

Program Book of



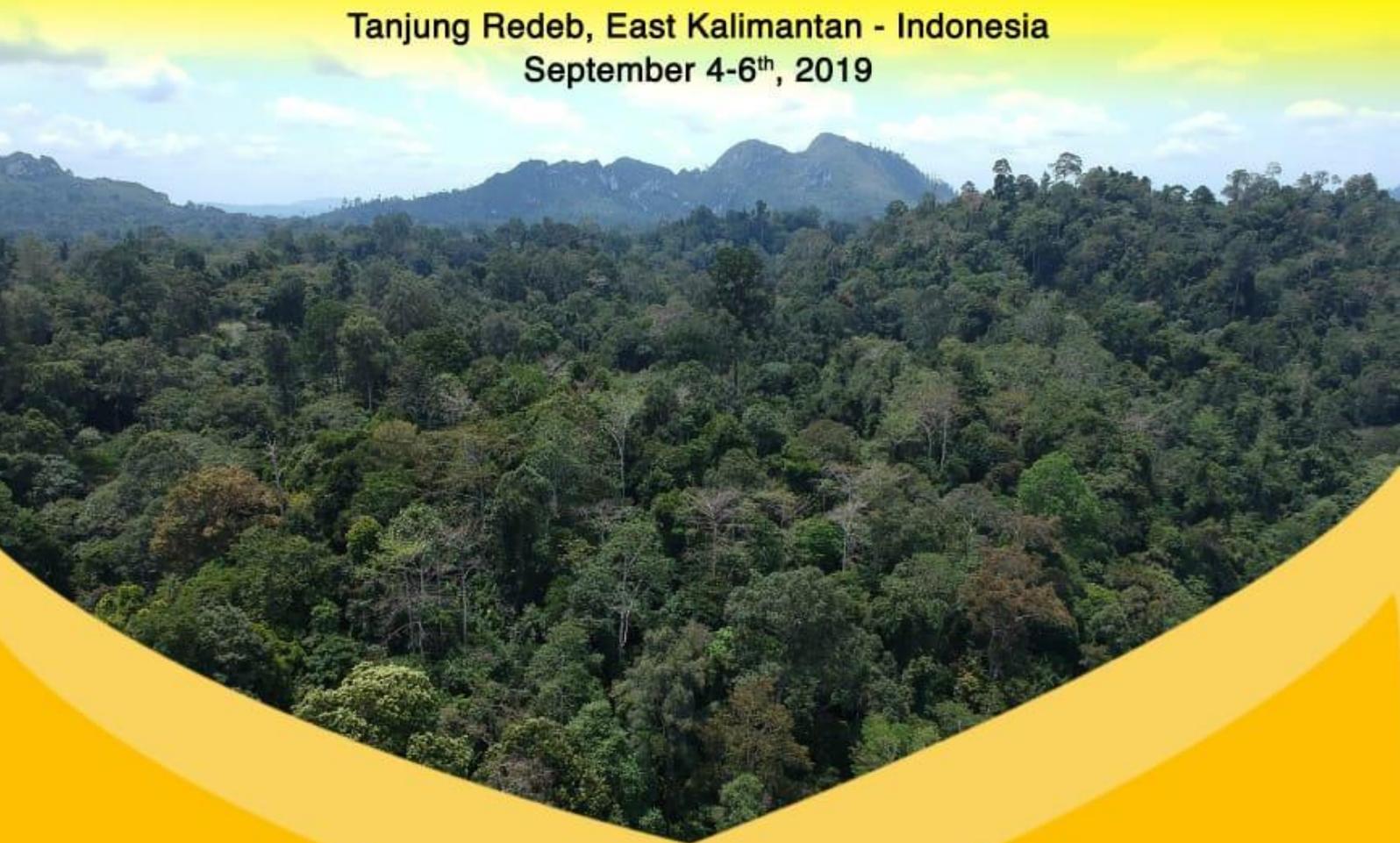
# JOINT SYMPOSIUM ON TROPICAL STUDIES

The 11<sup>th</sup> International Symposium of Indonesian Wood Research Society (IWoRS)

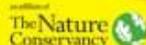
The 2<sup>nd</sup> International Symposium on Tropical Forests and Environmental Sciences (ISTFES)

## Green Innovation on Tropical Forest and Forest Industries Toward Sustainable Livelihoods

Tanjung Redeb, East Kalimantan - Indonesia  
September 4-6<sup>th</sup>, 2019



Yayasan Konservasi  
Alam Nusantara





## WELCOME MESSAGE

### CHAIRMAN OF ORGANIZING COMMITTEE

Dear Colleagues and Friends,

On behalf of the Organizing Committee, I am delighted to welcome you to *Berau*, the northeast District/Regency of East *Kalimantan* province which has the most complete landscape from green tropical humid forest down to beautiful beach and coral reef in *Derawan* islands. Thank you for participating in this symposium, I wish you a pleasant stay in Tanjung Redeb.



This year, we organized and collaborated two distinct international symposium - **The 11<sup>th</sup> International Symposium of Indonesian Wood Research Society (IWoRS)** and **The 2<sup>nd</sup> International Symposium on Tropical Forest and Environmental Sciences (ISTFES)** – which we marked it as “**Joint Symposium on Tropical Studies**”. This joint symposium will be held simultaneously in one day on 4 of September 2019. On the day after symposium, registered participant will be escorted to experience the beach and coral reef as well as beautiful sunset in *Maratua* island (part of famous *Derawan* islands).

By collaborating these two symposium, we are expecting ideas and experience will be spread and shared widely among 113 participants which apparently comes from various institution and disciplines. We also delighted if participants may append their professional network and friendship during the symposium so that further benefits in term of academics activities may be obtained and co-organized.

As chairman of the organizing committee, our highest appreciation goes to all organizing committee member who has been demonstrated hard work and long standing commitment to prepare this symposium. In addition, we would like to extend our sincere gratitude to Mayor (*Bupati*) of Berau Regency, Research and Development Agency on Conservation of Natural Resources Technology (Ministry of Environment and Forestry) and Association of Faculty of Forestry University of Mulawarman Alumni as co-organizer of this symposium, as well as our distinguish sponsor (PT Inhutani I, Perhutani, Berau Coal, GIZ, The Nature Conservancy and PT Tanjung Redeb Hutani). This program book contains useful information especially on some technical guidance for presenter and participant of this symposium. Please enjoy the symposium and enjoy Berau.

Tanjung Redeb, September 2019  
Chairman of Organizing Committee

**Kiswanto, Ph.D**





## WELCOME MESSAGE

### DEAN OF FACULTY OF FORESTRY, UNIVERSITY OF MULAWARMAN

Welcome to Tanjung Redeb, Welcome to East Kalimantan



On behalf of the Faculty of Forestry, University of Mulawarman, we would like to welcome you to the **Joint Symposium on Tropical Studies 2019** which adjoin The 11<sup>th</sup> International Symposium of Indonesian Wood Research Society (IWoRS) and The 2<sup>nd</sup> International Symposium on Tropical Forest and Environmental Sciences (ISTFES). We are very proud to be host of this pivotal events, which congregate researchers and prospective student from Indonesia and around the world to change and share their views and thoughts

on **Green Innovation onTropical Forest and Forests Industries Toward Sustainable Livelihoods.**

The University of Mulawarman has been awarded “A” grade for its outstanding achievement on education, research and community services based on research outputs. Through this symposium, we believe that such prestigious achievement may sustain both for the university and faculty of forestry. For at least 57 years, Faculty of Forestry has been successfully played significant role to provide excellent forester who work either in forestry sector or in any other related position which mainly still related to environmental issues. Through this symposium, it is also expected that master and doctoral student from graduate school in Indonesia and abroad may join as presenter to share their valuable work and research.

We had carefully formulated symposium theme this year which strongly emphasize on innovation in forestry sector. Global Innovation Index 2019 by Cornell University, INSEAD, and the World Intellectual Property Organization has published ranked of Indonesia’s innovation at position 85 among 129 countries in the world. Among Southeast Asian countries, Indonesia’s innovation rank only higher over Cambodia which means that hard work must be done to improve this situation in the future through competitive research and education. Finally, we thank to the Organizing Committee for their tremendous efforts and commitment in the last 5 months to organize this symposium. Yet some details may be miss therefore we ask you for apologize. We congratulate to all of you and wish you delighted and enjoy this event.

Tanjung Redeb, September 2019  
Dean,

**Dr. Rudianto Amirta**





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## SYMPOSIUM COMMITTEE

<b>Steering Committee</b>	<b>: Prof. Dr. H. Masjaya, M.Si</b> (Rector of Mulawarman University) <b>Prof. Dr. Ir. Mustofa Agung Sardjono</b> (Vice Rector of Mulawarman University for Academic Affairs) <b>Dr. Rudianto Amirta, S.Hut., M.P.</b> (Dean Faculty of Forestry Mulawarman University) <b>Dr. Irawan Wijaya Kusuma, S.Hut., M.P.</b> (Vice Dean Faculty of Forestry Mulawarman University for Academic Affairs) <b>Dr. Ir. Wahjuni Hartati, M.P.</b> (Vice Dean Faculty of Forestry Mulawarman University for Treasury) <b>Dr. Ir. Syahrir Yusuf, M.P.</b> (Vice Dean Faculty of Forestry Mulawarman University for Studenship) <b>Prof. Dr. Enos Tangke Arung, S.Hut., M.P.</b> (Secretary of Mulawarman University Research Institute)
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### Organizing Committee

• Chairman	: Kiswanto, S.Hut., M.P., Ph.D
• Secretary	: R.R. Harlinda Kuspradini, S. Hut., M.P., Ph.D.
• Vice Secretary	: Dr. rer. nat. Harmonis., S. Hut., M.Sc.
• Treasurer	: Jufriah, S.Hut., M.P.
• Vice Treasurer I	: Sutrimo Selamat, SE
• Vice Treasurer II	: Wahid, SE.
• Secretary Office	: Yohanes Budi Sulistioadi, S. Hut., M.Sc., M.S., Ph.D. Ali Suhardiman, S. Hut., M.P., Ph.D. Erika Deciarman, S.Hut.,M.P. Nur Maulida Sari, S.Hut., M.P. Dewi Mujiasih, S.Hut
• Division of Program	: Dr. Wiwin Suwinarti, S.Hut., M.P. Dr. Ir. Isna Yuniar Wardhani, M.P. Dr. Rachmat Budiwijaya Suba, S.Hut., M.Sc. Rustam, S.Hut., M.P.
• Division of Communication	: Mochamad Syoim, S.Hut., M.P.     Suhartono Oshlifin Rucmana Saud, S.Hut     Sutikno
• Division of Transportation	: H. Yuliansyah, S.Hut., M.P.     Ariyanto, S.Hut., M.Sc. Warsudi, S.Hut., M.P.     Ibnu Suyuti, S.Hut Supriyadi
• Division of Fund Raising	: Dr. Ir. Triyono Sudarmadji, M.Agr Dr. Ir. Enih Rosamah, M.Sc
• Division of Logistic	: Ir. Hj. Hastaniah, M.P.     Ir. Erly Rosita, M.P. Fatimah, S.Hut.     Yuniar Arianti, S.Hut.
• Division of Proceeding	: Dr. Erwin, S.Hut., M.P.     Ir. Sri Sarminah, M.P. Agmi Sinta Putri, S.Si., M.Hut.     Elis Septia, S.Hut
• Division of Journal Publication	: Dr. Ir. Syahrinudin, M.Sc.     Ir. Rita Diana, M.A. Fenny Putri M. Sofyan, S.Hut.     Siti Nur Halimah, S.Hut





## ORGANIZER AND CO-ORGANIZER



## SPONSORS



Yayasan Konservasi  
Alam Nusantara

an affiliate of

The Nature  
Conservancy 



**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH





## INFORMATION FOR PRESENTER

### Audio/Visual Equipment

There will be several seminar rooms for oral presentation session. Every seminar room will be equipped with computer/laptop connected to a LCD projector, laser pointer and USB/HDMI connector. Please ensure that your presentation material are compatible with Microsoft Powerpoint or Adobe Reader (in pdf format). Presenters may use their own laptop, but it is not recommended. All presenters are expected to converge in seminar room 10 minutes before the presentation session started to copy and do final check the compatibility of the presentation file.

### Oral and Poster Presentation

Location and time allocation of each presentation is available in this program book. Please make sure that you find your session time and room. All presenters are kindly asked to deliver concise presentation in 10 minutes. There will be 5 presentations for one session (approximately 50 minutes) and continued by 10 minutes discussion. Poster presentation is allocated during lunch break. Each poster should be attached on the available board nearby the ballroom. The presenters must be stand by next to their poster during the poster presentation session.

### Chairman and Time Keeper

Each presentation session will be facilitated by a chairman who also act as moderator. Time keeper will ring the bell for the first 8 minutes to indicate presentation has been consume 8 out of 10 minutes of allocation time. Second ring bell indicates that presenter has already run out their presentation time. Chairman will guide the presentation, introduce the presenter and title of presentation. Chairman has responsibility to ensure that each presenter comply with their allocated time.

### Best Presenter Award

Best presenter award for student and non-student will be selected in this symposium. The award will be given to the presenter who exhibited excellent performance. Chairman will be assigned to score each presenter using these following criteria i.e. compliance with time allocation, presentation materials and presentation techniques. Organizing committee and chairmans will do prompt meeting to decide the awardee whom will be announced at the closing ceremony of the symposium.

### Proceeding

Submitted full paper to the organizing committee will be published in the Atlantis Press Proceeding called Advances in Biological Sciences Research (<https://www.atlantispress.com/proceedings/series/absr>). All articles published in this proceeding series are submitted for indexation in CPCI (part of Clarivate's Web of Science), CNKI and Google Scholar.





## SOSIAL AND CULTURE PROGRAMME

Berau regency is located at the northeast part of East Kalimantan Province. The capital city of Berau is called *Tanjung Redeb*. Berau has approximately 21,240 km<sup>2</sup> of land masses with more than 179,000 inhabitants lives in this region. To visit Berau from Jakarta, it takes about 3.5 hours with approximately a quarter hour transit in Balikpapan airport. From *Samarinda City*, Berau only takes 55 minutes fly by airplane. The only airport in *Tanjung Redeb* is *Kalimara* Airport (share code BEJ) with 12 departure time in a day.



