida Rasnovi</b>	PS43
17:15 – 17:30	Utilizing Web Based GIS Services for Retrieving and Disseminating Geographic Information for Disaster Management <b>Nizamuddin, Ardiansyah, Hizir Sofyan, Muzailin, W. A Aldika</b>	PS44

**KS01**

## **Mathematics of Phytoplankton Blooms**

**Hadi Susanto<sup>1\*</sup>**

<sup>1</sup>Department of Mathematical Sciences, University of Essex, UK

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**Abstract.** In this talk, I will review and discuss bloom formations in nature. As a particular case, I will present my study on a two-species predator-prey plankton model, modelling the interactions of microzooplankton and phytoplankton. The system is analysed in order to explain the conditions for phytoplankton bloom formation and to explore system bifurcations. When a spatial diffusion term is included, we obtain a reaction–diffusion system that is investigated by determining the Turing space of the model. Thereafter, a bifurcation analysis of specific pattern formation is explored. The system is shown to exhibit the potential for temporally varying spatial patterns.

**KS02**

## **Forefront of Liquid Metal Technologies for Fusion Reactors**

**Masatoshi Kondo<sup>1\*</sup>**

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**Abstract.** Fusion reactor is innovative power plant, which can realize sustainable society. The important issue is the development of key in-vessel components, i.e. blanket and divertor. The blanket is essential component being in charge of tritium breeding and energy conversion. Self-cooling liquid blanket concepts have been studied both for magnetic confinement fusion reactors and inertial fusion reactors, since the blanket structure can be simplified according to their multi-function such as a T breeder, a T transporter, a reactor coolant and a shielding material. Liquid metals lithium (Li) and lead lithium alloy (Pb-16Li) are candidate tritium breeders. The divertor is responsible for power exhaust and impurity removal thorough guided plasma exhaust in magnetic plasma confinement systems. The divertor is exposed to high-energy neutron and large heat load about 5 to 10MW/m<sup>2</sup>. The critical issue for the divertor development is to mitigate the damage of its structural material by large heat load. The liquid surface divertor concept, in which the surface of the structural material is covered and protected by the liquid metal coolant, is being proposed. In this concept, the recycling of plasma particles can be suppressed due to their adsorption and transport by the flowing liquid metal coolant. Then, the plasma performance may be improved. Thus, the liquid divertor concepts have some strong advantages, which can achieve longer lifetime of the system and better plasma performance. Liquid tin (Sn) which has extremely low vapour pressure is candidate coolant of the liquid divertor. In the present paper, recent studies on the liquid blanket and the liquid divertor are introduced. The thermophysical properties of the liquid breeders and the liquid metal coolants are reviewed. The chemical compatibility between liquid metals and structural materials is important issue for the development of above-mentioned in-vessel components. The research campaign on the material compatibility are newly started to make clear the corrosion kinetics, which is influenced by thermal-fluid conditions and neutron irradiation. Recent progress of the material compatibility studies is reported.

**KS03**

## **Medicinal Plants and Natural Products**

**Khalijah Awang<sup>1\*</sup>**

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**Abstract.** Since the time of the oldest civilization, nature has been the source of medicines, particularly plants. However, many medicines are produced synthetically at present. Today, with increasing concern over the wellbeing and a cleaner environment, the interest in plants as an alternative source of medicines has revived. Actually, plants has always been used, until today, to treat various maladies such as diabetes, fever and microbial infections as herbal preparations in traditional health/cure practices. Therefore, this presentation will discuss the various research that has been accomplished by the Phytolab group, University Malaya, on selected medicinal plants such as *Alpinia conchigera* (lengkuas ranting), *Curcuma zedoaria* (kunyit putih), *Mitragyna speciosa* (ketum), and *Brucea javanica* (melada pahit). These plants have been used in traditional medicine and we have studied through bioassay guided and chemical constituent studies to give a scientific support on their claimed efficacies. Structures below are some of the active chemical compounds from these plants. Results from plants collected from the Malayan flora with bioactive compounds will also be discussed briefly.

**KS04**

## **Searching for Robust Microbial Enzymes: Back to the old days**

**T M Iqbalsyah<sup>1\*</sup>**

<sup>1</sup>Biomolecules Application Research Group, Chemistry Department, Faculty of Mathematics and Natural Sciences, Syiah Kuala University, Banda Aceh, Indonesia

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**Abstract.** Enzyme engineering by rationale and computational design as well as directed evolution has limitations, as the activity and stability of the enzymes are compromised. Our group has, therefore, been focusing on finding novel robust enzymes from nature. Undersea fumarole in Pria Laot Area of Weh Island provides a harsh environment, in term of high temperature and salinity, for bacteria to produce enzymes with thermophilic and halophilic properties. Amongst many strains isolated from the area, two strains (dubbed PLS 75 and PLS 80) were novel compared to other reported strains by phylogenetic analysis of the 16s rRNA genes. PLS 75 was able to produce both  $\alpha$ -amylase and cellulase. The molecular weight of the  $\alpha$ -amylase was much smaller (14 KDa) than other reports. It was a thermophilic acidic  $\alpha$ -amylase as it showed optimum activity at 80 °C and pH 5. The activity increased when in methanol, hexane, and in the presence of high salt concentrations. The ability to hydrolyze starch in extreme conditions makes the enzyme potential in providing media from biomass for bioethanol fermentation. Meanwhile, the lipase from PLS 80 was able to catalyze both the hydrolysis and trans-esterification of lipid. It was most active at alkaline pH and 70 °C. Although the molecular weight was high (50 kDa), the lipase was active in the presence of mercury. The enzyme showed an excellent activity on long fatty acids substrates, which is useful in a biodiesel production application. Further studies may make both strains have the potential to find a niche in renewable energy production.

IS01

## Cellulose Nanofiber/Graphene Oxide Bionanocomposite Film Production by Employing Coal from Sawahlunto, West Sumatera as Graphite Source

Kerista Sebayang<sup>1</sup>, Saharman Gea<sup>2\*</sup>, Cut Fatimah Zuhra<sup>2</sup>, Dinda Mestika Putri<sup>2</sup>, Vivi Purwandari<sup>3</sup>

<sup>1</sup>Department of Physics, Faculty of Mathematic and Natural Sciences, Universitas Sumatera Utara, Medan, Indonesia

<sup>2</sup>Department of Chemistry, Faculty of Mathematic and Natural Sciences, Universitas Sumatera Utara, Medan, Indonesia

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**Abstract.** The need in producing advanced materials with vast abilities has been dominating recent research performance. The challenge that needs to be addressed is the involvement of natural resources as an affordable and effective basic material. This research has successfully produced Cellulose Nanofiber (CNF)/Graphene Oxide (GO) Bionanocomposite film from utilizing Oil Palm Empty Fruit Bunch (OPEFB) solid waste as a source of cellulose, and Coal from Sawahlunto region, West Sumatera, Indonesia as graphite alternative source. The cellulose was isolated from the OPEFB solid waste through the steam explosion method, and then ultrasonic and homogenizer processing method were performed to yield cellulose nanofiber. On the other hand, the coal from Sawahlunto was converted into graphite, and then oxidized with hummer method in order to produce graphene oxide. At last, CNF/GO bionanocomposite film was produced by mixing method and hydraulically hot-pressed. Several characterizations, such as Fourier Transform Infrared (FT-IR), X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM) have been conducted to analyse the bionanocomposite film. Those characterizations have indicated the successful production of CNF, GO and CNF/GO bionanocomposite. Furthermore, it is found that graphene oxide is evenly dispersed into the CNF matrices, indicating that graphene oxide has decent performance to be filler for cellulose nanofiber matrices with flat and homogenous surface.



**IS02**

## **Natural Plant Extracts as Green Corrosion Inhibitor for Metal**

**Mohd Hazwan Hussin<sup>1</sup>**

<sup>1</sup>Materials Technology Research Group (MaTReC), School of Chemical Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia

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**Abstract.** Traditionally, reduction of corrosion has been managed by various methods including cathodic protection, process control, reduction of the metal impurity content, and application of surface treatment techniques, as well as incorporation of suitable alloys. However, the use of corrosion inhibitors has proven to be the easiest and cheapest method for corrosion protection and prevention in acidic media. These inhibitors slow down the corrosion rate and thus prevent monetary losses due to metallic corrosion on industrial vessels, equipment, or surfaces. Inorganic and organic inhibitors are toxic and costly and thus recent focus has been turned to develop environmentally benign methods for corrosion retardation. Many researchers have recently focused on corrosion prevention methods using green inhibitors for metals in acidic solutions to mimic industrial processes. This presentation provides an overview of types of corrosion, corrosion process, and mainly recent work done on the application of natural plant extracts as corrosion inhibitors for metals.

IS03

## The Conservation Efforts of Wild Plant Species with Revealing Its Therapeutic Potential, Case in Wild Mango in Sumatra

Fitmawati<sup>1\*</sup>

<sup>1</sup>Department of Biology, Faculty of Mathematics and Natural Sciences, University of Riau  
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**Abstract.** Sumatera forests are threatened with extinction due to rapid and massive deforestation and land clearing which requires us as scientists to save the rich biodiversity of the Sumatra tropical rainforest. Over the past 31 years, deforestation has removed Sumatra's natural forests by 34%. One the first steps to rescue germplasm was collected information about biodiversity of Sumatra Mango from 2012 to 2016. The results from exploration show that Sumatera has eight wild mango spesies which is *Mangifera quadrifida*, *M. torquenda*, *M. magnifica*, *M. grifithii*, *M. kemanga*, *M. sumatrana*, *Mangifera* sp1. (Mangga Bukit Suligi), and *Mangifera* sp2. (Mangga Hutan). Wild mangoes are less valuable fruits, so people are not interested to cultivate it. These types have the potential not to pass domestication and slowly will disappear automatically without being known for their benefits. Eventually it will increase the number of threatened species in the wild. The protection (conservation) of wild mango species in their natural habitat will not be effective if the benefits of that plants is unknown, while the typical and unique characteristics shows that this plant has the potential as terapeutic agent. The antioxidant activity show that the antioxidan content of wild mango very strong with IC50 values approximately from 0.8 to 66.8 ppm especially *M. magnifica*, *Mangifera* sp1, and *Mangifera* sp2. Antioxidant is important to resolve some degenerative diseases and improving immunity. Base on immunomodulator ability test, the highest phagocytosis activity of macrophage cells was found in ethanol extract of *Mangifera* sp2. leaves with (84%). The highest phagocytosis capacity of the macrophage cells was also found in ethanol extract of *Mangifera* sp2. leaves with an average phagocytic capacaity of 171.67 from 50 active macrophages. The results of this study indicated that wild mango leaves had the potential of immunostimulant activity. The positive result of toxicity test using Brine Shrimp Lethality Test (BSLT) method showed the high cell apoptosis ability. The bark of *Mangifera* sp2. has the highest toxicity and the lowest toxicity is the bark of *M. sumatrana*. This research is the foundation in an effort to protect wild mango species in their natural habitat through the development of standardized herbal medicinal phytopharmaca.

IS04

## Assessing Dengue Vector Abundance in Penang Island by Cluster Analysis

Nur Aida Hashim<sup>1,2\*</sup>, Abu Hassan Ahmad<sup>3</sup>, Anita Talib<sup>4</sup> and Suwarno<sup>5</sup>

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**Abstract.** Dengue is one of the deadliest mosquito-borne disease in the world. *Aedes albopictus* and *Aedes aegypti* are the two responsible vectors for the disease. In this study, self-organizing map (SOM) was applied for ordination, clustering and mapping of the *Ae. aegypti* and *Ae. albopictus* abundance with their breeding container sizes. It was found that the abundance of vector related with the size of breeding container. Regardless of urbanization level, *Ae. albopictus* was more abundant in medium size containers, while *Ae. aegypti* was found more abundant in large containers. This finding suggested that for control efforts, eliminating medium and large breeding containers will significantly reduce *Aedes* population in Penang Island.

## PS01

### Utilizing Sabang Sea Urchin Shell as An Inexpensive and Alternative Heterogeneous Catalyst for Biodiesel Synthesis

Zahratul Hayati<sup>1</sup>, Rara Mitaphonna<sup>1</sup>, Amraini<sup>1</sup>, Yola Nadia<sup>1</sup>, Surya Lubis<sup>1</sup> and Muliadi Ramli<sup>1\*</sup>, Rizky Wardani<sup>1</sup>

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**Abstract.** This research is focused on the utilization of sea urchin shell found in Sabang Island as a raw material for heterogeneous catalyst synthesis and Its catalytic study on transesterification reaction of palm oil and methanol to produce fatty acid methyl esters which referred as biodiesel compound. The catalyst was prepared through thermal decomposition method, namely it was calcinated at 900 C in air atmosphere and then its doped by different concentration of potassium element (5%, 10% and 20% wt/wt) with using impregantion process. The characterization result by using X-Ray Diffraction (XRD) proved that the produced catalyst was dominated by CaO crystals, in which MgO was detected as minor compound. Another ccharacterization process using Scanning Electron Microscope-Energy Dispersive Spectroscopy (SEM-EDS) was indicated that the produced catalyst has been homogeneous on its morphology. Finally, in order to have scientific information regarding its catalytic activity, the catalyst was succesfully applied on transesterification reaction of palm oil and methanol resulting ricinoleic methyl esters as the main biodiesel product.

## PS02

### Effect of Stabilization Using Autoclave and Microwave on the Proximate Value of Rice Bran as Food Material

Refani Fazira Panjaitan<sup>1</sup>, Febriani<sup>1</sup>. Hira Helwati<sup>1\*</sup>

<sup>1</sup>Chemistry Department, University of Syiah Kuala, Banda Aceh, Indonesia, 2311

\*E-mail: muliadiramli@unsyiah.ac.id

**Abstract.** This research is focused on the utilization of sea urchin shell found in Sabang Island as a raw material for heterogeneous catalyst synthesis and Its catalytic study on transesterification reaction of palm oil and methanol to produce fatty acid methyl esters which referred as biodiesel compound. The catalyst was prepared through thermal decomposition method, namely it was calcinated at 900 C in air atmosphere and then its doped by different concentration of potassium element (5%, 10% and 20% wt/wt) with using impregantion process. The characterization result by using X-Ray Diffraction (XRD) proved that the produced catalyst was dominated by CaO crystals, in which MgO was detected as minor compound. Another ccharacterization process using Scanning Electron Microscope-Energy Dispersive Spectroscopy (SEM-EDS) was indicated that the produced catalyst has been homogeneous on its morphology. Finally, in order to have scientific information regarding its catalytic activity, the catalyst was succesfully applied on transesterification reaction of palm oil and methanol resulting ricinoleic methyl esters as the main biodiesel product.

PS03

## Interpretation of Gravity Satellite Data to Delineate Structural Features Connected to Geothermal Resources at Bur Ni Geureudong Geothermal Field

Deviyani Rusdiyanti Putri<sup>1\*</sup>, Nazli Ismail<sup>2</sup>, Rinaldi Idroes<sup>3</sup>, Syamsul Rizal<sup>4</sup>, Muhammad Nanda<sup>5</sup>

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**Abstract.** The gravity method is often use in analyzing geothermal potential studies. The method is carried out in various objectives as well as determining potential areas, reservoir locations, and various other studies. In this paper, satellite gravity data is applied to well understand the surface geological conditions connected with geothermal manifestations arround Bur Ni Geureudong geothermal field located in Bener Meriah District, Aceh, Indonesia. Free Air anomaly data obtained freely from satellite geodesy information with 1 minute-grid and then processed to obtained Bouguer anomaly distribution maps in the study area which showed a response to the existence of geothermal manifestations. The Tilt Derivative technique was applied revealed by Bouguer anomaly to enhance linear trends of geological structures. The emphazise of this analytical technique is able to clearly display faults correlate with hot springs around the area.