There are a lot of tourism spots in Berau regency especially natural attraction. Beside the magnificent tropical rain forest, Berau has sea attraction including beach and coral reef. *Derawan*, *Maratua*, *Sangalaki* and *Kakaban* island are the group of small island in the *Sulawesi* sea that homes for the second highest coral reef biodiversity in Indonesia after *Raja Ampat* Islands and third highest in the world. Those islands has also been widely known as diving spots to observe and admirer sea creatures such as coral reef fish, jelly fish, sting rays and sea turtle as seen in the picture below.



A view on Derawan island resort



A view on Maratua island resort



A sting ray on Sangalaki island surrounding water

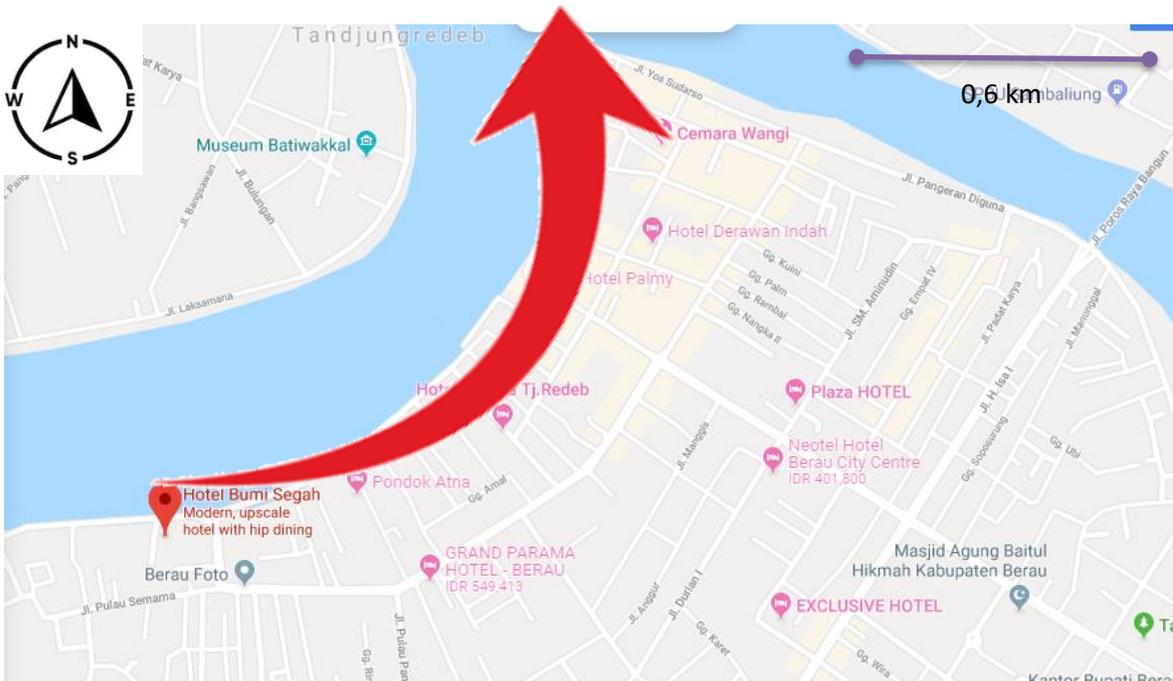
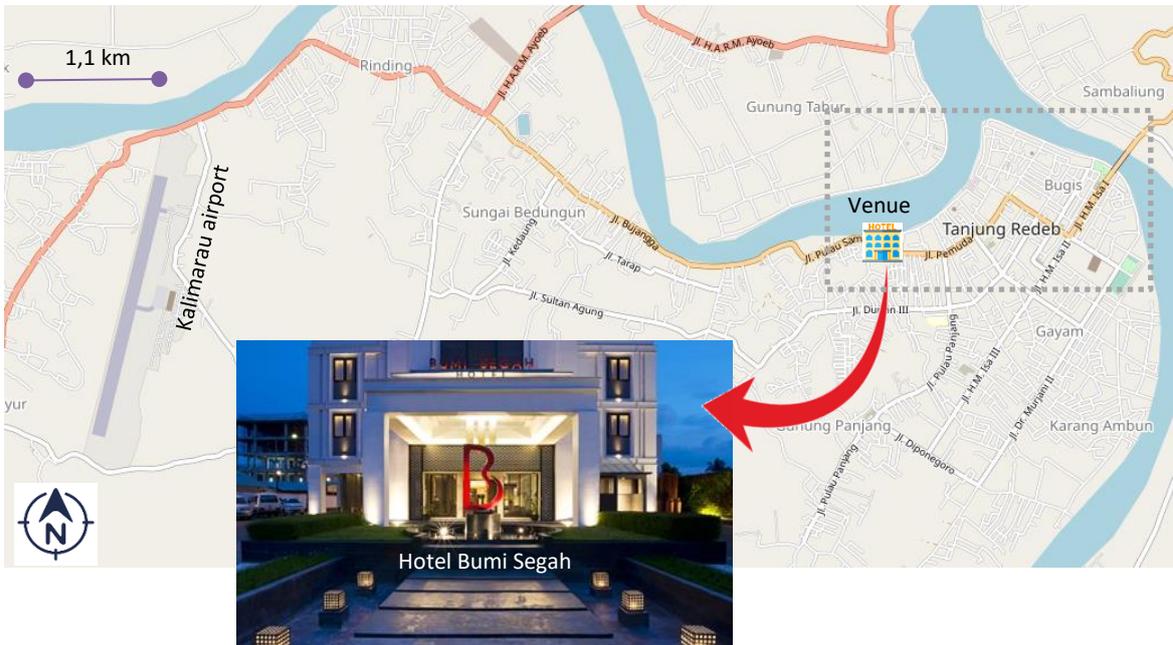


Jelly fish attraction on Kakaban island





## MAP



Maps of Tanjung Redeb city and the location of Bumi Segah Hotel as the venue of the symposium and its proximity hotels (courtesy to Google Maps and Open Street Map)





## GENERAL INFORMATION

### Venue

#### **BUMI SEGAH HOTEL (TOKYO BALLROOM)**

Jl. Pulau Sambit No.747, Tanjung Redeb, Berau Regency (Postal code 77315)

Kalimantan Timur, INDONESIA

Tel +62554 24041 – 24043 – 24045

Mobile (+62)811 5833 727

E-mail: [information@bumisegah.com](mailto:information@bumisegah.com)

Website : [www.bumisegah.com](http://www.bumisegah.com)



### Symposium committee:

Faculty of Forestry University of Mulawarman Samarinda

Jl. Penajam Kampus Gunung Kelua Samarinda, Kalimantan Timur, Telp./Fax.: +62-541-749068,

E-mail: [istfes@fahatan.unmul.ac.id](mailto:istfes@fahatan.unmul.ac.id)

Website: <http://conference.fahatan.unmul.ac.id>

### Contact Person

Kiswanto, Ph.D (+62-812-5342-125; E-mail: [kiswanto@fahatan.unmul.ac.id](mailto:kiswanto@fahatan.unmul.ac.id))

R.R. Harlinda Kuspradini, Ph.D (+62-822-5011-7179; Email: [alinkuspra@gmail.com](mailto:alinkuspra@gmail.com))

### Registration

Presenters and other participants are requested to complete registration form at registration desk during the symposium. Notebook and name tag will be provided during registration. All presenters and participants are requested to wear the name tag during the symposium.

### Organizing Committee Desk

The organizing committee desk will be located nearby the Tokyo ballroom of Bumi Segah Hotel during the symposium (08.00 – 17.30 central Indonesia time) to assist the symposium participants and symposium with related and updated information.

### Airlines and Departure Times Information from Berau (Kalimara) Airport

Departure Time	Airlines	Destination city	Flight Number
07:00	Wings Air	Samarinda (AAP)	IW1485 (ATR)
07.25	Sriwijaya Air	Balikpapan (BPN)	SJ233 (B735)
08:45	Express Air	Samarinda (AAP)	XN609 (ATR)
08.50	Garuda Indonesia	Balikpapan (AAP)	GA467 (CRK)
09:30	Wings Air	Balikpapan (BPN)	IW1361 (ATR)
10:00	Wings Air	Balikpapan (BPN)	IW1381 (ATR)
10:25	Garuda Indonesia	Balikpapan (BPN)	GA462 (CRK)
12:40	Wings Air	Balikpapan (BPN)	IW1363 (ATR)
15:40	Express Air	Tarakan (TRK)	XN619 (ATR)
16:00	Wings Air	Balikpapan (BPN)	IW1365 (ATR)
16:20	Sriwijaya Air	Balikpapan (BPN)	SJ237 (B735)
17:20	Trans Nusa	Balikpapan (BPN)	8B672 (ATR)
17:40	Garuda Indonesia	Balikpapan (BPN)	GA466 (CRK)
18.40	Sriwijaya Air	Balikpapan (BPN)	SJ236 (B735)
19.35	Sriwijaya Air	Balikpapan (BPN)	SJ236 (B735)





### Excursion information

Excursion will take place in Maratua islands which located in the *Sulawesi* sea. Maratua is one of 31 islands in the east coast of *Berau* (see figure below).



Maratua island is about 31 miles from East Kalimantan shoreline and famous as nesting ground of Green Sea Turtles. To reach Maratua island, traveller may used regular boat departed from Segah ports in Tanjung Redeb city or sea port in Tanjung Batu village (approximately 4 hours driving by car from Tanjung Redeb). In order to enjoy trip and vacation in Maratua island, these following items may be useful:

1. Sunblock
2. Sun glasses
3. Beach hat
4. Roll extention cable
5. Plastic wrap for your smartphone
6. Selfie stick
7. Slippers
8. Toiletries
9. Medicine
10. Tumbler
11. Snorkling gear
12. Cash





**PROGRAM IN BRIEF**

SEPTEMBER 4<sup>TH</sup> 2019 AT BUMI SEGAH HOTEL, TANJUNG REDEB

**07.30 – 08.00**  
**REGISTRATION**

**08.00 – 08.45**

Opening Ceremony  
Welcome Remarks from Organizing Committee  
Foreword from the Rector of Mulawarman University

**08.45-09.00**  
**COFFEE BREAK**

**09.00 – 10.15**

**Chairman : Dr. Rudianto Amirta**

**Keynote Speech I**

by: **Dr. Dwi Sudharto**  
(Ministry of Environment and Forestry, Republic of Indonesia)

**Keynote Speech II**

by: **Prof. Dr. Takashi Watanabe**  
(Director, RISH, Kyoto University, Japan)

**Keynote Speech III**

by: **Prof. Dr. Mustofa Agung Sardjono**  
(Mulawarman University, Indonesia)

**10.15 – 11.30**

**Chairman : Prof. Dr. Enos Tangke Arung**

**Keynote Speech IV**

by: **Prof. Dr. Tohru Mitsunaga**  
(Gifu University, Japan)





**Keynote Speech V**

by: **Dr. Dena J Clink**  
(Cornell University, USA)

**11.30-12.00**

**Chairman : Ali Suhardiman, Ph.D.**

**Invited Speech I**

by: **Prof. Dr. Byung-Dae Park**  
(Kyungpook National University)

**Invited Speech II**

by: **Dina Riska, M.Sc.**  
(The Nature Conservancy)

**12.00-13.00**

**LUNCH BREAK AND POSTER SESSION**





PARALLEL SESSION				
TOKYO BALLROOM (FP)	GENEVA ROOM (FP)	LONDON ROOM (FP- WE)	FRANKFURT ROOM (SF-BCR-PMR)	ZURICH ROOM (GAF-SFM-SC)
<b>13.00 – 14.00</b> <b>SESSION I</b>				
<b>Chairman: Andi Detti Y</b> FP-01 → FP-05	<b>Chairman: Suhasman</b> FP-16 → FP-20	<b>Chairman: Rini Pujiarti</b> FP-36 → FP-40	<b>Chairman: J.P Gentur S</b> SF-01 → SF-05	<b>Chairman: Faradilla F</b> GAF-01 → GAF-05
<b>14.00 – 15.00</b> <b>SESSION II</b>				
<b>Chairman: Isna Y Wardhani</b> FP-06 → FP-10	<b>Chairman: Lina Karlinasari</b> FP-21 → FP-25	<b>Chairman: Nanang Masruchin</b> FP-41 → FP-45	<b>Chairman: Nyoman J Wistara</b> BCR-01 → BCR-05	<b>Chairman: Adek Zamrud A</b> GAF-06 → GAF-10
<b>15.00 – 16.00</b> <b>SESSION III</b>				
<b>Chairman: Fauzi Febrianto</b> FP-11 → FP-15	<b>Chairman: Yanti Rachmayanti</b> FP-26 → FP-30	<b>Chairman: Chaidir</b> FP-46 → FP-50	<b>Chairman: Rina Susanti</b> BCR-06 → BCR-10	<b>Chairman: Ferisman T</b> GAF-11 → GAF-12 SFM-01 → SFM-03
<b>16.00 – 16.30</b> <b>COFFEE BREAK AND POSTER SESSION</b>				
<b>16.30 – 17.30</b> <b>SESSION IV</b>				
	<b>Chairman: Nani Husien</b> FP-31 → FP-35	<b>Chairman: Masteria YP</b> WE-01 → WE-05	<b>Chairman: Syahriyanti Saad</b> BCR-11 PMR-01 → PMR-04	<b>Chairman: Triyono S</b> SC-01 → SC-03
<b>17.30 – 18.00</b> <b>CLOSING</b>				





## PROGRAM IN DETAIL

Oral Presentation (Wednesday, September 4<sup>th</sup>, 2019)