## PS04

### **Preliminary Study of Bioethanol Production by *Saccharomyces cerevisiae* BTCC12 Utilizing Hydrolysis Products of *Dioscorea hispida* tubers**

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**Abstract.** *Dioscorea hispida* is an underutilized plant despite its high carbohydrate and other useful content. This study utilized *D. hispida* flour as the raw material for bioethanol production by employing Separated Hydrolysis Fermentation (SHF) technique. Initially, the starch was used as the sole carbon source for *Aspergillus awamori* KT-11 to produce amylases. The optimum enzyme activity (7.4 U/ml) was observed at 96 hours fermentation. The enzymes were then used to hydrolyse *D. hispida* flour. The optimum condition for the hydrolysis was achieved at 9 hours when using a mixture of starch and enzyme solution with a ratio of 1:6 (w/v). Thin layer chromatography results showed that qualitatively the main sugar product of the hydrolysis was glucose, followed by fructose and maltose. The hydrolysates were then used by *Saccharomyces cerevisiae* BTCC12 as the media for bioethanol fermentation conducted at 30 °C and 150 rpm. HPLC analysis showed that the concentration of ethanol after 6 hours was 0.37 g/L and the reducing sugar concentration only 2.9% of the initial. The results provide a solid basis for further studies to optimized ethanol fermentation utilizing *D. hispida* as the substrate.

## PS05

### **Utilization of Bananas Peels Waste for Citric Acid Production by *Aspergillus niger***

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**Abstract.** The potential of Bananas peels waste of Pisang Ayam (*Musa acuminata*), Pisang Raja (*Musa Paradisiaca* cv. Raja genom AAB), and Pisang Nipah (*Musa balbisiana*) as substrate for citric acid production by *Aspergillus niger* were have been investigated. The main purposes of this research was to determine the percentages of citric acid production, pH, and total biomass at differences of media of Bananas peels waste. The results showed that the percentages of citric acid production using media of *Musa acuminata*, *Musa Paradisiaca* cv. Raja genom AAB and *Musa balbisiana* were 58.80; 69.84; and 46.80% respectively. The pH values of each media were 2.50; 1.50; and 2.0 respectively. The results also founded that the total biomass of each media were 2.442; 2.649; and 2.407 respectively. Overall, the results showed that Banana peels waste of *Musa Paradisiaca* produce the highest amount of citric acid after 240 h fermentation.

PS06

## Effects of addition of natural ingredients as antimicrobial agents in *Dioscorea hispida* Dennts starch-based biofilm

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**Abstract.** The addition of antimicrobial agent ingredients in food packaging bioplastic aims to extend the food storage period and prevent the growth of pathogenic microbes. The use of antimicrobial agents from natural ingredients can make the biofilms safer to use. In this study, biofilms were made by adding natural antimicrobial agents from turmeric extract with the composition of 1.2% starch, 0.4% chitosan and variation of turmeric extract concentrations. 1.5% glycerol were added as a plasticizing. The best biofilms obtained by adding 0.375% of the extract with tensile strength and elongation values were 18.1 kgf / mm<sup>2</sup> and 30.24%. SEM photography showed that the edible film had a smooth surface. The edible films can inhibit the growth of *Escherichia coli* bacteria which can be seen from the formation of clear zones around edible films on antimicrobial activity assay by agar diffusion method.

PS07

## Combustion characteristics of densified bio-char produced from Gayo Arabica coffee-skin

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**Abstract.** Increasing number of coffee-by-products highlights its potential as source of renewable energy. The use of coffee skin as a raw material for bio-briquettes is considered as an effective way to minimize their wastage as landfill. This study aims to examine the characteristics of bio-briquettes produced through a slow pyrolysis process and densified at a pressure of 100, 150 and 200 kg/cm<sup>2</sup>. Prior to briquetting process, the raw material was sun-dried, pyrolyzed, ground and sieved to 0.841 mm. A mixture was then made by adding starch binder followed by molding and drying processes. Characterization of the briquette employs a number of techniques including DSC, TGA, bomb calorimeter and proximate analyses as well as mechanical testing. The results show that the calorific value of the coffee-skin briquette is 16780 J/g containing 9.5 wt% of moisture, 18 wt.% ash. The rate of combustion is 0.02 g/s with ignition time of 196 s. Varying briquetting pressure results in a change in ignition time of bio-briquettes as the density is increased. A significant change was also observed on the rate of combustion upon increasing the briquetting pressure. This investigation concludes the potential use of coffee industry by-product as feedstock for solid biomass fuel production.

PS08

## Analysis of Yellowfin Tuna (*Thunnus Albacares*) Fisheries Management in North Aceh Water

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**Abstract.** This study describes bioeconomic analysis of resource utilization Yellowfin Tuna on various management regimes through Gordon Schaefer's Model with Fox algorithm biological parameter estimation model. The purpose of this study was to analyze the biological and economic aspects of the level of utilization of Yellowfin Tuna resources. The study was conducted at the Kutaraja Fishing Port in Banda Aceh by survey method. The results showed the intrinsic growth ( $r$ ) was 0.876072655 tons per year, the catchability coefficient ( $q$ ) was 0.000158046 tons per year, the carrying capacity was 6.873.10 tons per year, the cost ( $c$ ) was Rp. 17.55 million per trip and price ( $p$ ) is Rp. 34.94 million per ton. Based on these parameters, the management regime at the time of MSY obtained the production level ( $h$ ) of 1.505.33 tons per year, the effort amounted to 2,771.58 trips per year and the economic interest rate ( $\pi$ ) of Rp. 3,955.15 million per year. In MEY conditions, the production rate ( $h$ ) is 1,183.48 tons per year, the effort is 1,490.01 trips per year, and the economic interest rate ( $\pi$ ) is Rp. 15,199.41 million per year. In the condition of management of open access production ( $h$ ) is 1,496.82 tons per year with an effort of 2,980.03 trips per year and economic interest of Rp 0. The results of the static parameter analysis show that the utilization of the Yellowfin Tuna in North Aceh waters has experienced economical overfishing and biological overfishing.



## PS09

### Wave Properties using Displaced Phases Amplitude

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**Abstract.** Displaced phase-amplitude variable in polar form. This variable is used to investigate changes in amplitude in complex fields with phases that depend only on the position in the propagation. Soliton on Finite Background (SFB) which is an exact solution of Nonlinear Schrodinger (NLS) equation has been widely used in investigating wave propagation dynamics so that it is the basic for the proposed displaced phase-amplitude. Using displaced phase-amplitude, the results obtained can be described in Argand Diagrams. Wave equation used as a model is the Benjamin Bona Mahony (BBM) equation where the envelope of this wave evolves following the NLS equation. This wave is unidirectional long wave on the surface and has low amplitude characteristics. Phenomenon phase singularity that occur in wave propagation can be investigated through argand diagrams, but for more details can be reviewed on graphs of real numbers in complex numbers. This phenomenon has a significant effect on the increase in amplitude. It is found that the modulation frequency affects the phase and the phenomena of phase singularity occur at certain frequency intervals in wave propagation.

## PS10

### Fermentation of Coffee Beans with Inoculation of *Bacillus cereus* and its Impact on Coffee's Sensory Quality

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**Abstract.** The aim of this research was to study the coffee fermentation with inoculation of *Bacillus cereus* isolated from civet (*Paradoxorus hermaphroditus*) as starter culture. The quality of coffee was evaluated by sensory quality (cup test). Two treatments were carried out: control/coffee not inoculated starter culture (treatment A) and coffee inoculated with *Bacillus cereus* starter culture (treatment B). The fermentations were conducted for 48 h in triplicate. A panel of five trained coffee testers (Q-grader from Gayo Cupper's Team) evaluated the samples. Ten sensorial attributes analyzed were fragrance/aroma, flavor, aftertaste, acidity, body, uniformity, balance, sweetness, cleanliness and overall. The result showed that the use of *Bacillus cereus* starter culture can improve quality of coffee fermentation. The aroma, flavour, aftertaste, body, balance and overall increased respectively. The cupping score total of coffee increased from 82.91 to 84.33. Metabolites analysis should be further investigated to confirm this result, especially organic acids compound.

PS11

## Chemical and Sensory Analysis of Several Sweet Potato (*Ipomoea batatas* L.) Clones

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**Abstract.** This study aims to find out suitable chemical composition and sensory test of 24 sweet potato clones to select clones that meet consumer preferences. This study was conducted at the Laboratory of Animal Food, Faculty of Agriculture, Syiah Kuala University in September-October 2015. The clones used in this study were nineteen sweet potato clones passed by CIP-SEA Bogor, Indonesia and five Local clones. The study used Completely Randomized Design of non-factorial where clones were treated. The highest moisture content and ash were found in Cream Saree, a local clones (83%; 4.77%). The highest protein content was found in CIP-BDG and CIP-WHI5 clones (4.89%; 4.58%), and the highest carbohydrate content (56.10%) was found in CIP-CER. The sensory results were that the preferred round tuber shape was found on CIP-513 clone, the preferred texture of tuber skin and soft tuber flesh were found on CIP-MAN, CIP-BDG, CIP-WHI5, CIP-204, CIP-B19, CIP-287, CIP-GA, SARI, local Cream Saree, local Orange Saree, the preferred skin color and purple tuber flesh were found in CIP-1945 clones, CIP-BDG, and CIP-W, the preferred sweet tuber taste was found in CIP-B9 clones, and the overall reception criteria was found on the CIP-GA clone.

PS12

## Mechanical and physical properties of rice straw fiber-reinforced polypropylene composite

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**Abstract.** Research on composites using natural fibers has been carried out intensively. One of the abundant natural fibers and not yet utilized optimally is rice straw fiber. In this study, the composite made of rice straw fiber and polypropylene as the adhesive has been produced. The purpose of this study is to determine the right composition of rice straw fiber and polypropylene to obtain the composite having excellent mechanical and physical properties. The polypropylene was obtained from used plastic. The length of rice straw fiber for all samples was 0.5 cm with randomly oriented. The ratio of rice straw fiber to polypropylene was 30:70, 40:60, 50:50, and 60:40 wt. %. First, rice straw fiber was mixed with polypropylene homogeneously at a temperature of 170 °C by using the coupling agent (benzoyl peroxide, maleate anhydride, xylene, and methanol). Next, that mixture was poured into the sample mold and pressed with a load of 3 tons for 60 minutes to produce the composite samples. The mechanical properties (modulus of rupture, modulus of elasticity, compressive strength) and physical properties (water content, density, thickness swelling) of composite samples were examined for various compositions of rice straw fibers. The universal testing machine manufactured by Hung Ta Company was used in this study. The mechanical and physical properties measurement were conducted according to the Indonesian National Standard (SNI). Our results showed that the modulus of rupture of the composite is independent of the composition of rice straw fiber. The highest modulus of rupture is 113 kgf/cm<sup>2</sup> obtained at the formation of rice straw fiber 40 wt. % and polypropylene 60 wt. %. However, the modulus of elasticity and compressive strength of composite depend on the composition of rice straw fiber. The highest modulus of elasticity is 34879 kgf/cm<sup>2</sup> obtained at the composition of rice straw fiber 30 wt. % and polypropylene 70 wt. %. The modulus of elasticity tends to decline when the composition of rice straw increases. The highest compressive strength and density are 8.9 MPa and 0.6 g/cm<sup>3</sup>, respectively, which are obtained at the formation of rice straw 60 wt. % and PP 40 wt. %. Both compressive strength and density tend to increase as the composition of rice straw increases. The thickness swelling after the sample was immersed in water for 24 hours was obtained less than 2% for all rice straw fiber compositions. Our composites (for all rice straw fiber compositions) have met SNI requirements. Based on our results, we recommend producing a composite of rice straw fiber and polypropylene adhesive with an arrangement of 60 wt.% rice straw fiber and 40 wt. % adhesive.

PS13

## High Photocatalytic Activity of TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> Nanocomposite Prepared by Impregnation Method for Degradation of Indigo Carmine

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**Abstract.** The photocatalytic degradation of indigo carmine (IC) dye was carried out by using TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposite prepared by impregnation method under UV light irradiation. Fe<sub>2</sub>O<sub>3</sub> was extracted from iron ore using hydrochloric acid and NH<sub>4</sub>OH as precipitant agent, while titanium tetraisopropoxide was used as precursor of TiO<sub>2</sub>. The effect of TiO<sub>2</sub> to Fe<sub>2</sub>O<sub>3</sub> mole ratio on the properties and performances of TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposite was examined on the prepared three series of TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposites with TiO<sub>2</sub> to Fe<sub>2</sub>O<sub>3</sub> mole ratio of 1:3, 1:1 and 3:1. The characterization of TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposite by XRD showed that the iron (III) oxide extracted from iron ore and calcined at 700 °C was in hematite phase ( $\alpha$ -Fe<sub>2</sub>O<sub>3</sub>). The photocatalytic activity of TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposites was determined by using 6 W UV lamp with the wavelength 365 nm and the degradation percentage of indigo carmine was determined based on UV-Vis spectrophotometer data. Degradation efficiency was highly affected by mole ratio of TiO<sub>2</sub> to Fe<sub>2</sub>O<sub>3</sub>, initial pH of IC solution, photocatalyst dosage and initial IC concentration. The maximum experimental degradation efficiency of IC was 92.70% for 120 min irradiation time using TiO<sub>2</sub>/Fe<sub>2</sub>O<sub>3</sub> nanocomposite with the mole ratio of TiO<sub>2</sub> to Fe<sub>2</sub>O<sub>3</sub> was 1:3. The optimum condition was achieved at pH value 1 using 0.35 g of photocatalyst and at 20 ppm of initial IC concentration.

PS14

## Physical and Chemical Properties of Particleboard Made of Rice Straw and Plastic Waste

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**Abstract.** Rice straw is one of the agricultural waste which has not been used optimally yet, especially in Indonesia. Meanwhile rice straw contains cellulose that can be used to form composite such particleboard. In this study, the physical and chemical properties of particleboard made of rice straw particle and polypropylene from plastic waste as adhesive were investigated. The rice straw and polypropylene compositions were varied: 30:70, 40:60, 50:50, and 60:40 wt.%. The rice straw particle sizes were varied for 20 mesh, 40 mesh, 50 mesh and 60 mesh for each composition. X-Ray Fluorescent has been used to measure the chemical composition of our particleboard. The density of our particleboard is found to be in the range of 0.59 to 0.77 g/cm<sup>3</sup>. The thickness swelling of particleboard is less than 2%. Both density and thickness swelling has met the Indonesian National Standard for particleboard requirement. In general, the density of particleboard strongly depends on rice straw particle size. As the particle size decreases, the density increases. The particle size of rice straw affects the thickness swelling of particleboard. The thickness swelling decreases as the particle size decreases. The major constituents of our particleboard are the silicon dioxide (SiO<sub>2</sub>), calcium oxide (CaO), and potassium oxide (K<sub>2</sub>O). Our finding showed that the particle size has an important role in the physical properties of particleboard.

## PS15

### ***Ruellia tuberosa* L Anthocyanin Extract as a pH Sensitive Substance**

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**Abstract.** Anthocyanin from the flower *Ruellia tuberosa* L was successfully extracted by maceration using methanol. The total extract obtained was 19.22% with a concentration of 1.503 mg/L correspondingly. Retention time was analyzed using Thin Layer Chromatography and an Rf value of 0.43 was achieved. The analytical determination of functional groups was conducted using FTIR. The sensitivity of anthocyanin towards phosphate buffer pH is 0.222 at the range of pH 6-8 with R<sup>2</sup> = 0.996 at maximum wavelength of 635nm. On the other hand, its sensitivity towards citrate buffer is 0.022 at pH range 6-8 with a linearity of R<sup>2</sup>=0.999 at 625nm maximum wavelength. The anthocyanin showed good in sensitivity and dynamic range in 0.1M Phosphate buffer solution than 0.01, 0.03, and 0.05 M.

## PS16

### **Analysis of Mercury Concentration and Its Distribution Patterns in Water and Sediment Samples in the River area of Krueng Sabee, Krueng Panga and Krueng Teunom, Aceh**

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**Abstract.** Analysis of mercury (Hg) levels in water and sediment samples in the river area of Krueng Sabee (KS), Krueng Panga (KP) and Krueng Teunom (KT) have been carried out. Samples were collected during March (rainy season) and April 2019 (dry season) at different sampling points (upstream (1), median (2) and downstream (3)). Concentration of mercury was determined by using Atomic Absorption Spectrophotometer (AAS). Measurement of temperature, pH and salinity of the water samples was carried out in situ method. The results of in situ measurements show temperatures range of 24 to 32 0 C, pH 6 - 8 and salinity 0.1 - 0.3. Based on the results of the mercury analysis, the concentration of mercury in water and sediment samples during rainy season were 0,3328 and 6,2330 µg / L, respectively and dry season were 0,0560 and 0,2778 µg / L, respectively. Evaluation of the pattern of Hg distribution in water and sediment samples was conducted by the Principal Component Analysis (PCA) method. The result of PCA analysis in sediment samples showed a strong correlation of Hg concentration at the KS1 and KP2 sampling points. Meanwhile, the concentration of Hg in water samples found a strong correlation at sampling points of KT1 and KP1.