## FOREST PRODUCT (FP)

Session I: 13.00 – 14.00

Tokyo Ballroom		Moderator – Andi Detti Yunianti	
FP-01	Agus Sulisty Budi	Impact of Nailing on Physical Toughness to Gelam ( <i>Melaleuca</i> sp.) in Schaffolding	Faculty of Forestry, Mulawarman University
FP-02	Fanny Hidayati	Physical, mechanical, and anatomical characteristics of <i>Acacia mangium</i> wood observed in progeny trial in Central Java, Indonesia	Faculty of Forestry, Gadjah Mada University
FP-03	Fauzi Febrianto	Physical and Mechanical Properties of Hybrid Oriented Strand Board Prepared From Steam Treated Mangium Wood and <i>Betung</i> Bamboo Strands	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
FP-04	Imam Wahyudi	Quality Improvement of Superior <i>Muna</i> -Teakwood Through Partial Densification	Faculty of Forestry, Bogor Agricultural University
FP-05	Imam Wahyudi	Characteristic of the Superior <i>Muna</i> Teakwood	Faculty of Forestry, Bogor Agricultural University

Session II: 14.00 – 15.00

Tokyo Ballroom		Moderator – Isna Yuniar Wardhani	
FP-06	Y.S. Hadi	Physical and Mechanical Properties of Furfurylated <i>Jabon</i> and Pine Woods	Bogor Agricultural University
FP-07	Listya Mustika Dewi	Anatomy and Fiber Quality of the Least Known Timbers from the <i>Icacinaceae</i> Family: <i>Apodytes</i> , <i>Citronella</i> , <i>Gomphandra</i> , <i>Gonocaryum</i> , <i>Medusanthera</i> , and <i>Uranda</i>	Forest Products Research and Development Center, Bogor
FP-08	Andi Detti Yunianti	Wood Quality from Genetic Diversity of <i>Jabon Merah</i> ( <i>Anthocephalus macrophyllus</i> ) from <i>Wajo</i> and <i>Sidrap</i> Provenances, South of Sulawesi	Faculty of Forestry, Hasanuddin University
FP-09	Erwin	Microscopic Evaluation of Biocontrol Potential of <i>Trichoderma viride</i> and <i>Aspergillus flavus</i> Against <i>Trametes</i> sp. in Wood Decay Process	Faculty of Forestry, Mulawarman University
FP-10	Cicilia Maria Erna Susanti	Diversity and Anatomical Properties of Wood Member of <i>Arfak</i> tribes Traditional House “Kaki Seribu”	Faculty of Forestry, Papua University





Tokyo Ballroom		Moderator – Fauzi Febrianto	
FP-11	Effendi Tri Bahtiar	Bearing Area Factors of Indonesian Wood Subjected to Compression Perpendicular to Grain	Bogor Agricultural University
FP-12	Isna Yuniar Wardhani	Bonding Strength of Rubber Nature Glue on Three Wood Species	Faculty of Forestry, Mulawarman University
FP-13	Rahayu Istie	Density and Dimensional Stability of Fast Growing Wood Species Impregnated by Nano Silika from Leaf of <i>Betung</i> Bamboo	Bogor Agricultural University
FP-14	Ira Taskirawati	The Bamboo Sawdust and Addition of EM4 as an Alternative Material for the Cultivation of Oyster Mushroom ( <i>Pleurotus ostreatus</i> )	Faculty of Forestry, Hasanuddin University
FP-15	Sarah Augustina	NIR's Spectra and Density Profile of Boron-Densified Wood: The Case of Three Lesser-used Wood Species from Indonesia	Forest Products Science and Technology Study Program, IPB University

Coffee Break: 16.00 – 16.30



**FOREST PRODUCT (FP)**

Session I: 13.00 – 14.00

Geneva Room		Moderator – Suhasman	
FP-16	Trisna Priadi	Improving the Dimensional Stability and Durability of Fast Growing Wood	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
FP-17	Nani Husien	Macroscopic Properties of Fossil Wood From Kutai Kertanegara	Faculty of Forestry, Mulawarman University
FP-18	Lina Karlinasari	Tensile properties of Leaf Sheath <i>Roystonea regia</i>	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
FP-19	Herliani	Test Contents of Seaweed Oil and Water Content Test From <i>Gaharu</i> Oil Control Process Species <i>Aquilaria malaccensis</i> L. (as a support for high level botany courses)	Biology Education Program, Faculty of Teacher Training and Education, Mulawarman University
FP-20	Yanti Rachmayanti	Multiplication of DNA Fragments Extracted From Tropical Timber	Faculty of Mathematics and Natural Sciences, Institut of Technology Bandung

Session II: 14.00 – 15.00

Geneva Room		Moderator – Lina Karlinasari	
FP-21	Naresworo Nugroho	Experimental Study of the Flat Use Adjustment Factor on <i>Shorea</i> spp. Timber	Bogor Agricultural University
FP-22	Firda Aulya Syamani	The Quality of Particleboards Made From Mixed Particles of <i>Sengon</i> ( <i>Albizia chinensis</i> (Osbeck) Merr.) and <i>Bagasse Sorgum</i> ( <i>Sorghum bicolor</i> (L.) Moench) after Alkaline Treatment	Research Center for Biomaterials LIPI, Puslit Biomaterial LIPI
FP-23	Siti Hanifah Mahdiyanti	Non-Destructive Evaluation of Wood Thermal Degradation Using Near Infrared and Visible-Light Spectroscopy	Faculty of Forestry, Gadjah Mada University
FP-24	Suhasman	Performance of Resinless Plywood Made from <i>Sengon</i> Veneer Using <i>Acacia</i> Bark Powder as Bonding Agent	Faculty of Forestry, Hasanuddin University
FP-25	Suhasman	Bonding Agent From Oxidized Bark or Wood Powder for Producing Resinless Plywood	Faculty of Forestry, Hasanuddin University





Session III: 15.00 – 16.00

GenevaRoom		Moderator – Yanti Rachmayanti	
FP-26	Yuliani	Potential of <i>Ageratum conyzoides</i> as Biopesticide	Department of Biology, Faculty of Mathematics and Natural Sciences, State University of Surabaya
FP-27	Ainun Ade Putri K	Exploration of Particle Board Capability by Addition of <i>Sansevieria trifasciata</i> Extract as Pollutant Absorption for Cigarette Smoke	Hasanuddin University
FP-28	Dodi Nandika	Bioactivities of Catechin from <i>Gambir</i> ( <i>Uncaria gambir</i> Roxb.) against Wood-Decaying Fungi	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
FP-29	Syahidah	Natural Resistance of Several Community Woods from South Sulawesi against Marine Borer	Hasanuddin University
FP-30	Arinana	Palatability of subterranean Termites <i>Coptotermes curvignathus</i> on <i>Pinus merkusii</i> of Presto, Boiling, and Steam Treatments	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University

Coffee Break: 16.00 – 16.30

Session IV: 16.30 – 17.30

Geneva Room		Moderator – Nani Husein	
FP-31	Binti Khairunnisa	Antioxidant of <i>Homotrigona fimbriata</i> Propolis	Faculty of Forestry, Mulawarman University
FP-32	Saat Egra	Screening and Antimicrobial Activity of Some <i>Tarakan's</i> Educational Forest Plants	Borneo Tarakan University
FP-33	Andi Sri Rahayu Diza Lestari	Characteristics of Bark Tannin-Based Adhesive with the Addition of a Biopesticide	Faculty of Forestry, Hasanuddin University
FP-34	Agmi Sinta Putri	Evaluation of Antioxidant and Antibacterial Activity from Three Different Solvents of <i>Nephelium ramboutan-ake</i> Leaves Extract	Faculty of Forestry, Mulawarman University
FP-35	Marwanto	Morphological Characteristic and Chemical Properties of Balsa Fibers Due To Alkaline Treatment	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University



**FOREST PRODUCT– WILDLIFE ECOLOGY (FP–WE)**

Session I: 13.00 – 14.00

London Room		Moderator – Rini Pujiarti	
FP-36	Nanang Masruchin	Characterization of Polysaccharide Nanoparticles by Cationic Functionalization	Research Center for Biomaterials LIPI, Puslit Biomaterial LIPI
FP-37	Yadi	Honey of Stingless Bee ( <i>Homotrigona fimbriata</i> ) As Anti Skin Bacteria	Faculty of Medicine, Mulawarman University
FP-38	Muhammad Iqbal Maulana	Characteristic of Bamboo Cellulose Nanofibers at Various Delignification Levels	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
FP-39	Harlinda Kuspradini	The diversity of Terpenoid in the <i>Litsea</i> spp. essential oils	Faculty of Forestry, Mulawarman University
FP-40	Sukemi	DPPH-Scavenging Activity of Propolis Of <i>Tetragonula iridipennis</i> From East Kalimantan	Department of Chemistry, Faculty of Education, Mulawarman University

Session II: 14.00 – 15.00

London Room		Moderator – Nanang Masruchin	
FP-41	Enos Tangke Arung	Potency of Bee Pollen of Stingless Bee ( <i>Homotrigona Fimbriata</i> ) as Anti Cancer	Faculty of Forestry, Mulawarman University
FP-42	Annisa Primaningtyas	A Preliminary Study of Fat liquor Synthesis From Candlenut Oil ( <i>Aleurites moluccana</i> ): Effects of Reaction Time and Reactants Ratio	Faculty of Forestry, Gadjah Mada University
FP-43	Chaidir	Aglaforbesin, A New Aglain Derivate Isolated From The Leaves of <i>Aglaia dasyclada</i> With New Condensation Pattern Between Flavonoid and Putrecine Bisamide	Center of Pharmaceutical and Medical Technology, BPPT Serpong
FP-44	Agmi Bagus Kartiko	Evaluation of Antibacterial Activity and Physico-Chemical Profiles of <i>Eucalyptus pellita</i> Essential Oil From East Kalimantan	Faculty of Forestry, Mulawarman University
FP-45	Cita Tri Murni Andayati	Antibacterial Activity of Methanol Extract and Its Fractions from Knop Grass Root ( <i>Hyptis capitata</i> Jacq.) AGAINST <i>Propionibacterium acnes</i>	Faculty of Mathematics and Natural Sciences, Mulawarman University





Session III: 15.00 – 16.00

London Room		Moderator – Chaidir	
FP-46	Masteria Yunovilsa Putra	Antioxidant and Antibacterial Capacities of the Mangrove <i>Sonneratia alba</i> and <i>Bruguiera gymnorrhiza</i>	Research Center for Oceanography, Indonesian Institute of Sciences
FP-47	Nur Maulida Sari	Anticariogenic and Antioxidant Activity of Some Medicinal Plants Used by <i>Bentian</i> Tribe in East Kalimantan, Indonesia	Department of Forest Product Technology, Agricultural Engineering Polytechnic Institute of Samarinda
FP-48	Rini Pujiarti	Effect of Location and Distillation Method on Yield, Quality and Antioxidant Activity of Clove ( <i>Syzygium aromaticum</i> ) Leaves Oil	Department of Forest Products, Faculty of Forestry, Gadjah Mada University
FP-49	Ayu Mitha Sari	Effect Of <i>Heterotrigena itama</i> Bee Pollen Extract On Antioxidant and <i>Propionibacterium Acnes</i> Growth	Faculty of Forestry, Mulawarman University
FP-50	Sisilia Silau	Effectiveness of Distillation Models on Bioactivity from Essential Oil Fraction of <i>Cinnamomum camphora</i> (L.) J. Presl.	Faculty of Forestry, Mulawarman University

Coffee Break: 16.00 – 16.30

Session IV: 16.30 – 17.30

London Room		Moderator – Masteria Yunovilsa Putra	
WE-01	Chandradewana Boer	How to Survey and Conserve One of Big Mammals in the Tropical Rain Forest of Kalimantan? (Nicht Survey, Salt-licking and Camera Trapping will elp the estimation of Rhino's population)	Faculty of Forestry, Mulawarman University
WE-02	Mukhlisi	Biodiversity of Bird and Mammal in the <i>Wanapatra Lestari</i> Area of PT. Pertamina Refinery Unit V Balikpapan, Indonesia	Research and Development Institute of Natural Resources Conservation Technology, Samboja
WE-03	Maya Safira Firdausy	Community of <i>Psittacidae</i> Family In <i>Aketajawe Lolobata</i> National Park North Maluku	Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry, Bogor Agricultural University
WE-04	Harmonis	<i>Odonata</i> communities on the three habitat types in landscape of the Mulawarman University Education Forest	Faculty of Forestry, Mulawarman University





WE-05	Teguh Muslim	Population Ecology and Potential Food Sources of the <i>Siamese Crocodile</i> in <i>Mesangat</i> Swamp, East Kalimantan	Research and Development Institute for Natural Resources Conservation Technology, Samboja
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**SOCIAL FORESTRY–BIOMASS CONVERSION AND RENEWABLE ENERGY–PEATLAND & MANGROVE (SF – BCR – PMR)**

**Session I: 13.00 – 14.00**

Frankfurt Room		Moderator – J. Pramana Gentur Sutapa	
SF-01	Arinafril	Local People Knowledge for Managing Insect Pest Infestation in Agroforestry: an Ethnoecological Study	Department of Agroecotechnology, Sriwijaya University, Indralaya
SF-02	Makarennu	A Strategic Approach of an Integrated Supply Chain Management and Scor Model for Palm Sugar Business	Faculty of Forestry, Hasanuddin University
SF-03	Rujehan	Effect of Community Migration and Remittance on Local Forest and Land Management In North Kalimantan, Indonesia	Faculty of Forestry, Mulawarman University
SF-04	Trina Tallei	Diversity and Local Knowledge of Local Fruits in North Sulawesi	Department of Biology, Faculty of Mathematics and Natural Sciences, Sam Ratulangi University, Manado, North Sulawesi
SF-05	Rina Susanti	Sustainable Livelihood and Language in Ethnomedicine of the Dayak in North Kalimantan	Keio University, Graduate School of Media and Governance, Fujisawa, Japan

**Session II: 14.00 – 15.00**

Frankfurt Room		Moderator – Nyoman J. Wistara	
BCR-01	J. Pramana Gentur Sutapa	Utilization Of Coconut Shells ( <i>Cocos nucifera</i> ) for Improving Calorific Value of Pellet from Mahogany Wood ( <i>Swietenia macrophylla</i> )	Faculty of Forestry, Gadjah Mada University
BCR-02	J. Pramana Gentur Sutapa	Environment Friendly Method for Improving Quality of Wood Pellet	Faculty of Forestry, Gadjah Mada University
BCR-03	Ismail Budiman	Mechanical Properties, Pollutant, Adsorption, and Self-Healing Capability of Mortar from Oil Palm Shell and Empty Fruit Bunches Fiber	Research Center for Biomaterials, LIPI
BCR-04	Muliyana Arifudin	Physico-chemical Characteristics of pellet made of sawdust waste from Papua's commercial wood species and sago pulp	Faculty of Forestry, Papua University
BCR-05	Tomy Listyanto	Effect of Temperature and Silicing Thickness on Extractive and Colour Change of Superior Teak Wood	Faculty of Forestry, Gadjah Mada University





Session III: 15.00 – 16.00

Frankfurt Room		Moderator – Rina Susanti	
BCR-06	Dewi Mujiasih	Pretreatment of <i>Macaranga hypoleuca</i> (Reichb.f. and Zoll) Mull.Arg. using Peroxo Metal Catalyst, Silicomolybdc Acid	Faculty of Forestry, Mulawarman University
BCR-07	Syahriyanti Saad	Bioplastic based on Carrageenan and Cellulose from <i>Sengon</i> Wood	Faculty of Forestry, Hasanuddin University
BCR-08	Ratih Damayanti	Ultrastructure and Quality of Paper	Forest Product Research and Development Center, Bogor
BCR-09	Nyoman J. Wistara	Optimizing Enzymatic Hydrolysis of <i>Jabon</i> Alkaline Pulp	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
BCR-10	Siswa Setyahadi	Microbial Enzyme for Pulping Process	Center for Bioindustrial Technology, Agency for the Assessment and Application of Technology, Laptiab, Puspiptek Indonesia

Coffee Break: 16.00 – 16.30

Session IV: 16.30 – 17.30

Frankfurt Room		Moderator – Syahriyanti Saad	
BCR-11	Erkata Yandri	Assesment of Agricultural Wastes as Wood Subtitude Fuel for Modern Biomass Cook Stove Using Briquettes and Pellets	Darma Persada University
PMR-01	Irma Dewiyanti	Litter Production and Decomposition of Mangrove in The Northern Coast of Aceh Besar District, Aceh Province	Faculty of Marine and Fisheries, Syiah Kuala University
PMR-02	Yuni Sri Rahayu	Accumulation Pattern of Na <sup>+</sup> And Cl <sup>-</sup> Concentration in Mycorrhizal Plant Grown on Saline Soil	Department of Biology, State University of Surabaya
PMR-03	Rachmad Mulyadi	The Dynamics of Wetlands in the Karangmumus Sub-Wathershed of Samarinda	Faculty of Forestry, Mulawarman University
PMR-04	Yosefin Ari Silvianingsih	Earthworm Population in Wetland, Central Kalimantan: Indicator of Soil Health in Various Landuse Systems	Palangka Raya University



**GENERAL FORESTRY–SUSTAINABLE FOREST MANAGEMENT–SILVICULTURE****(GAF–SFM –SC)****Session I: 13.00 – 14.00**

<b>Zurich Room</b>		<b>Moderator – Faradilla Fadlia</b>	
GAF-01	Adek Zamrud Adnan	Isolation of Agarose from Agar and Its Use as Medium for Identification of DNA Plasmid Fractions of <i>Escherichia coli</i> by Electrophoresis Method	Faculty of Pharmacy, Andalas University
GAF-02	Eliyani	Machine Learning Based Recognition of Golden Teak Leaf	Mercu Buana University
GAF-03	Dwifitri	Journalism Environment on Forest Fires of <i>Seulawah</i> in Aceh through Online News	Faculty of Political and Social Science, Malikussaleh University
GAF-04	Suryanto	Policy Changes in Ecotourism Governance in National Park and Others Forest Conservation	Natural Resources Conservation Technology, Samboja
GAF-05	Yohanes Budi Sulistioadi	Estimation of River Capacity through Multi-Temporal Drone Imagery	Center for Geospatial Information Infrastructure Development, Institute of Research and Community Services Mulawarman University

**Session II: 14.00 – 15.00**

<b>Zurich Room</b>		<b>Moderator – Adek Zamrud Adnan</b>	
GAF-06	Rita Diana	Composition and Structure of Vegetation Species On Different Age of Logged-over Forest in PT Karya Lestari, East Kalimantan	Faculty of Forestry, Mulawarman University
GAF-07	Faradilla Fadlia	Overlapping Forest Ownership Between Mukim (Indigenous Peoples) And PT Acehnusa Indrapuri (PT ANI) (Analysis of Sense of Place)	Department of Political Science, Faculty of Political and Social Sciences, University of Syiah Kuala
GAF-08	Diah Rakhmah Sari	Productivity and Cost Analysis of Felling Using Chainsaw MS 381 in Plantation Forest	Faculty of Forestry, Mulawarman University
GAF-09	Arief Fahmie	Data Collection Methods of Training Evaluation and Green Innovation Development on Forest Industries	Indonesian Islamic University, Yogyakarta
GAF-10	Ali Suhardiman	Identifying Logging Road as Sources of Forest Degradation in Tropical Forest Using Sentinel-2 Satellite Image	Faculty of Forestry, Mulawarman University





Session III: 15.00 – 16.00

Zurich Room		Moderator – Ferisman Tindaon	
GAF-11	Sri Sarminah	Land Rehabilitation by Using Sengon and Jabon to Reduce Run Off and Erosion	Faculty of Forestry, Mulawarman University
GAF-12	Triyono Sudarmadji	Spatiotemporal Rainfall Analysis in the Eastern Region of Kalimantan Island	Faculty of Forestry, Mulawarman University
SFM-01	Triyono Sudarmadji	Mined-Out Forest Land Rehabilitation and It's Ecosystem Recovery In East Kalimantan, Indonesia	Faculty of Forestry, Mulawarman University
SFM-02	Abdunnur	$\delta^{13}C$ and $\delta^{15}N$ Stable Isotope Ratio Analysis of Fish Species and Mangrove Leaf on Mangrove Ecosystem of Muara Badak Coastal Area – East Kalimantan	Faculty of Fisheries and Marine, Mulawarman University
SFM-03	Burhanuddin Adman	Synergy With Nature in an Effort to Restore Long-Cycle Local Tree Species on Post-Mining Land	Institute of Conservation Technology for Natural Resorces, Samboja

Coffee Break: 16.00 – 16.30

Session IV: 16.30 – 17.30

Zurich Room		Moderator – Triyono Sudarmadji	
SC-01	Syahrinudin	Biochar Application on Spodosols Soils Promotes Higher Plant Growth and Survival Rate	Faculty of Forestry, Mulawarman University
SC-02	Ferisman Tindaon	Assessing Ecotoxicological Risk of Agrochemicals on Non Target Microbial Activities in Soils	Agroecotechnology Department, Faculty of Agriculture, Nommensen University
SC-03	Kiswanto	Identifying the Deforested and Degraded Forest to Formulate Appropriate Restoration Strategy	Faculty of Forestry, Mulawarman University



Poster Presentation (Wednesday, September 4<sup>th</sup>, 2019)

CODE	NAME	TITLE	AFFILIATION
P-01	Irmanida Batubara	Optimum Formula of Zein-Secang ( <i>Caesalpinia sappan</i> ) Nanoparticles as Antioxidant and Antibacterial Agents	Bogor Agricultural University
P-02	Wida Banar Kusumaningrum	Stable Thermoplastic Starch Bioplastic for Packaging Application	Research Center for Biomaterials, Indonesian Institute of Sciences
P-03	Enih Rosamah	Antidiabetic Activities of Ethanolic Extracts from Leaves, Bark and Stem of Baraan ( <i>Dracontomelon dao</i> (Blaco) Merr & Rolfe) Against $\alpha$ -glucosidase enzyme	Faculty of Forestry, Mulawarman University
P-04	Ashlikhatul Mahmudah	Bioactivity and Phytochemicals of Two Ferns in East Kalimantan	Faculty of Forestry, Mulawarman University
P-05	Restina Wiandany	Bioactivity and Phytochemicals of Honey from Several Locations in East Kalimantan	Faculty of Forestry, Mulawarman University
P-06	Endang Suryanti	Phytochemicals and biological activities of <i>Hyptis capitata</i> Jacq plants from four growing locations in Indonesia	Faculty of Forestry, Mulawarman University
P-07	Yessi	Antioxidant activity of methanol extract of <i>Gmelina elliptica</i> flower from East Kalimantan	Biology Education Program, Faculty of Teacher Training and Education, Mulawarman University
P-08	Endang Lukitaningsih	A New Compound (8,9)-furanly-pterocarpan-3-ol used for Standardization of <i>Bengkoang</i> Extract as Sunscreen and Skin Whitening Agent	Faculty of Pharmacy, Gadjah Mada University
P-09	Wasrin Syafii	In vivo Antimalarial Activity of Ethanolic and Aqueous Extracts of <i>Strychnos Ligustrina</i> Wood Against <i>Plasmodium berghei</i> in Mice	Department of Forest Products, Faculty of Forestry, Bogor Agricultural University
P-10	Rita Kartika Sari	Antioxidant, Photoprotective, and Physicochemical Properties of Antiaging Cream Formula Containing Phytosomal Extract of <i>Daemonorops draco</i> Resin and <i>Centella asiatica</i> Leaves	Faculty of Forestry, Bogor Agricultural University
P-11	Lilik Astari	Surface roughness and mechanical properties of particleboard made from <i>alang-alang</i> and sorghum stalks	Research Center for Biomaterials, Indonesian Institute of Sciences
P-12	Yusup Amin	Characteristics and Potensial Utilization of Yopo Wood ( <i>Piptadenia peregrina</i> Benth.)	Research Center for Biomaterials, Indonesian Institute of Sciences
P-13	Siti Sofiatun Nafiah	Mold Staining Phenomenon on Rubber Sheet: Comparison Between Commercial Formic Acid Reagent and Wood Vinegar as Latex Coagulant	Faculty of Forestry, Mulawarman University





CODE	NAME	TITLE	AFFILIATION
P-14	Jufriah	Physical and Mechanical Properties of Wood Plastic Composites from <i>Mahang</i> Wood ( <i>Macaranga gigantea</i> Muell.Arg.) Based on Variation of Heat Press Time	Faculty of Forestry, Mulawarman University
P-15	Erly Rosita	The Properties of Cement Bonded Particleboard from <i>Ketapang</i> ( <i>Terminalia cattapa</i> Linn.) Based on Drying Time of Board	Faculty of Forestry, Mulawarman University
P-16	Mardiatul Ufa	An Evaluation of a New Function of a Tropical Plant Species, <i>Vernonia amigdalina</i> as Ethanol Feedstock: a Preliminary Study	Faculty of Forestry, Mulawarman University
P-17	Aulia Fitria Ningrum	Alkaline Pretreatment of Tropical Short Rotation Coppice Species, <i>Bauhinia purpurea</i> : a Preliminary Study	Faculty of Forestry, Mulawarman University
P-18	Nasriati	Comparasion of Growth and Antioxidant Properties of Wild and Domesticated a Tropical Fungi, <i>Xylaria hypoxylon</i>	Faculty of Forestry, Mulawarman University
P-19	Sonja V. T. Lumowa	Implementation of <i>Kirinyu</i> ( <i>Chromolaena odorata</i> l.) Leaf Extract and Lemongrass ( <i>Andropogon citratus</i> ) Stem Extract to the Intensity of Pest Insect on Mustard Pakcoy ( <i>Brassica rapa</i> l.) as Pracice Materials for Entomology Course	Department of Biology Education, Faculty of Teacher Training and Education, Mulawarman University
P-20	Denny Irawati	Effect of Simultaneous Saccharification and Fermentation (SSF) Time on Ethanol Production from Spent Medium of Oyster Mushroom ( <i>Pleurotus ostreatus</i> )	Faculty of Forestry, Gadjah Mada University
P-21	Wahjuni Hartati	Morphological, Physical, Chemical and Mineralogical Characteristics of Dystrustepts Soil with Natural and Plantation Forests	Faculty of Forestry, Mulawarman University
P-22	Wiwin Suwinarti	Premium Charcoal Production using <i>Shorea</i> and Non- <i>Shorea</i> Woody Waste Biomass: a Preliminary Study	Faculty of Forestry, Mulawarman University
P-23	Arif Habibal Umam	Observation Of Sumatran Orangutan ( <i>Pongo abelii</i> ) Nesting Preferences In the Ketambe Research Station with The Leuser Conservation Forum (FKL), Southeast Aceh	Department of Forestry, Syiah Kuala University
P-24	Evi Sribudiani	Characteristic of Bintangur ( <i>Calophyllum pulcherrimum</i> ) treatment as alternative for made “Jalur” for sustainability pacu jalur culture with infuse method	Forestry Department of Riau University





## Keynote & Invited Speech





## ABSTRACTS

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### KEY - 02

# Conversion of lignocellulosic biomass for sustainable humanosphere

T WATANABE\*

Research Institute for Sustainable Humanosphere (RISH), Kyoto University,  
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**Abstract.** There is a growing demand to develop new, highly efficient technology to produce biofuels, chemicals and materials from lignocellulosic biomass. In biorefinery using enzymatic saccharification and fermentation, lignin should be separated from the cell wall polysaccharides, accommodating increase in the hydrolyzability of (hemi)celluloses and use of the lignin as an aromatic feedstock. To establish the environmentally friendly biorefinery process, we have been studying lignin-degrading (bio)catalysts, structure of lignin and lignin-carbohydrate complexes, analytical methods for plant cell walls including quantitative 2D-NMR, interaction of lignin with cellulases and production process of bioethanol, aromatic chemicals and antiviral compounds using microwave reactions<sup>1-13</sup>. We constructed a bench scale plant for wood biorefinery using microwave reactors, and demonstrated coproduction of bioethanol and lignin with minimum chemical modifications. We also developed microwave reactions useful for production of raw feedstock for functional resins<sup>2-4,6</sup>, and analyzed microwave acceleration effects. Highly selective degradation of lignin is pivotal for lignocellulosic biorefinery. However, few studies have examined natural and synthetic molecular components recognizing the heterogeneous aromatic polymer. We identified lignin-binding 12-mer peptides which exhibit structure-dependent high-affinity binding to isolated lignin<sup>9,12</sup>. We have been analyzing molecular interactions between the peptides and lignin, and synthesizing ligninolytic (bio)catalysts. Enzymatic saccharification is an essential process to produce biofuel and chemicals from lignocellulose resources. Cellobiohydrolase I (Cel7A) from *Trichoderma reesei* has catalytic domain and carbohydrate binding module 1 (*TrCBM1*). *TrCBM1* possesses high affinity to lignin, and the resultant non-productive adsorption inhibits enzymatic saccharification. We found that *TrCBM1* adsorbed cellobiose in highly specific manner via flat plane surface and cleft while MWLs were adsorbed at multiple binding sites<sup>13</sup>. The approaches for biorefinery is reported.