PS17

## Energy Dependence of Cl Emission Lines in TEA CO<sub>2</sub> Laser Induced Breakdown Spectroscopy

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**Abstract.** Cl detection using laser induced breakdown spectroscopy (LIBS) techniques in geology and environment samples is still challenging. The experimental conditions greatly influence the analytical performance of LIBS. Cl emission in LIBS must be studied carefully to find the optimum condition to allow Cl detection. In the present study, Cl emission was studied from sample containing Cl as major element, namely polyvinyl chloride (PVC). The Cl emission was investigated by varying the experimental conditions, especially energy of the laser pulse. In this work TEA CO<sub>2</sub> laser was used for inducing plasma. The laser beam was focused using a ZnSe lens onto the sample. The emission spectrum from the induced plasma was detected using an optical multichannel analyzer (OMA) system. It was found that Cl emission lines only can be obtained when helium was used as the surrounding gas. However, the strongest emission line of Cl I 837.59 nm in the infrared region cannot be detected even under helium surrounding gas. Instead, many ionic emission lines of Cl in ultraviolet regions including the strong lines (Cl II 479.45 nm, Cl II 481.00 nm, Cl II 481.94 nm and the weak lines (Cl II 476.86 nm, Cl II 478.13 nm, Cl II 489.67 nm, Cl II 490.47 nm and Cl II 491.77 nm) can unequivocally be detected. It was also found that the intensity of Cl emission lines critically depends on the energy of the laser pulse, the emission intensity of Cl lines increases with energy. In present work, the highest intensity of Cl emission lines was obtained when the energy of the laser pulse was about 2500 mJ, giving strong and clear Cl emission lines with low background and relatively high normalized signal to background ratio of more than 3.

PS18

## **Infrared Spectroscopy Characteristics of Mount Sinabung Volcanic Materials, North Sumatra, Indonesia**

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**Abstract.** Infrared spectroscopy has the capability to determine the mineralogical composition of geologic materials. Its reflectance spectra contain diagnostic spectral absorption feature characteristics that can be used for analyzing the mineral chemistry and chemical composition of volcanic material samples. In this research, we analyze the infrared spectral shapes and properties of volcanic materials at specific wavelength ranges in order to identify compositional information of the samples. We used volcanic material samples such as ash and rock collected from Sinabung volcano, North Sumatra, Indonesia. Variation in depth of absorption features and reflectance values of ash and rock samples related to grain size and surface roughness of the samples. The results showed that these volcanic samples exhibit a strong Al-OH absorption feature centered at  $\sim 2.20 \mu\text{m}$ . It indicates that the samples contain predominantly clay and other phyllosilicate minerals. The infrared spectroscopy is an applicable method for identifying compositional information of raw and geologic materials.

PS19

## **Experimental investigation of a cold storage box with Aceh locally produced hydrated salt as phase change materials: effect of salt treatment**

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**Abstract.** This investigation aims to study heat transfer rates and temperature changes within a 5-liter cold box enveloped with water-salt solution as phase change material (PCM). The study begins with design and fabrication of a cold box followed by performance tests. Salt sample was collected from a traditional producer in Aceh Besar District, Indonesia. In order to understand the effect of pretreatment, some of samples were heated at 400 °C and 800 °C for 30 minutes and compare it with those untreated. Salt solution of each samples was prepared by adding 10 wt.% of salt into water and filled into eight PCM bottles. PCM charging procedure was performed in a refrigerator for 12 h. By placing eight bottles of PCM into the cold-box, thermal energy discharging process was monitored by using four thermocouples. The changes in temperature were recorded for eight hours. In general, result shows that pre-treatment of salt results in a positive effect on thermal energy storage capacity. The best performance of cold storage system was exhibited by PCM made of salt treated at 600 °C where the rate of temperature change within eight hours experiment is 0.055 °C/min.



PS20

## Analysis of Temperature and Column Variation in Gas Chromatography to Dead Time and Retention Time of n-alkane homologous series using Randomized Block Design

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**Abstract.** The retention behavior of n-alkane homologous series under temperature and column variation have been studied using randomized block design. n-alkane homologous series secondary retention data of C<sub>1</sub> and C<sub>5</sub>-C<sub>8</sub> that measurement with gas chromatography at temperatures of 60, 90 and 120 °C and columns of PS-255, OV-11, CPSIL-5CB, HP -5 and HP-INNOWAX were used as a set data in randomized block design. The test results show that the retention value of C<sub>1</sub> is significantly different at each temperature, but the retention value of C<sub>5</sub>-C<sub>8</sub> isn't. The optimal temperature for measurement C<sub>1</sub> is 60 °C and the best column used is OV-11. Retention value of C<sub>1</sub> and C<sub>6</sub>-C<sub>8</sub> is significantly different at each column, but the retention value of C<sub>5</sub> isn't.

PS21

## Preparation and characterization of cellulose acetate from cotton

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**Abstract.** The preparation and characterization of cellulose acetate from cotton had been conducted. Cotton was hydrolyzed using various concentrations sulfuric acid (10, 20, 30 and 40%). The bleaching process was performed by using H<sub>2</sub>O<sub>2</sub> solution. Acetylation process was conducted using acetic acid solution. The obtained cellulose acetate was then characterized using Fourier Transform Infrared Spectroscopy (FTIR) in order to observe the functional groups, Scanning Electron Microscopy (SEM) to examine the surface morphology and X-Ray Diffraction (XRD) to observe the crystallinity of cellulose acetate. The results of FTIR analysis confirmed the formation of cellulose acetate. SEM images showed the irregular sizes of cellulose acetate with fiber form. XRD patterns exhibited that the acetylation process increase the crystallinity of cellulose.

PS22

## Study on the effect of mesh ratio to the potential distribution of RC cathodic protection using BEM

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**Abstract.** Researchers and engineers have used cathodic protection (CP) to prevent corrosion in reinforced concrete (RC). Boundary element method (BEM) is a promising numerical technique to evaluate the effectiveness of CP on RC structures. However, some parameters that might affect the system or the potential distribution, such as mesh ratio, still need to be studied further. This paper aims to study the effect of mesh ratio on the potential distribution of RC installed CP using BEM. The geometry of the model refers to the previous research. The mesh for the model was triangular element and six variations of the mesh ratio were selected for the study. The mesh ratio obtained from the comparison between the size of the concrete element and the anode or cathode element. Simulation results show that the distribution of potential for all mesh ratio are within the protection criteria ( $\leq -850$  mV vs Cu/CuSO<sub>4</sub>). However, the difference between maximum and minimum potential value becomes smaller when the mesh ratio increased. Hence, it shows that the mesh ratio has an effect on the distribution of potential of RC installed CP. But, it still tolerable since the potential within protection criteria.

PS23

## Morphological Identification of *Fusarium* Species Isolated from Infected Sea Turtle Nests in Peninsular Malaysia

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**Abstract.** Conservation work has been extremely active protecting the sea turtle nesting areas from uncontrolled human activities such as habitat destruction, accidental catch in fishing nets, poaching, they've been hunted by people and predators as well as they've ingested plastic pollution. Now, there's yet another threat to this sea turtle, presence of fungus, *Fusarium* species inside the nesting chamber had colonised the live eggs and silently killing those living eggs. Consequently, it will reduce the success of turtle eggs hatching and this critical situation is increasing at turtle nesting sites and hatcheries in the nation. Therefore, it is essential to understand the morphological characteristics of this particular fungus *Fusarium* species in improving monitoring conduct and conservation. This study aimed to identify the *Fusarium* species that are invading turtle nests in Malaysia. Samples of infected eggs, sands and debris around the egg chambers were collected from 30 sea turtle nests. The pentachloronitrobenzene (PCNB) media was used for isolation of *Fusarium* species and pure cultures were obtained and growth onto the Potato Dextrose Agar (PDA) whereas Carnation Leaf Agar (CLA) was chosen to further observing the morphological characteristics. A total of 121 isolates of *Fusarium* species were isolated from infected eggshells, sands and debris identified as *F. solani* (31%), *F. acutatum* (23%), *F. proliferatum* (10%), *F. fujikuroi* (5%), *F. semitectum* (19%), and other *Fusarium* species (12%). Mortalities in nesting areas of sea turtle in Malaysia may lead to *Fusarium* species. There is an urgent need to monitor the nesting areas and to understand the dispersal of *Fusarium* species along the nesting beach.

PS24

## Endophytic fungi from leaves of *Syzygium cumini*, *Senna siamea* and *Annona muricata* and its potential as antimicrobial agents

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**Abstract.** Medicinal plants are harbour of endophytic fungi. In this study, we have been isolated endophytic fungi from three medicinal plants namely *Syzygium cumini*, *Senna siamea* and *Annona muricata*. The first stage before isolation of endophytic fungi was surface sterilization of leaves. Isolation of endophytic fungi used potato dextrose agar (PDA) media and PDA containing plant extract. The single spores from endophytic fungi were obtained using water agar method. Twenty-eight endophytic fungi have been isolated from *S. cumini*, forty-eight from *S. siamea* and nineteen from *A. muricata*. The antimicrobial activity was shown by 17 of endophytic fungi from *S. cumini*, 34 of endophytic fungi from *S. siamea*, and 8 of endophytic fungi from *A. muricata*. The results suggest that endophytic fungi isolated from *S. siamea* leaves show a good source of natural antimicrobial agents.

PS25

## Effect of Silicon Nutrient on the Plant Growth of Pepper Plant (*Pipper nigrum*)

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**Abstract.** Malaysia together with Vietnam, India, Indonesia and Brazil are the world's major producers and exporters of pepper. However, one of the major problem in pepper plant cultivation is poor growth causing very low field survivability. Recently, studies had shown that silicon (Si) application has beneficial effects on growth of plants especially on rice, barley and wheat but there is limited work on pepper plant. Therefore, this study was aim to determine effect of silicon on the plant growth by applying it to plant roots. Silicon nutrient that is in the form of silicic acid had been applied once a week on pepper plants. Five different concentrations were applied to the pepper plants; 0.5% Si (v/v), 1.5% Si (v/v), 2.0% Si (v/v), 1.5% potassium silicate (v/v) as positive control and negative control (without silicon). Growth parameters such as plant height, stem diameter and chlorophyll concentration were observed and collected twice a month. Our finding showed that Si nutrient treatments have a promising results when all the pepper plant that was treated with Si had the greatest plant height and diameter. The highest was plants treated with 0.5% Si (v/v) (51.7cm) followed by 1.5% Si (v/v) (39.5cm), and 2.0% Si (v/v) (30.9cm) whereas both control only 27.9cm and 12.7cm for 1.5% potassium silicate and control (without Si), respectively. The widest in diameter was pepper plant with 0.5% Si (v/v) with 2.7mm in size but for both controls below than 1.7mm wide. There was an increasing of chlorophyll with the highest chlorophyll amount was from plants treated with 0.5% Si (v/v) showed  $58.36\mu\text{mol}/\text{m}^{-2}$  whereas the lowest reading was  $41.2\mu\text{mol}/\text{m}^{-2}$  observed in control pepper plants (without Si). Therefore, this study had proven that silicon nutrient could improve pepper plant growth. Further investigation on physical changes (cuticle thickness, wax formation and phytolith) are essential to increase our understanding of silicon nutrient on pepper plants.

PS26

## Flowers Preferred by Stingless Bee, *Heterotrigona Itama* and The Association of The Flowers and The Bee's Mouth Morphology

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**Abstract.** *Heterotrigona itama* is a stingless bee species from Meliponini tribe. The bee obtain nectar, pollen, and resin, to produce honey, bee bread, and propolis. However, there are limited studies especially on the nectar preferences for this species. This study was conducted to identify the nectar concentration in selected flowers favoured by *H. itama* and the relationship between the bee and the flowers morphology. Flowers' nectar were obtained from different flower species and the nectar concentrations were measured using a digital refractometer. The length of flower's tube of each species and the bee's tongue were also measured. The results revealed that flowers preferred by *H. itama* have nectar concentration above 30%. The flower's tube length of the preferred flowers were between 2.0 to 4.0 mm, which is almost similar with the bee's tongue length. This study revealed that both nectar concentration and the flowers morphology are important factors for the bees in choosing their food sources. The results from this study will give benefit to the beekeepers where more suitable flowering plants could be planted and hence could improve the stingless bee beekeeping activities. Understanding the relationship between the bees and their flower preferences could also help us to understand the importance of conserving various flowering plants to ensure the sustainability of the bees' food sources.

PS27

## Free Radical Scavenging Activity of Methanolic Extract of Temurui (*Murraya Koenigii* L. Spreng) Collected from Langsa, Aceh

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**Abstract.** Free Radicals are substances that derive from incompletely oxidated compounds that can damage cells and cause inflammatory diseases, atherosclerosis, cancer, and aging. Plants are known as a source of medicines that are being developed by researchers, such as temurui (*Murraya koenigii* L. Spreng) which collected from Langsa, Aceh. Temurui or curry leaves, a plant that is usually used as a cooking spice by Aceh people, were extracted using maceration method with methanol. Methanolic extract of temurui showed potential DPPH scavenging activity with the IC<sub>50</sub> value of 77.818 ppm. This activity was contributed by secondary metabolites contained in that plant, such as alkaloids, terpenoids, saponins, flavonoids, and tannins. This plant have great potent to develop as new drugs, especially new antioxidant drugs.

PS28

## Indigenous Knowledge of Postnatal Mother Care Using Plants by Acehnese

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**Abstract.** Acehnese is one of the tribes of seven others (Gayo, Alas, Aneuk Jamee, Kluet, Singkil, Tamiang, Simeulu) who are in Aceh Province. Indigenous knowledge is a cultural heritage that can function as a conservation effort on biological resources. Postnatal care is one of the cultures of the Acehnese people. The aim of this research is to obtain information about postnatal mother care by the Acehnese. The method used is Participatory Rural Appraisal (PRA) and observation techniques by purposive respondents (midwives (mak blien), postnatal mothers, and mothers aged  $\geq 45$  years). The data is collected in six districts of Aceh Province (Banda Aceh, Aceh Besar, Pidie, Pidie Jaya, Bireun, and Aceh Jaya). The results show that there are seven types of treatment in postnatal mother care, including body massage, stomach medicine, burn stone (t $\ddot{o}$ et batee), fog treatment (salee), herb powder (param), and bathing herb, and drinking herb. Treatments are carried out for 44 days postnatal using 79 species belonging to 36 family of plants.

PS29

## Isolation and activity antioxidant test of cocoa pod husk ethyl acetate extracts (*Theobroma cacao* L)

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**Abstract.** Isolation and testing of antioxidant activity on the ethyl acetate extract of cocoa pods (*Theobroma cacao* L) have been studied. Antioxidant tests were carried out using 1,1-diphenyl-pikril hidrazil (DPPH). The test results showed that the *Theobroma cacao* (TCE) ethyl acetate extract had antioxidant activity with IC<sub>50</sub> = 159,6355 ppm, where vitamin C = 1,1959 ppm has been employed as a positive control. Isolation of active TCE components by column chromatography using the ASTM 60 mesh silica gel (Merck 774) as stationary phase and nhexane: ethyl acetate (9: 1) as eluent, yielded seven combined fractions (TCE 1 to TCE 7). The results of the separation of these fractions produce pure white colored isolates with a melting point of 114-120oC. Based on phytochemical tests, the pure isolates are a group of phenolic compounds.