**Keywords:** Bioethanol, cellulase, lignin, microwave, peptides, CBM

### References

<sup>1</sup>*Sci. Rep.*, **8**, 6538, 2018, <sup>2</sup>*Green Chem.*, **17**, 2780, 2015, <sup>3</sup>*Green Chem.* **18**, 6526, 2016, <sup>4</sup>*J. Agric. Food. Chem.*, **64**, 9152, 2016, <sup>5</sup>*Chem. Eng. J.*, **299**, 209, 2016, <sup>6</sup>*ACS Sustain. Chem. Eng.*, **5**, 11551, 2017, <sup>7</sup>*ibid*, **6**, 3070, 2018, <sup>8</sup>*ibid*, **6**, 119, 2018, <sup>9</sup>*Sci. Rep.*, **6**, 21833, 2016, <sup>10</sup>*Sci. Rep.*, **6**, 21742, 2016, <sup>12</sup>*RSC Adv.*, **7**, 31338, 2017, <sup>13</sup>*Sci. Rep.*, **9**, 1977, 2019.





## ABSTRACTS

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### KEY - 03

# Green local community: Balancing benefits from and for tropical rain forests

M A Sardjono\*

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Faculty of Forestry Mulawarman University

\*Corresponding author: [masardjono@fahatan.unmul.ac.id](mailto:masardjono@fahatan.unmul.ac.id)

**Abstract.** Policies and researches related to tropical rain forests (TRF) focus primarily on different concepts and innovations for increasing the functions and products of these renewable resources for the welfare of local community. The term Social Forestry has become very popular among foresters in Indonesia in the last decade, and even it gives high expectation that a solution for the acute problems of deforestation and forest degradation in the tropics has been found. However, this phenomenon can even endanger the sustainability of the forest itself, because needs (or better using the term 'rights') of the ecosystem for better management, i.e. responsible use, are even overlooked. The term 'Green' is widely used for different purposes and connoted as 'environmentally friendly'. Green Local Community (GLC) is used in this context to express necessity of local community to understand not only the benefits which they can get from the surrounding ecosystem, but also simultaneously their responsibility for conserving products and function of the system. The community's roles are very important in place since they are factually an integrated element of the system. Their live and life are depending absolutely from the resource. Therefore, balancing the interaction between natural and social resources in term of mutualism has to be highlighted in every local community-related program. The theme of the symposium on Green Innovations should comprehensively cover both advanced technologies of forest and forest products and various programs of social engineering as well as sociological approaches as part of human investment ensuring the sustainability of the resources cum the communities.

**Keywords:** Green, local community, tropical rain forest, social forestry, human investment





## ABSTRACTS

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**KEY - 04**

### Challenges of wood flavor in super-aging society

T Mitsunaga\*

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1-1 Yanagido, Gifu 501-1193 Japan, Tel & Fax: +81-58-293-2920

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**Abstract.** Aromatherapy is a natural remedy that uses essential oils obtained from plants for health and beauty. The aromatherapy is divided into French medical aromatherapy and English aesthetic aromatherapy. Aromatherapy generally in Japan referred to aesthetic aromatherapy, and uses essential oils for the purpose of relaxation. On the other hand, in medical aromatherapy, essential oils are used for the care of poor body condition and alternative medicine for improving symptoms that are not recognized as illness. In both fields, the research has been done mostly by using flowers and fruits, and there is still no scientific evidence that precedes sensory data for essential oils derived from trees. Therefore, in this study, we focused on wood-derived essential oils that are discarded in large quantities with abundant biomass resources and aimed to apply it as a medical aromatherapy to challenge a super-aging society that will come in near future. The samples were Japanese cypress species, Sugi, Hinoki, and Hiba wood essential oils. For the mice inhaled essential oils, autonomic nerve activity was measured by electrophysiological measurement, stress test by restraint stressed mice, and memory and learning test by animal behavior test. The mice inhaled all the essential oils treated in this study decreased a sympathetic nerve activity. The concentrations of corticosterone and  $\alpha$ -amylase of the mice decreased by especially Sugi essential oil inhalation, which showed the tendency of stress relieve. Animal behavior studies suggested that Japanese cypress wood essential oil flavor may be effective in the early stages of memory formation. From the above results, inhalation of Japanese cypress wood essential oil flavors are involved in the stress response of SAM (neurotransmitter) and PHA (endocrine system) to suppress excited sympathetic nerves, reducing stress and improving memory impairment.

**Keywords:** Essential oil, autonomic nerve, corticosterone,  $\alpha$ -amylase, animal behavior studies





## ABSTRACTS

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### KEY - 05

# Acoustic monitoring of vocal Southeast Asian primates and their habitats: recent advances and challenges

D J Clink and H Klinck

Bioacoustics Research Program, Cornell Laboratory of Ornithology, Cornell University, 159 Sapsucker Woods Road, Ithaca, NY, 14850, USA

**Abstract.** Recent advances in recording technology and data storage capabilities have the potential to revolutionize how we monitor vocal primates. Here, we highlight the recent developments and applications in acoustic monitoring of Southeast Asian primates and their habitats, incorporating examples from our own work on the Bornean gibbon (*Hylobates muelleri*). First, we discuss how passive acoustic monitoring (PAM) the use of electronic recording devices to track and monitor vocal animals can be applied in terrestrial systems. We then present some preliminary results of a PAM study on Bornean gibbons, highlighting some of the ways that PAM can be used to monitor gibbon species. We then discuss the major obstacles in implementing broad-scale acoustic monitoring of primates, such as the lack of automated detection methods and the need to validate abundance and density estimates obtained using PAM with other survey techniques. We conclude by providing suggestions for future research which incorporates PAM.

**Keywords:**





## ABSTRACTS

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**INV - 01**

### **Controlling crystalline features of urea-formaldehyde resin adhesives for wood-based composites**

**Byung-Dae Park\* and E S Wibowo**

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Republic of Korea

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**Abstract.** Urea-formaldehyde (UF) resin, a polymeric condensation product of formaldehyde with urea, is one of the most important formaldehyde-based resins, and being widely used as wood adhesives. However, UF resin of low formaldehyde/ urea (F/U) mole ratio contains crystalline structures either in liquid or cured state. These crystalline features of UF resins with low F/U mole ratio results in a poor adhesion at the expense of low formaldehyde emission. These results also suggest that the crystallite formation in cured UF resin does not make contribution to its cross-linking in the curing process, leading to a lower cross-linking density and consequent poor adhesion strength. This paper reports a way of controlling of the crystalline feature of the UF resins using the modified nanoclay with a transition metal ion (TMI). The results showed that the 5% TMI-bentonite (BNT) addition resulted in amorphous structure of UF resins, which subsequently led to a great improvement for the adhesion and formaldehyde emission of wood-based composites. These results indicate that the prevention of the crystal formation in the UF resins can improve their adhesion strength and formaldehyde emission at the same time.

**Keywords:**





## ABSTRACTS

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**INV - 02**

### **Enhancing multi-stakeholder commitment's in East Kalimantan: Developing SIGAP Sejahtera as a prototype initiative of green growth compact**

**D Riska**

Green Growth Compact Specialist, The Nature Conservancy  
Jl. MT. Haryono No.18 Samarinda, 75124, Kalimantan Timur

\*Corresponding author: dina.riska@tnc.org

**Abstract.** The Provincial Government of East Kalimantan is committed to implement green development that considers the equity of environmental, economic and social aspects. The commitment of green development has been signed in a declaration of Green Kaltim (Kaltim Hijau). The goal of Kaltim Hijau is including to improve environmental index and reducing the emission, as well as to increase the economic growth based on the sustainable development principles. To accelerate the realization of wider and more equitably of Kaltim Hijau, collaborations among all elements must be built and developed. The process to develop multi commitments from multi-stakeholders in achieving the goal of Kaltim Hijau is then known as the Green Growth Compact (GGC). GGC is a process to involve multi-stakeholders at multi levels in East Kalimantan including private sector, local government institutions, the provincial government, local communities and NGO to universities. Berau district government implements SIGAP Sejahtera program, as approach and tool to facilitate community in village development and managing natural resources in sustainable manner. Ninety-nine villages in Berau district has been involved in the SIGAP Sejahtera program and this program has been adopted for village development planning by Provincial Government of East Kalimantan. With strong multi-stakeholder commitment, SIGAP is expected to improve village governance, community economic empowerment and natural resources management.

**Keywords:**





## ORAL PRESENTATION





## Forest Product (FP)





## ABSTRACTS

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**FP - 01**

### **Impact of nailing on physical toughness to Gelam (*Melaleuca* sp.) in schaffolding**

**A S Budi\*, I Y Wardhani, Erwin, Windi, N Husien and S Wahyuni**

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**Abstract.** Gelam pole is more popular as steger than bamboo or meranti rafters (kaso) because of it is abundant in Kalimantan, the price is cheap, the stem is straight and strength. Gelam wood which is used as steger repeatedly must be considered of its toughness and strength. The purpose of this study was to investigate the impact of nailing on physical toughness of Gelam as steger (schaffolder) during building construction. Gelam poles were taken from three location of building construction in Samarinda. Macro- and microscopic analysis carried out in Wood Biology Laboratory, fracture test to analyse the grain was Forest Product Industry and Testing Laboratory, Mulawarman University. Ultrastructure photographs were carried out at PT Vanadia Jakarta. The results show that the location of the vulnerability of the wood was around the former nailing. Wood becomes rusty and it followed by a fungal attack marked by discoloration of wood to be darker and look rotten. The fracture test shows it was very significant difference between used wood and sound wood. Used wood has “cubical” shape at the fracture, whereas sound wood has “long grains”. If the building contractor will use gelam used wood as steger more than once, he must be give attention to the location of nails and its extent of the existing dark color.

**Keywords:** Gelam, nail, steger, macroscopic





## ABSTRACTS

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**FP - 02**

### **Physical, mechanical, and anatomical characteristics of *Acacia mangium* wood observed in progeny trial in Central Java, Indonesia**

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**Abstract.** The Center for Forest Biotechnology and Tree Improvement has set up a breeding program for *Acacia mangium* through establishing progeny trial in Wonogiri, Central Java, Indonesia to increase stand productivity and quality of the timber products. Total of 65 families were tested in the trial. Of these families, some families were selected as the best five families in growth performance of diameter at 5 years age. However, research on wood properties of these selected families is not reported as yet. This research aims to investigate physical, mechanical, and anatomical characteristics of 5-year-old *Acacia mangium* from the best five selected families. The mean value of basic density of five families was 0.450 g/cm<sup>3</sup>. The lowest value of basic density was found in Family 30 (0.438 g/cm<sup>3</sup>), while the highest value was found in Family 32 (0.478 g/cm<sup>3</sup>). The mean value of MOE of static bending strength of five families was 85,030 kg/cm<sup>2</sup>. The lowest value of MOE was found in Family 8 (80,888kg/cm<sup>2</sup>), while the highest value was found in Family 32 (91,207 g/cm<sup>2</sup>). For other characteristics (shrinkage, MOR of static bending strength, compression strength, hardness, fiber length, fiber wall thickness, and fiber diameter), the values were also varying among the five selected families. Based on these result, Famili 30 show a good performance for basic density and most of mechanical properties.

**Keywords:** *Acacia mangium*, physical properties, mechanical properties, anatomical characteristics, tree improvement





## ABSTRACTS

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**FP - 03**

### **Physical and mechanical properties of hybrid oriented strand board prepared from steam treated Mangium wood and Betung Bamboo strands**

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**Abstract.** The aim of this study was evaluate the physical and mechanical properties of mangium and betung bamboo hybrid oriented strand board (OSB) with steam modification and various shelling ratio. Mangium (*Acacia mangium* Willd.) and betung bamboo (*Dendrocalamus asper* (Schult.F) Backer ex. Heyne) strands were steamed at 126°C temperature and 0.14 MPa pressure for 1 hour and then rinsed using 1% NaOH. Hybrid OSB with 30 × 30 × 0.9 cm<sup>3</sup> size were prepared from mangium strands as face layers and bamboo strands as core layer. Phenol formal dehyde adhesive content of 8% and four different shelling ratio used in this study were 15/70/15, 20/60/20, 25/50/25 and 30/40/30. The evaluation of hybrid OSB properties were referring to the JIS A 5908-2003 standard. The results showed that the steam modification treatment had an effect on the physical and mechanical properties of the resulting OSB hybrids. The steam treatment can improve physical and mechanical properties of OSB hybrids, but steam treatment with 1% NaOH rinsing decreases the physical and mechanical properties of the hybrid OSB. So that 1% NaOH rinsing is not suitable for wood mangium. Shelling ratio can increase the mechanical strength of the hybrid OSB in the parallel to grain direction, but can reduce the perpendicular to grain direction strength.