PS30

## Mud-Puddling Behaviour of Butterflies in the Soraya Research Station, District of Subulussalam, Aceh, Indonesia

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**Abstract.** Butterflies, mostly the male congregate and uptake the sodium and amino acids from the mud, dung, and urine of mammals or decaying flesh and then transferred to the female during mating. This behaviour is usually called as puddling. In this study, the mud-puddling behaviour was observed in some area of the Soraya river. Five sampling points were observed for three hours each (09:00-12:00 am) for 15 days. The number of individual and frequency of each butterflies species that puddlings were observed. A total of 19 species of butterflies were identified. *Appias lycnida* and *Graphium evemon* were the most active in puddling followed by *Pathysa antiphates* and *Caleta elna*. Frequency of puddling and number of species of butterflies were high in the dung and urine of mammals.

PS-31

## Diversity of gastropods epifauna Based on Substrate in Littoral Zone in Mesjid Raya, District of Aceh Besar, Indonesia

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**Abstract.** The gastropod is one class of the Mollusca phylum using the abdomen as the leg. Generally, gastropods are crawling on the bottom of the waters and submerged in the mud and are often called epifauna and infauna gastropods. Research on diversity of epifauna gastropods in the littoral zone has been done in Mesjid Raya, Aceh Besar District. This research aims to determine the diversity of gastropod species based on the substrate types (coral reef, muddy and sandy). The exploratory method by using transect line was used in this study. In each substrate, a line transect was drawn for five transects with a length of 50 m. The transects were started from the tidal line. The distance between transects were 50 m. Each transect was made in 10 sampling plots measuring 1m x 1m, and the distance between plots was 5m. The gastropods were collected directly and without damaging the substrates. The epifauna gastropods obtained was put into a sample bottle and preserved using 70% alcohol. The results showed that 23 families and 54 species of epifauna gastropods were identified. The highest density was obtained on *Rhinoclavis aspera* (4.43 individuals/m<sup>2</sup>). Furthermore, the highest diversity index was found in the sandy substrate, meanwhile the lowest diversity was found in the coral reef substrate.



PS32

## Model of Virus Therapy and Chemotherapy for Cancer

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**Abstract.** This article discusses the mathematical model of changes in cancer cells due to intervention. Here the effect of combination treatment, in the form of viral injection, and chemotherapy on tumor cells is presented in detail. There are two different tumor cells, which are uninfected tumor cells and infected tumor cells. Model simulations with various parameters were carried out for 700 days. The initial value for the population of virus-infected tumor cells is divided into three categories, namely each number of virus-injected tumor cells is  $\frac{1}{4}$  (one quarter),  $\frac{1}{2}$  (half),  $\frac{3}{4}$  (three quarters) and the total population of tumor cells that are not infected. Based on the simulation results it was concluded that the more the number of tumor cells injected with the virus, the faster the decline in the number of tumor cell populations. In addition, it was concluded that the reduced population of tumor cells decreases the amount of concentration of chemotherapy drugs used.

PS33

## Initial Effect of The Glutathione on The Motility and Viability of African Catfish *Clarias gariepinus* Spermatozoa After Cryopreservation

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**Abstract.** The aim of the present study was to determine the optimum concentration of the glutathione for the best motility and viability of African catfish *Clarias gariepinus* spermatozoa after cryopreservation. The study was conducted at the Ujung Batee Brackish Aquaculture Center (BPBAP), Aceh Besar, Indonesia. The Completely Randomized Design (CRD) with five concentrations of glutathione were used in this study. The tested concentrations of glutathione were P0 = Ringer's solution + 20% FBS + 15% DMSO + sperm (control); P1 = Ringer's solution + 20% FBS + 15% DMSO + 0.5 mg Glutathione + sperm; P2 = Ringer's solution + 20% FBS + 15% DMSO + 0.10 mg Glutathione + sperm; P3 = Ringer's solution + 20% FBS + 15% DMSO + 1.5 mg Glutathione + sperm; P4 = Ringer's solution + 20% FBS + 15% DMSO + 2.0 mg Glutathione + sperm. Every treatment was performed with four replications. The results showed that the glutathione gave the significant effect on the sperm motility, but did not give the significant effect on the sperm viability. The average percentage of sperm motility after thawing was P0 (39.25%), P1 (28.50%), P2 (39.25%), P3 (34.00%) and P4 (40.50%), while the average percentage of sperm viability was P0 (84.37%), P1 (81.00%), P2 (91.62%), P3 (81.87%) and P4 (92.00%). The highest value of motility and viability were recorded in the in treatment P4 (2.0 mg L<sup>-1</sup> glutathione). It is concluded that the optimum concentration of the glutathione for the best sperm motility and viability is 2.0 mg L<sup>-1</sup>.

PS34

## The potential use of Satellite Gravity Data for Oil prospecting in Tanimbar Basin, Eastern Indonesia

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**Abstract.** One way to increase oil and gas production in Indonesia is through the geophysical study for new deposits in Basins frontier. I.e., Tanimbar basin in Province of Maluku, Eastern of Indonesia. The Tanimbar basin is located in an area known as the Outer Banda Arc. Gravity is a usually geophysical method that used for the sedimentary basin. But for the regional scale, the method requires an expensive cost and long time-consuming. In this research, we use the satellite gravity data provided by Scripps Institution of Oceanography, University of California San Diego. This data has a low resolution of 1.5 km for 1 pixel and also free access. The satellite data will be compared with the gravity ground survey. The data was acquired by the University of London and Bandung Institute of Technology in 1987. The gravity satellite can show a more contrasting of geological structure compared to the ground survey, as well as syncline and anticline. The sub-sedimentary basin is represented by the low Bouguer anomalies (-40 to -25 mGal) that correlated well to ground survey data. Based on the result, it can be concluded; the satellite gravity is potentially used for delineating the sedimentary basin in Tanimbar Island.

PS35

## Dead Time Determination of 2-Alkanones and Alkylarylketones Homologues Series using Methanol/Water Eluent in High Performance Liquid Chromatography System by Indirect Methods

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**Abstract.** The calculations of the dead time have been done in High Performance Liquid Chromatography System using indirect methods. The comparison between the indirect methods has also been studied. Several indirect methods used in this research were iteration, non-linear, spreadsheet, and statistics. The methods were implemented using C Programming language. The dead time was calculated with retention time and carbon number data from 2-alkanones and alkylarylketones. The retention data were collected in different eluent polarity from methanol/water eluent system with some eluent composition variation. The result showed that change in eluent polarity doesn't affect to the dead time accuracy. The value of dead time generated by the non-linear method was relatively high while the other methods produced are quite good regardless of eluent composition variation. Therefore, iteration, spreadsheet, and statistics methods can be used to calculate the dead time accurately in High Performance Liquid Chromatography System, in particular for index retention study purpose.

PS36

## The determination of depth anomaly in archaeo-magnetic using Euler Deconvolution; a case study in Kuta Lubok Fortress

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**Abstract.** Geophysical surveys have been conducted using magnetic in the archaeological site of Kuta Lubok Fortress, Aceh Besar. The fortress was built in the 13th century by the Lamuri Sultanate in the northern part Aceh coast. To map an estimated area of archaeological objects, 420 stations have been measured. The data were measured by 21 profiles across of the area with the length of profiles vary from 40 to 60 meters. To get a complete resolution, data is taken with a distance of 20 meters between lines and a distance of 5 meters between stations. From the total magnetic field map that has reduced to the poles, the anomaly is generally able to delineate buried building sites. Then based on Euler deconvolution analysis, the structure of the fortress building can be seen using a 5-meter depth level. But a clearer structure is seen in the use of 10 meters in depth. Based on the interpretation of the two tolerance layers it can be concluded that the Kuta Lubok fortress was found stretching parallel to the line along the 400 meters to the east of the fort building which is still intact.

PS37

## One-dimensional magnetotelluric inversion using least-square approach and particle swarm optimization algorithm

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**Abstract.** Magnetotelluric method is a geophysical method which uses natural time variations of the Earth's magnetic and electric fields. One-dimensional magnetotelluric inversion was carried out to estimate the electrical resistivity distribution of rocks which varied with depth. Non-linear relationships between model parameters and observation data lead to difficulties in the inversion process. This problem can be solved with a non-linear inversion method with a global search technique. Particle swarm optimization (PSO) is one of the global search techniques that can find acceptable solutions from a very broad set of initial parameters. The PSO simulates the social behavior observed in flocks (swarms) of birds looking for food. In addition, this study also carried out non-linear inversion with a linear approach which is one of the local search techniques. Then the two inversion methods will be compared in determining the best model solution. The observation data used is synthetic data in response to a simple three-layer synthetic model. Gaussian noise with 10% standard deviation will be added to the theoretical response of the synthetic models.

PS38

## The 2D Resistivity Modelling on North Sumatran Fault Structure by using Magnetotelluric Data

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**Abstract.** Aceh is a region located on Sumatran Fault zone which earthquake often occurred caused by the movement of the fault. So the location and structure of the fault are needed to be investigated to reduce the disaster impact. A geophysical survey using magnetotelluric method was done to create 2D resistivity model on the northern and southern part of the fault. The measurement was carried out on two lines, with length of each line is 92 km and 114 km and consisted of 14 measurement points across the fault. The obtained result shows 2D resistivity models generated by *Reduce Basic Occam* (REBOCC). The models show a very clear resistivity contrast on both paths, so that the fault structure can be interpreted properly. The interpretation of resistivity models identify the structure of Sumatran Fault around Jantho and between Seulimum-Saree. It is correlated to some references that the northern Sumatran Fault is divided into two paths, Aceh segment and Seulimum segment. On the southern part, Sumatran fault is identified around Geumpang, Pidie. The Modelling using REBOCC inversion is better than MT2D, because REBOCC can produce better resistivity contrast models, so that the fault structure can be interpreted more clearly.

PS39

## Surface Water Quality Assessment and Monitoring in Aceh Jaya District

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**Abstract.** The surface water quality is a matter of serious concern today. Illegal gold mining has contributed greatly towards the socio-economic development of the country but raise a question about its negative impacts to surface water and drinking water quality. The assessment of water quality has been carried out to determine the concentrations of different ions present in the surface waters. In this research the water quality of rivers affected by artisanal gold mining was evaluated based on seven teen parameters and nine sample stations. Water samples have been taken and analyzed from three main rivers in the district of Aceh Jaya. River Kr. Teunom, Kr . Panga and Kr. Ligan have taken samples of the sample water covering upstream, median and downstream. The results showed that the physical water quality in Kr. Teunom, Kr. Panga, and Kr. Ligands are still in line with river water quality standards by Government Regulation No. 82 of 2001. Based on the chemical parameters of the river water conditions Kr. Teunom, Kr. Panga, and Kr. Ligan have found mercury (Hg) with varying degrees. However, the levels are still below the quality standard in accordance with Government Regulation No. 82 of 2001 for Class I water and the Regulation of the Minister of Health No. 492 / Menkes / Per / IV / 2010 on drinking water quality requirements. The presence of this mercury should be cautious because it can accumulate in the food chain in the long term. Cyanide levels in all samples of river water are still below the quality standard.

PS40

## Wind disturbance elimination on dual axis solar tracker using fuzzy logic control

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**Abstract.** The use of solar energy using solar panels began to be encouraged. Solar panels utilize solar radiation and convert it into clean and renewable energy. The problems of the accuracy of the panel facing right towards radiation are a challenge in the development of a driving system. Solar panels have limited motion, which is a maximum of  $\phi$ , so that wind disturbances are very dangerous for motor drives and solar panels. This paper aims to eliminate wind disturbances in solar panel drive systems. The fuzzy logic control method is used to determine the amount of power given to the driving motor to direct the panel towards solar radiation. Inputs and outputs of fuzzy controllers are arranged by dividing into each of the seven members. Simulation results show that the position error of solar panels without wind disturbances reaches  $0.5^\circ$  in zonal and  $0.6^\circ$  in meridional. By using wind disturbances, this system managed to maintain errors smaller than  $0.54^\circ$  in zonal and  $0.74^\circ$  in meridional.



PS41

## **Picturing Diphtheria Outbreak in Indonesia using National Annual Report Data: What are the lessons learned?**

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**Abstract.** Diphtheria is one of the vaccine preventable diseases. Due to the advances in medical technology and vaccine availability, this disease should no longer be a health problem. Its outbreak which reached the highest point in 2017 has opened our eyes that diphtheria remains a major threat, is highly contagious, and leads to morbidity and mortality. The large number of diphtheria cases also indicates that the protection of immunization in the community has decreased. This paper discussed the usage of the reliable official big data namely the Indonesia Health Profile from year 2004 to 2017 released by the Ministry of Health to describe the magnitude of diphtheria in Indonesia. This paper will provide the trends of diphtheria cases as well as other indicators related to the immunization coverage of anti-diphtheria vaccines. The released data should be used properly by the government and related institutions to generate better policies and recommendations in order to end the outbreak and provide sufficient protection against diphtheria amongst Indonesian community.

PS42

## Simple Combination Method of FTIR Spectroscopy and Chemometrics for Qualitative Identification of Cattle Bones

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**Abstract.** Aceh Cattle is one of the cattle breed indigenous to Indonesia which has been established as Indonesian local genetic resource diversity based on Ministry of Agriculture decree number: 2907/Kpts/OT.140/6/2011. Aceh Cattle has a distinctive and delicious meat taste so that people of Aceh preferred Aceh Cattle breed over other cattle. The entry of other cattle breed such as Bali Cattle and Brahman Cattle to Aceh Province has caused beef sold in the market to be indistinguishable. This study aims to identify Aceh, Brahman and Bali cattle bones using Fourier Transform InfraRed Spectroscopy (FTIR) combined with chemometrics to see the spectrum differences of the three types of cattle bone measured at wave numbers 400 – 4500 cm<sup>-1</sup>. The complexity of IR spectrum pattern caused difficulties in interpretation and the visual of the three bones is hard to differentiate. The combination of FTIR and chemometrics method such as main principal component analysis (PCA) is able to be used to see the difference between the three cattle. The result shows that the bones of each cattle had different chemical characteristics that the bones were separated into their respective groups. Combination methods of FTIR with chemometrics using main component analysis could be used to identify cattle bones to determine its breed.

PS43

## The Spatial Distribution of *Bactrocera dorsalis* after 15 Years of the 2004 Indian Ocean Tsunami in Banda Aceh, Indonesia

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**Abstract.** *Bactrocera dorsalis* is one of fruit fly species that caused to the decreasing of fruits qualities. The 2004 Indian Ocean tsunami impacted more than 60% Banda Aceh city's areas. The purpose of this study is to analyze the special distribution of *Bactrocera dorsalis* after 15 years of the 2004 Indian Ocean tsunami in Banda Aceh tsunami affected and non-affected areas. The data was collected from December 2018 to January 2018. The *Bactrocera dorsalis* was captured by using the Steinner Modification Trap method in four villages, which selected randomly in nine sub-districts in the tsunami affected and non-affected areas of Banda Aceh. The host plants were selected such as mangos, star fruits, guavas, and jackfruits, which commonly recognized in Banda Aceh. Data was analyzed and presented by using the GIS. After 15 years of the 2004 Indian Ocean tsunami the land and fruits plants have recovered. *Bactrocera dorsalis* were found in tsunami affected and non-affected areas with total 2510 of *Bactrocera dorsalis*. There is no significant difference of the spatial distribution of *Bactrocera dorsalis* in both areas.

PS44

## Utilizing Web based GIS Services for retrieving and disseminating Geographic Information for Disaster Management

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**Abstract.** The development of Information Technology and Communication (ICT) related to web-based services such as portals, web services and databases (DB) services for searching, retrieving, disseminating and sharing information has also been followed in the field of Geographic Information Systems (GIS) through web-based GIS Services. In GIS, the portal is replaced with Geoportal, Web Service followed by Web Mapping Service (WMS) and Web Feature Service (WFS) while DB Services was replaced by Geographic Database (GeoDB) services. Web based GIS services can be classified as Geoportal, WMF, WFS and GeoDB Services. This research develops a prototype of web-based GIS services for the management of Geographic Information related to disaster management. There are several techniques for developing GIS based web services such as using Content Management Systems for GIS, namely OpenGeo Suite, GeoNode, and ArcGIS based GIS Services. This research focuses on Web-based GIS Services with the ArcGIS platform. The prototype of Web-based GIS Services was built focusing on Geographic information in disaster management cycles such as recovery (rehabilitation and reconstruction), prevention (mitigation), preparedness and emergency response periods.



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