**Keywords:** Betung bamboo, mangium wood, oriented strand board, shelling ratio, physical and mechanical properties





## ABSTRACTS

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**FP - 04**

### **Quality improvement of superior Muna-teakwood through partial densification**

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**Abstract.** Physical-mechanical properties including wood appearance, durability, and bonding quality of 8 year-old of superior Muna teak (*Tectona grandis*) wood after partial densification by 20% reducing level from the original thickness have been studied. Three different healthy trees from one area of man-made forest in Muna Island, Indonesia were selected and cut. From each tree, a log of 100 m of basal area was selected and converted into wood samples. Prior to compress, wood samples are soaked in boron solution under hot condition (80 °C) for 6 hours. Partial densification was conducted directly using hot pressing machine at 20 MPa of pressure and 150 °C of temperature for 15 minutes. Wood appearance was evaluated visually, while physical properties namely wood appearance, density and specific gravity as well as mechanical properties especially MOR, MOR, and the hardness were measured by following the modification of BS 373.1957. Durability was evaluated by grave yard test method, while bonding quality was evaluated following JAS 234-2003. Results showed that all parameter studied well improved after partially densified. The wood became darker, glossier, and more attractive, wood density and specific gravity increased 75 and 80%, and wood strength class improved from III to II in general, respectively compared to those of wood control. MOR increased 52%, MOE increased 45%, and wood hardness increased 68%. Result also shows that densified wood became more durable. Its durability class increased from III to II. In case of bonding quality it was found that shear strength of densified wood was improved significantly.

**Keywords:** Bonding quality, durability, Muna Island, partial densification, physical mechanical properties, superior teakwood





## ABSTRACTS

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**FP - 05**

### Characteristic of the superior Munateakwood

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**Abstract.** Teak wood, including from Muna Island, has been widely used as raw material for the best of wooden furniture. The superior-grown seedling through gamma ray radiation has been developed due to the scarcity of this wood at the market. The aim of this research was to investigate wood characteristics of the 8 year-old of superior-grown teak from Muna Island. Wood disks and boards from basal area of three different diameter trees were used as the samples. Anatomical structure and several physical-mechanical properties of wood were observed and measured following procedural standard. Results showed that anatomical structure of this wood is similar to that of teak in general, but its heartwood portion is higher (73.41%). Its green moisture content (74.05%) is lower than that of the faster-grown teak at similar age. The wood is more stable than general teak (T/R-ratio = 1.23), but its specific gravity (0.52) is lower than that of the older teak wood. Mechanical properties of this wood are higher than those of the faster-grown teak, but lower than those of the older teak. Based on specific gravity, this superior Muna teak wood, therefore, is categorized as the Strength Class of III.

**Keywords:** Anatomical structure, mechanical properties, Muna Island, physical properties, superior-grown teak





## ABSTRACTS

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**FP - 06**

### **Physical and mechanical properties of furfurylated Jabon and Pine woods**

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**Abstract.** Timber production is mostly from plantation forest which cut at young age 6-10 years old, and the timber is dominated by sapwood and juvenile wood. The timber had inferior quality in terms of physical and mechanical properties. Impregnation of furfuryl alcohol (FA) could improve physical-mechanical properties and resistance to bio-degradation attack. Specimens of jabon (*Anthocephalus cadamba*) and pine (*Pinus merkusii*) woods were impregnated with FA and the physical and mechanical properties were evaluated. Weight percent gains of FA wood were 84.70% for jabon and 10.69% for pine. The results showed that FA wood had better physical and mechanical properties in terms of moisture content, water absorption, swelling, shrinkage, modulus of elasticity, modulus of rupture, and hardness.

**Keywords:** Wood from plantation forest, juvenile wood, impregnation





## ABSTRACTS

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**FP - 07**

### **Anatomy and fiber quality of the least known timbers from the icacinaceae family: Apodytes, Citronella, Gomphandra, Gonocaryum, Medusanthera, and Uranda**

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**Abstract.** Research on wood basic properties is undertaken to determine the possibility of using wood which includes various testing such as anatomy, physical, mechanical, chemical and durability. The least known timbers have not been widely used and included into commercial timber classification. Many wood species in Xylarium Bogoriense belongs to the least known wood species, one of them is the Icacinaceae family. Icacinaceae is one of families that produce wood fiber and distribute in many regions in Indonesia, but only a few information about the anatomical properties. The determination of anatomical characteristics of the least known timbers is important to complete the database for wood identification. Therefore, further studies is important to support the possible use based on the properties of each wood. In this study, the anatomical properties and fiber quality of wood were observed. The wood samples were taken from Xylarium Bogoriense which belongs to Icacinaceae family i.e. *Apodytes* sp., *Citronella* spp., *Gonocaryum* spp., *Gomphandra* sp., *Medusanthera papuana*, and *Uranda* sp.. Microscopic features were observed based on the guideline from *International Association of Wood Anatomists* (IAWA). The results show that all wood samples could be microscopically differentiated from their anatomical characteristics especially from the type of rays, parenchyma, vessel and fibre. The fiber quality of all samples were categorised into class III which are not recommended for pulp and paper raw material.

**Keywords:** Icacinaceae, the least known timbers, wood anatomy, fiber quality





## ABSTRACTS

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**FP - 08**

### **Wood quality from genetic diversity of Jabon merah (*Anthocephalus macrophyllus*) from Wajo and Sidrap provenances, South of Sulawesi**

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**Abstract.** Red jabon is one of fast growing species which is developing on Community Forest in South Sulawesi to supply the wood demands. The study used a purposive sampling method and drew on the results of previous studies that produced dendrograms depicting the genetic relationships of trees from the Wajo and Sidrap provenances, South Sulawesi, Indonesia. This research conduct to discover effect of genetic variation in wood quality especially specific gravity, fibers dimensions and nano structure. The wood samples has been collected from trees with different genetic variation in Wajo and Sidrap Provenances, respectively. The wood samples has been taken from 1.3 m from ground used increment borer. Results showed that wood from Wajo and Sidrap provenances, respectively, had specific gravity, fiber length, fiber diameter, lumen diameter, and fiber wall thickness almost same among each trees. In general, the fiber quality of jabon merah from Wajo and Sidrap Provenances had classified on class III-II to use as pulp and papers. Nanostructure from Wajo and Sidrap provenances, respectively, had MFA values of 22.21° and 23.34°, crystallite lengths of 9.88 nm and 8.40 nm, crystallite widths of 2.54 nm and 2.72 nm, and the degree of crystallinity was 58.87% and 62.47%. The analysis of the genetic association with specific gravity, fiber dimensions, and nanostructure of jabon merah showed that specific gravity, fiber length and crystallite length varied more with distant relationships and was the same with near relationships. The other parameters did not have a clear pattern of genetic associations with the variability of the fiber dimensions and ultrastructural characteristics, and those characterisitcs are thought to be little influenced by genetics.

**Keywords:** Jabon merah, Wajo, Sidrap, provenances, genetic variation





## ABSTRACTS

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**FP - 09**

### **Microscopic evaluation of biocontrol potential of *Trichoderma viride* and *Aspergillus flavus* against *Trametes* sp. in wood decay process**

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**Abstract.** With increasing public awareness using various preserved wood products and their concern over the environmental impact of currently used chemical wood preservatives, therefore mechanisms of control with environmental friendly for the preserved wood products are needed. Hence, we used biological agents have been well known as antagonistic fungi against wood-damaging fungus. In this microscopic evaluation, some isolates of *Trichoderma viride* and *Aspergillus flavus* used to know their ability to inhibit growth of *Trametes* sp. in PDA medium and controlling wood decaying process under laboratory condition. Hyphae of *Trametes* sp. colonized to most vessel lumen and caused damaging cell wall of neighboring cells, whereas with presence of *T. viride* those not observed though abundant hyphae of *Trametes* sp. were present in lumen of vessels. It was suspected that *T. viride* have ability to inhibit the growth of *Trametes* sp. and more competitive activity than *A. flavus* that tend to stimulate extensive wood cell degradation on dual-fungal culture of PDA medium.

**Keywords:** Biocontrol, wood decay, antagonistic fungi, *Trametes* sp., microscopic observations





## ABSTRACTS

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**FP - 10**

### Diversity and anatomical properties of wood member of arfak tribes traditional house “Kaki Seribu”

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**Abstract.** The traditional Arfak house is made of wood with a rectangular geometric shape in the form of a stilt house with many supporting poles that have only 1 or 2 doors without shutters. The purpose of this study is to find out the varieties of wood used as 'kaki seribu' house materials. In addition, the anatomical characteristics of wood materials that have been used as building materials for 'kaki seribu' traditional house. The research was conducted in Kwau Village, with traditional houses chosen purposively and literature studies. Anatomical observations using wood used in one sample house were chosen purposively with the approval of the village head and the owner's heirs. The results of the study showed that 'kaki seribu' traditional house used more than 12 species of wood, most of which were lesser-known wood species found in many communal forest areas. This shows that the architectural characteristics of 'kaki seribu' traditional house are the same at different locations, but the use of materials for home construction is more influenced by the availability of materials in the environment. Anatomical observations show that the anatomy of *Dodonea viscosa*, *Quercus* sp., *Calophyllum* sp., *Macaranga* sp., *Platea latifolia*, *Gnetum gnemon*, *Euodia elleryana*, *Vitex pinnata*, *Trema orientalis*, *Pipturus* sp., and *Nothofagus grandis* have been used for more than 7 years (the house was built in 2010) there is almost no difference with wood that has not been used as a construction.

**Keywords:** Arfak's traditional house, 'kaki seribu', wood anatomy, lesser-known wood





## ABSTRACTS

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**FP - 11**

### **Bearing area factors of Indonesian wood subjected to compression perpendicular to grain**

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**Abstract.** Indonesian government through the Badan Standarisasi Nasional (BSN) has published the Indonesian National Standard on Design Specification for Wood Construction SNI 7973: 2013, which refers to LFRD (Load Factor Resistance Design) and ASD (Allowable Stress Design). According to that standard, compression strength perpendicular to grain ( $F_{c\perp}$ ) must be multiplied by bearing area factor ( $C_b$ ) to adjust the reference design value based. This study conducted to measure the compression strength perpendicular grain of several Indonesian wood which supported by several sizes of bearing area and calculated the empirical value of the bearing area factor. The result shows that  $F_{c\perp}$  is influenced by variation bearing area factor and species timber. Evaluation bearing area factor based on SNI 7973:2013 shows the different value when compared the result of this research. Increasing bearing area factor shows  $F_{c\perp}$  decreases at maximum and proportional load.

**Keywords:** Bearing area factor, compression strength, perpendicular to grain, SNI 7973:2013, timber construction, mechanical properties of wood, wood engineering





## ABSTRACTS

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**FP - 12**

### **Bonding strength of rubber nature glue on 3 wood species**

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**Abstract.** Wood bonding strength is the important thing if the wood will be used as construction material such as glulam, CLT, I-beam or other as well as plywood and other bio composite that use adhesive as binding material. The purpose of this study was analyses the bonding strength of rubber natural glue Biomattex on Bangkirai (*Shorea laevis*), Meranti Merah (*Shorea smithiana*) and Matoa (*Pometia pinnata*) at radial surface. Sample preparation and testing were according to DIN 52186, glued shear strength test parallel to grain. The dimension of sample was 50x50x50 cm. The result of this research indicated that glued shear strength of Bangkirai, Red Meranti and Matoa are 0.52 N/mm<sup>2</sup>, 0.66N/mm<sup>2</sup> and 0.68 N/mm<sup>2</sup> respectively. The percentage of wood failure at bonding surface are 6.41% (Bangkirai), 7.73% (Red Meranti) and 0.83% (Matoa). The conclusion of this research was rubber natural glue Biomattex is not suitable for Bangkirai, Red Meranti and Matoa.

**Keywords:** Rubber natural glue, glued shear strength, wood failure, radial surface





## ABSTRACTS

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**FP - 13**

### **Density and dimensional stability of fast growing wood species impregnated by nano silica from leaf of Betung bamboo**

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**Abstract.** Jabon (*Anthocephalus cadamba* Miq.) and Sengon (*Falcataria moluccana* Miq.) are fast growing wood species which have low quality characteristics i.e. low specific gravity, strength, durability, density, and dimensional stability. The objectives of this research were to determine the effect of polyethylene glycol (PEG) and nano silica from leaf of betung bamboo impregnation treatment on dimensional stability, density of jabon and sengon wood, and to identify the characteristics of impregnated jabon and sengon wood. Jabon and Sengon were impregnated by using five kinds of solution. They were control (water), 50% MEG, 0.5% MEGSiO<sub>2</sub>, 0.75% MEGSiO<sub>2</sub> and 1% MEGSiO<sub>2</sub>. The impregnation process was initiated by applying 0.5 bar of vacuum for 60 min and followed by 2.5 bar of pressure for 120 min. Characterization of nano silica were performed by using PSA and SEM-EDX. Characterization of impregnated fast growing species woods were performed by using SEM-EDX, XRD, and FTIR

**Keywords:** Betung bamboo, dimensional stability, impregnation, jabon, nanosilica, PEG, sengon





## ABSTRACTS

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**FP - 14**

### **The bamboo sawdust and addition of EM4 as alternative material for the cultivation of Oyster mushroom(*Pleurotusostreatus*)**

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**Abstract.** Bamboo is a versatile and very close plant in people's daily lives in Indonesia. However, bamboo waste is a problem that usually arises in bamboo-based industries. The residues in question are in the form of leftover pieces of bamboo, and the powder from the processing process. Bamboo is an organic material that contains lignin, cellulose, and hemicellulose, where the bamboo content can use as a medium for growing oyster mushrooms. The purpose of this study was to determine the growth of fungi by utilizing bamboo waste as the primary raw material using EM4 as a starter. The method used in this study is mixing raw materials (the cultivation media), sterilizing raw materials, inoculating, maintaining, and harvesting. There are four treatments also of EM4 as a starter, namely: without the addition of EM4 (P1) as a control; 1 ml EM4 (P2); 3 ml EM4 (P3); and 5 ml EM4 (P4) in 50 ml of water. Bamboo sawdust added 3 ml of EM4 at the time of mixing media is the best media cultivation. Using this media cultivation, it takes 63 days from media cultivation inoculated by fungi until the oyster mushrooms are ready to be harvested.

**Keywords:** *Pleurotusostreatus*, bamboo, EM4, mushroom cultivation





## ABSTRACTS

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**FP - 15**

### **NIR's spectra and density profile of boron-densified wood: The case of three lesser-used wood species from Indonesia**

**S Augustina<sup>1</sup>, I Wahyudi<sup>2\*</sup>, I W Darmawan<sup>2</sup>, O Taiyo<sup>3</sup>, K Hikaru<sup>3</sup>, K Yoichi<sup>3</sup>  
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**Abstract.** Effects of pre-treatment and compression ratio on density improvement of three lesser-used wood species namely Nyatoh (*Palaquium* spp.), Sepetir (*Sindora* spp.) and Pisang Putih (*Mezzettia* spp.) grown in North Kalimantan Province were studied and analyzed using Near Infrared Spectroscopy (NIR's) and X-ray Diffractometer. Pre-treatment applied was hot immersion within 2 and 5% of boron solutions separately at 80 °C for 3 hours, while densification was conducted using hot press machine at 30 kg/cm<sup>2</sup> of pressure and 160 °C of temperature for 15 minute with 20% and 40% compression ratios from the initial thickness. Results showed that density values of densified wood was increased significantly compared to the control. In case of Nyatoh it was 31.73% increased, for Pisang Putih it was 36.52% increased, and for Sepetir it was 35.04% increased. The higher compression ratio resulted in the larger improvement in wood density (30.13-47.01% increased at 40% compression ratio compared 23.08-25.53% increased at 20% compression ratio). Density profile analysis convinced that surface densification was occurred in all densified woods. The gradient of density distribution across the thickness was in the M-shape. Effect of treatment namely hot immersion and densification was seen in the NIR's spectra absorbance. At 2178 nm of wavelength a peak was appeared in the control wood, but none in the treated wood. This phenomenon was related to hemicellulose degradation during hot immersion and densification.

**Keywords:** Boron-densified wood, compression ratio, density profile, lesser-used wood species, near infrared spectroscopy





## ABSTRACTS

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**FP - 16**

### **Improving the Dimensional Stability and Durability of Fast Growing Wood**

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**Abstract.** Fast growing woods are increasingly used in developing community and industrial plantation forests. Red jabon (*Anthocephalus macrophyllus*) is one of fast growing wood species that has strength class III and durability class IV. So, this wood quality needs to be improved. This research aimed to evaluate the effects of boron and methyl methacrylate (MMA) impregnation and heat treatment on the dimensional stability and durability of red jabon wood. The impregnation used a pressure of 5 atm for 4 hours. After conditioning at room temperature, the following heat treatment was done in an electrical oven at 90 and 180 °C. Then the specific gravity, water absorption, dimensional stability, color changes and durability of wood samples were tested. The results showed that the specific gravity of red jabon wood increased by MMA impregnation, but decreased by higher temperature heating. The dimensional stability in terms of ASE of wood impregnated with MMA and heating at 90 or 180 °C is quite high, more than 80%, however the color change ( $\Delta E$ ) increased significantly after MMA impregnation and heating at 180 °C. The MMA impregnation reduced leaching and water absorption of the wood. Wood impregnated with boric acid and MMA followed with heating at 180 °C had the best durability from decay fungi and termite.

**Keywords:** Boron, dimensional stability, durability, fast growing wood, heat treatment, methyl methacrylate





## ABSTRACTS

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**FP - 17**

### **Macroscopic properties of fossil wood from Kutai Kertanegara**

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**Abstract.** This study focused on the macroscopic properties of two specimens of fossil woods found in Purwajaya village Kutai Kertanegara Regency, East Kalimantan. Structure of the Specimens on the transversal section were observed macroscopically and microscopically, the colour of specimens, hardness and specific gravity as well. Macroscopically, the fossil wood specimens are identified as tropical hardwood/porous wood species, which was characterized by the presence of pores (vessels). On the transverse surface of FKA showed that round pores size is medium to large, mostly single pores, with an irregular or diffuse arrangement. The rays are narrow and wide size, consists of two to several lines. On the transverse surface of FKB, pores seem round with almost uniform in size, diffuse pores arrangement, mostly single. The lines of the rays are wide, consist of several cells. Both pores filled with yellow deposits those identified as gum. Axial Parenchyma are Paratracheal and apotracheal. The Specific characteristic of both is the presence of Intercellular Canal on the transverse section. The color on the transverse surface are varies, from light brown to dark brown, grey and black color. These colors based on the mineral inside the fossil wood. The hardness of both specimen is 4 in mohs scale. Specific gravity of the specimens are 1.63g/ml and 1.74g/ml. The species of fossil wood studied is unknown yet, because the research is still in progress.

**Keywords:** Fossil wood, macroscopic properties, tropical hardwood, porous wood, density and, hardness





## ABSTRACTS

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**FP - 18**

### **Tensile properties of leaf sheath *Roystonea regia***

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**Abstract.** Natural fiber from palm plant has been interesting to be explored especially when it comes from waste material. The study on natural fiber has succeeded to find the innovation from this material such as a reinforce for many technical application especially in the automobile and packaging industries in parts where high load-carrying capacity is not required. Palem raja or king palm (*Rosyonea regia*) is an ornament plant which can be found in many city parks. The leaf waste from natural regeneration process has become the potential raw material resource. The mechanical tensile strength properties of waste leaf sheath palem raja from different parts were examined. The samples testing were determined in parallel, perpendicular, and 45° orientation to the grain. The result found that the tensile properties of parallel to grain were about 500 kg/cm<sup>2</sup>. This value was eight times higher than tensile properties of 45° orientation to grain and 12 times higher than tensile properties of perpendicular to the grain. The coefficient of variance from each part of the leaf sheath was found very high. Related to the result, the leaf sheath of palem raja is potentially used as a reinforcing element for many composite materials.

**Keywords:** Palem raja, reinforce, natural fiber, parallel to grain, composite materials





## ABSTRACTS

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**FP - 19**

### **Test contents of seaweed oil and water content test from Gaharu oil control process species *Aquilariamalaccensis* L. (as a support for high level botany courses)**

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**Abstract.** The description of qualifications in the Indonesian National Qualification Framework (KKNI) reflects learning outcomes. Agarwood oil content testing activities and water content testing in the process of agarwood oil refining in High Level Botany learning is a fulfillment of the demands of learning outcomes. Learning outcomes in the realm of pregnancy are able to demonstrate independent performance, quality, and measurable, while the realm of special skills that is able to work in accordance with knowledge in the field of biology by utilizing available natural resources Gaharu oil is essential oil taken from the refining process. Agarwood oil is essential oil taken from the distillation process. Agarwood oil contains aromatic resins that are needed in the world of health, cosmetics and medicine. Aloes oil distillation with steam and water method then obtained two products, namely aloes oil and distillation residual water, where the gaharu oil products obtained by producing a distinctive aroma is used as a perfume while the residual distillation can be consumed as medicine and skin care. This research is a type of descriptive analysis research with the approach taken is a qualitative approach that is used to determine the data in the form of numbers. The purpose of this study are: 1) to find out the content of alkaloids, flavonoids, saponins and tannins in the agarwood oil species *Aquilariamalaccensis* L. from the agarwood oil refining process, 2) to determine the water content of the agarwood oil refining process *Aquilariamalaccensis* L. Species showed that the species content of agarwood species *Aquilariamalaccensis* L. kemedangan type had flavonoid and quinone compounds, while the sapwood type had flavonoid, steroid and triterpenoid compounds. The residual water of distillation by steam method shows that the% inhibition value of agarwood *Aquilariamalaccensis* L. with kemedangan type is 41.8% with a low antioxidant content and is purple and the% inhibition value in the sapwood type is 82.7% with high antioxidant content and color yellow.

**Keywords:** Test of Agarwood oil content, water content test, distillation process, *Aquilariamalaccensis* L. species





## ABSTRACTS

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**FP - 20**

### **Multiplication of DNA fragments extracted from tropical timber**

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**Abstract.** Illegal logging in tropical forests is still a problem that needs to be resolved. Many attempts have been made to counter it including forest certification for those that have been managed sustainably. The problem in the field is the smuggling of illegally logged timber which are mixed and claimed as timber originating from certified forests. A tool that can trace timber to its geographical origin is needed to overcome this problem. Tools based on genetic molecules have been developed to identify the origin of timber, as well as methods for extracting DNA from timber. In this study, DNA extracts of timber were analyzed by PCR, by multiplication reactions of DNA fragments of different lengths: short fragments (100-200 bp), medium length fragments (550 - 660 bp), and long fragments (1,100-1,200 bp). Tests for PCR reaction inhibition were also carried out. Results showed that the size of the DNA fragment and the processing status of the timber influenced the success of the multiplication reaction. Short fragments and unprocessed timber resulted higher success rates. The success rate was also found higher in DNA extract from outer sapwood (without cambium) in comparison to DNA extract from the transition zone between sapwood and heartwood and the inner heartwood. However, PCR inhibitory substances were found higher in the extract from outer sapwood in comparison to transition wood and heartwood.

**Keywords:** Illegal logging, forest certification, timber geographical origin, wood DNA extraction





## ABSTRACTS

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**FP - 21**

### **Experimental study of the flat use adjustment factor on *Shorea* spp timber**

**E T Bahtiar, N Nugroho\*, D Hermawan, S Fauziyyah, A N Saragih and S Anggiriani**

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**Abstract.** The study was carried out to investigate the effect of width variations on the bending strength of *Shorea* spp. Modulus of elasticity (MOE) and modulus of rupture (MOR) was used to verify strength distribution in order to establish a design value for flat use. Bending strength was evaluated using static bending test procedure based on ASTM D143. There were 30 samples used on the static bending tests with six different widths: 2.5 x (2.5, 5, 7.5, 10, 12.5, and 15) cm. Physical properties including moisture content, specific gravity, and density, as well as macroscopic characteristics of the sample were also observed. The results showed sample with 2.5 cm width has the highest MOE of (7624.68 ± 943.67) MPa, meanwhile the lowest MOE value (4880.03 ± 286.40) MPa was obtained from samples with 15 cm width. Then, the highest MOR of (63.16 ± 5.89) MPa was attained from samples with 12.5 cm width, meanwhile the lowest MOR value of (53.25 ± 2.06) MPa displayed by samples with 15 cm width. Additionally, the correlation between MOE and MOR value was low ( $R^2=0.17$ ). The design value for flat use ( $C_{fu}$ ) obtained from this study for 2.5 cm to 15 cm width are ranged from (1.0-0.65), and had a lower value also a presumably opposite trend with the existing design value from SNI 7973:2013.

**Keywords:** Flat use, bending strength, modulus of rupture, modulus of elasticity, width dimension





## ABSTRACTS

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**FP - 22**

### **The quality of particleboards made from mixed particles of sengon (*Albizia chinensis* (Osbeck) Merr.) and bagasse sorgum (*Sorghum bicolor* (L.) Moench) after alkaline treatment**

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**Abstract.** The particleboard production industries need continue supply of raw material. Waste from plywood industry and agricultural activities can be used as an alternative for particleboards raw materials. Sengon and sorghum bagasse particles have been used as particleboards raw material using Urea Formaldehyde (UF) and Phenol Formaldehyde (PF) adhesive. However, the result show that mechanical properties of mixed sengon and sorghum bagasse particleboards bonded with PF adhesive were lower than of particleboards bonded with UF adhesive. This study aims was to analyze the effect of alkaline (5%) treatment on mixed particles (soaking duration: 0 minutes, 30 minutes, 60 minutes, and 120 minutes) and PF adhesive level (6%, 8% and 10%) on particleboards physical and mechanical properties. The particleboards density target in this study was 0.8 g/cm<sup>3</sup> and the particleboards testing refers to JIS A5908: 2003. Based on the results of the research, particleboards made from mixed particles without alkaline treatment, bonded with 10% PF adhesive perform the best particleboards physical properties (water absorption = 29.94% and thickness swelling = 20.51%). While particleboards made from mixed particles which were soaked in alkaline (5%) for 30 minutes, bonded with 10% PF adhesive, showed the best mechanical properties (modulus of elasticity = 3306 N/mm<sup>2</sup>, modulus of rupture = 43.82 N/mm<sup>2</sup>, internal bond = 1.09 N/mm<sup>2</sup>, and screw holding power = 853 N). Alkaline treatment did not improve the particleboards physical properties but improved the mechanical properties of the particleboards. The addition of the PF adhesive levels improved the particleboards physical and mechanical properties. Interaction of alkaline treatment for 30 minutes and 10% PF adhesive content produced good particleboards quality.

**Keywords:** Alkaline treatment, particleboards, phenol formadehyde, sengon particles, sorghum bagasse particles





## ABSTRACTS

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**FP - 23**

### **Non-destructive evaluation of wood thermal degradation using near infrared and visible-light spectroscopy**

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**Abstract.** Wood thermal degradation takes form in the change of chemical properties which affected the color appearance. Thermal treatment to wood in humid and non-humid condition was conducted to simulate the wood degradation mechanism. Hinoki wood (*Chromocyparis obtusa*) and keyaki wood (*Zelkova serrata*) was treated into heat in humid and non-humid condition, in the temperature of 120, 130, 150, and 180 oC, and treatment duration of 6 minutes to 9 months. Non-destructive measurement using near infrared (NIR) and visible-light (VIS) spectroscopy was applied to measure chemical change and color change in thermal-treated wood. NIR and VIS spectra collected from the measurement were subjected to principal component analysis (PCA). Principal component (PC) scores obtained from PCA was processed into Arrhenius Time-Temperature Superposition (TTSP). The result showed that PC1 and PC2 scores of NIR and VIS spectra enabled to depict and predict the degradation simulation and color change of thermal-treated wood. Complementary analysis of NIR and VIS spectra using two-dimensional (2D) correlation spectroscopy was attempted to see the correlation of chemical change in thermal-treated wood which cause the change in color. It is found that 2D correlation of NIR and VIS spectroscopy could show the correlation between spectra of certain chemical change which cause the change in color of thermal-treated wood. These non-destructive measurements of NIR and VIS spectroscopy coupled with PCA and 2D correlation methods would give significant benefits in the evaluation of degraded wood and archaeological wood.

**Keywords:** wood thermal degradation, non-destructive (NDT), near infrared (NIR), visible-light (VIS), principal component analysis (PCA), two-dimensional (2D) correlation spectroscopy





## ABSTRACTS

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**FP - 24**

### **Performance of resinless plywood made from Sengon veneer using acacia bark powder as bonding agent**

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**Abstract.** The study of resinless plywood technology using oxidized bark powder as a binder has been successfully developed. The results of the previous study showed that the size of the bark powder that passed between 20 to 60 mesh with a moisture content of 9% was the best condition for the bark powder to be oxidized and used as a veneer bonding agent. Due to plywood is produced with various number of veneer layers and different thicknesses, it has potency to affect the quality of veneer bonds when the resinless technology is applied. Therefore his study aims to evaluate the reliability of resinless plywood technology in the manufacture of various layers number of plywood. Plywood produced using sengon wood veneer with a thickness of 2 mm. Oxidized acacia bark powder was used as a bonding agent of veneer. The produced plywood consists of several layers such as 3 layers, 5 layers, 7 layers, 9 layers, and 11 layers. The results showed that the technique for producing resinless plywood using oxidized bark powder can be applied in many layers types of plywood. Plywood with a number of layers 3 to 9 layers can be bonded properly, however, plywood with a number of layers 11 partially fails. This refers to that for plywood with a number of layers above 10 layers it still requires an optimization process.

**Keywords:** Oxidation, wood bark, bonding agent, resinless plywood





## ABSTRACTS

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**FP - 25**

### **Bonding agent from oxidized bark or wood powder for producing resinless plywood**

**Suhasman\*, S Saad and A D Yunianti**

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**Abstract.** Resinless plywood technology has been successfully developed through the addition of oxidized bark powder as bonding agent. However, there are problems related to the application of the technique when it will be applied in the plywood industry due to the industry being demanded to collect and activates the bark powder. For practical reasons, this technique is less attractive, because so far, the supply of adhesives in the manufacture of plywood, produced from other industries. Usually these adhesives are obtained in the form of solids or liquids. The plywood industry just makes adhesive formulations according to the desired quality standards and then applies them in the manufacture of plywood. This research was carried out to study the ability of oxidized wood or wood bark powders as a bonding agent in the manufacture of plywood after being oxidized for certain amount of time, such as 1 day, 1 week, or 1 month. Oxidized powder comes from several wood or wood bark species, namely pine bark, acacia bark, sengon wood, jabon wood, and bamboo. The results of the study show that the application of lignocellulose powder which has been oxidized for up to one month does not show a significant effect on the quality of the plywood bonding strength. The best bond quality was obtained on plywood using acacia bark powder which had been oxidized a month before with a bonding strength of 10.31 kg/cm<sup>2</sup>. The sengon wood powder which has been oxidized a day before, also produces a high bonding strength value of 9.03 kg/cm<sup>2</sup>. These results indicate that the application of bonding agent that prepared from oxidized bark powder or wood powder has the potential to be further developed to substitute the utilization of synthetic adhesives used in the plywood industry.

**Keywords:** Oxidation, wood bark, plywood, bonding strength





## ABSTRACTS

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**FP - 26**

### **Potential of *Ageratum conyzoides* as biopesticide**

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**Abstract.** *Ageratum conyzoides*, contains some secondary metabolites such as alkaloids, flavonoids, phenols hydroquinone, tannins, and essential oils that can be used as a herbicide or insecticide. The purpose of this study is to describe the effect of methanol extract of *Ageratum conyzoides* leaves on mortality of *Spodoptera litura* larvae and also determine the LC50 and LC80 from various extract concentrations. This study used a completely randomized design, with two factors, that is the concentration factors of *A.conyzoides* leaves extract involves 0%, 6%, 8%, 10%, 12% and the location factors for taking *Ageratum conyzoides* leaves which include highland, medium land, and lowland. The sample was repeated six times. Data analysis using ANOVA followed by Tukey multiple range tests, and also using Probit analysis for LC50 and LC80. The results showed that there were significant differences between *A.conyzoides* extracts (0%, 6%, 8%, 10%, and 12%) on the mortality of *S. litura* larvae, but there was no difference in the mortality rate of *S. litura* between *A.conyzoides* extracts from various locations. The greater the concentration of the extract, the mortality of *S. litura* also increases. The 12% concentration gave mortality of *S. litura* larvae by 95%. Whereas LC50 from *A.conyzoides* extract was 3.45-3.87 and LC80 was 7.76-8.18.

**Keywords:** Potency, *Ageratum conyzoides*, biopesticide





## ABSTRACTS

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**FP - 27**

### **Exploration of particle board capability by addition of *sansevieria* extract as pollutant absorption for cigarette smoke**

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**Abstract.** Indoor air pollution is a problem that is already felt by most people. One of the biggest causes of air pollution is cigarette smoke. Many studies have revealed that the *Sansevieria* plant is able to absorb various types of pollutants. The combination of the ability of *Sansevieria* plants with particleboard as part of the room can be an effective innovation. The purpose of this study was to evaluate the possibility utilization of *Sansevieria* extracts form as additional component in manufacturing particle boards that capable to absorb air pollution from cigarette smoke. Particle board with *Sansevieria* extract were produced in two method such as, the extract was mixed with wood particle before hot pressed and the extract was sprayed on produced particleboard surface. The result indicated that the addition of extract 3 g which has been dissolved with distilled water after pressing is the most effective result. The combination of these treatments produced characteristics with a moisture content of 9.23%, density of 0.71 g/cm<sup>3</sup> and internal bond of 4.07 kg/cm<sup>2</sup>, all of which met the JIS A 5908-2003 standard. The results of functional groups and chemical content analysis showed that the addition of extracts was able to absorb pollutants from cigarette smoke. IR transmission spectrum shows C-H functional groups whose molecular vibrations tend to stretch and strengthen C = O and C = C groups. Particle board absorption chromatograms showed additional uptake of urea and the uptake amount of 40 types including substances derived from wood particles and *Sansevieria* extracts.

**Keywords:** Particle board, *Sansevieria*, characteristics, spectrum, chromatogram





## ABSTRACTS

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**FP - 28**

### **Bioactivities of catechin from Gambir (*Uncaria gambir* Roxb.) against wood-decaying fungi**

**D Nandika<sup>1\*</sup>, K Syamsu<sup>2</sup>, Arinana<sup>1</sup> D T Kusumawardhani<sup>1</sup> and Y Fitriana<sup>1</sup>**

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**Abstract.** Gambir is one of the most economically important natural products of Indonesia. Indonesia accounts for 80% of the global exports of this product. The product contains catechin, a phenolic compound of the flavonoid group, which has demonstrated bioactivity against horticulture-destroying fungi. However, its bioactivity in controlling wood-decaying fungi has not yet been reported. A laboratory study was conducted to examine the characteristics of the catechin of gambir and its bioactivity against the wood-decaying fungi *Schizophyllum commune* Fr. Extraction of catechin from gambir was conducted via a gradual maceration process using hot water (70 °C, 3 h) followed by ethyl acetate (1:10 w/v, 4 h). The chemical components of catechin were analyzed using gas chromatography mass spectrometry (GCMS), while its bioactivity against *S. commune* was examined according to EN 113 (1986). The results showed that there were five chemical components in catechins, *i.e.*, 1,2-benzenediol, catechol, 1,3,5-benzenetriol, dimethyl terephthalate, and terephthalic acid. These compounds demonstrated the ability to remarkably inhibit the growth of *S. commune*.

**Keywords:** Catechin, ethyl acetate, gambir, gas chromatography mass spectrometry, wood-decaying fungi





## ABSTRACTS

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**FP - 29**

### **Natural resistance of several community woods from South Sulawesi against marine borer**

**Syahidah<sup>1\*</sup>, D Sanusi<sup>1</sup> and W Samsu<sup>2</sup>**

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**Abstract.** The aims of this research is to analyze the natural resistance of community woods against marine borer namely *Diospyros* sp., *Calophyllum inophyllum*, *Dillenia indica*, *Albizia falcataria* (L) Fosberg, and *Vitex cofassus*. Samples preparation were conducted in Forestry Products Utilization and Processing Laboratory, Forestry Faculty, Hasanuddin University, South Sulawesi. The samples size is about 2.5 cm x 5 cm x 30 cm with total 30 samples. This research was held at Barrang Lompo Island on September-December 2018. All of samples arranged using plastic strap and immersed at the sea with 3 m depth for 3 months. The results showed that all the samples attacked by marine borer in various intensity and caused the various weight loss of the samples. *D. indica* showed the lowest attack intensity and also the lowest weight loss compared to the other species. On the contrary, *A. falcataria* (L) Fosberg has shown the highest attack intensity and the highest weight loss. Therefore, it can be concluded that *D. indica* has the highest and , *A. falcataria* (L) Fosberg has the lowest natural resistance against marine borer attack, compared to the other wood species. The kinds of organisms that has attack of the samples were *Teredo navalis* (Teredinidae) and *Martesia striata* Linn (Pholadidae).

**Keywords:** Natural resistance, attack intensity, community wood, marine borer, Pholadidae





## ABSTRACTS

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**FP - 30**

### **Palatability of subterranean Termites *Coptotermescurvignathus* on *Pinusmerkusii* of presto, boiling, and steam treatments**

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**Abstract.** Baiting system is a method to monitor and detect the presence of termites in a site. The bait material which was highly preferred by the termites could determine the success of controlling termites by baiting system and can also increase the frequency of bait wood to be attacked by termites for determination of termite diversity in a location. This research aims to determine the effect of treatment (presto, boiling and steam) on pine bait wood palatability against subterranean termites *Coptotermescurvignathus* Holmgren. Pine wood sample tests treated by presto, boiled, and steamed. Each treatment was carried out for five hours. Sample tests based on SNI 7207: 2014. The results showed that the three treatments could increase the palatability of *C. curvignathus* termites and the best treatment is presto.

**Keywords:** Baiting system, diversity, hardness, weight loss





## ABSTRACTS

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**FP - 31**

### **Antioxidant of *Homotrigona fimbriata* propolis**

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\*Research Grant by Kemenristekdikti (No. 204/UN17.41/KL/2019)

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**Abstract.** Stingless bee (kelulut) propolis is widely used in the medicine of around Indonesia to treat a variety of ailments. This research purpose to investigate antioxidant and phytochemical analysis from *Homotrigona fimbriata* propolis that collected in around Education Forest Mulawarman University Lempake. Antioxidant activity of the Ethanolic Extract Propolis (EEP) was measured by DPPH methods. Chemical composition of the ethanolic extract of propolis (EEP) was determined by phytochemical analysis. They were analyzed on the existence of alkaloids, flavonoids, tannins, steroids, and terpenoids. DPPH analysis revealed that the high antioxidant activity is *Homotrigona fimbriata*. This finding showed that propolis of *Homotrigona fimbriata* have potent for antioxidant.

**Keywords:** *Homotrigona fimbriata*, stingless bee, DPPH methods, antioxidant activity, phytochemical





## ABSTRACTS

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**FP - 32**

### **Screening and antimicrobial activity of some tarakan's educational forest plants**

**S Egra<sup>1\*</sup>, H Kuspradini<sup>2</sup> and T Mitsunaga<sup>3</sup>**

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**Abstract.** Some selected medicinal plants from Tarakan's Educational Forest from North Kalimantan were evaluated for potential antimicrobial properties. The leaves of the plants were extracted with ethanol. Antimicrobial activity against *Streptococcus sobrinus*, *Streptococcus mutans*, *Candida albicans*, *Propionibacterium acnes*, *Salmonella typhi* and *Staphylococcus aureus* were determined by an agar well diffusion method. The result showed that ethanol extract of *Fissistigma* sp., *Cratoxylum sumatranum* (Jack) Blume, *Garcinia* sp., and *Cyrtandra* sp. displayed good activity against *S. sobrinus* at 5000ppm of the extracts tested. The ethanol extract of *C. sumatranum* displayed more activity against *P. acnes* than others at 5000 ppm. The ethanol extract of *Cyrtandra* sp. Displayed more activity against *S. typhi* and *S. aureus* at 5000 ppm. The present result showed potential of some medicinal plants from Tarakan's Educational Forest from North Kalimantan as natural antimicrobial agents.

**Keywords:**





## ABSTRACTS

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**FP - 33**

### **Characteristics of bark tannin-based adhesive with the addition of a biopesticide**

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**Abstract.** Tannin-based adhesives have become an interesting research topic as it can be potentially used in the wood panel industry as an alternative for synthetic adhesives containing formaldehyde. The development of this type of adhesives is expected not only for the high strength of panels produced, but also for their high durability properties. This study was aimed at formulating tannin-based adhesives from Mahogany (*Swietenia mahagoni*) bark with the addition of bio-pesticide derived from Berenuk fruit (*Crescentia cujete*) in various concentrations. All formulations were physically and chemically characterized to determine their gel time, storage life, chemical compounds, and functional groups. Samples of phenol resorcinol formaldehyde were also prepared and analyzed for control. Results of the *py*-GCMS and FTIR are the main concerns in comparing and discussing the characteristic of this newly developed adhesive formulation.

**Keywords:** Adhesive formulation, *Crescentia cujete*, Bio-pesticide, Mahogany Bark, Tannin-based adhesives





## ABSTRACTS

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**FP - 34**

### **Evaluation of antioxidant and antibacterial activity from three different solvents of *Nephelium ramboutan-ake* leaves extract**

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**Abstract.** *Nephelium ramboutan-ake*, is a species of Sapindaceae family, locally named as Maritam from Kalimantan, however there is limited information about the potency of this plant. The objective of the present study was to carry out the antioxidant and antibacterial activity of *N. ramboutan-ake* leaf extract by three different solvents of extraction. The extracts obtained by successive solvent extraction from maceration method using n-hexane, ethyl acetate, and ethanol solvent. Antioxidant activity was analyzed by DPPH radical scavenging assay compared by ascorbic acid. Antibacterial activity was assayed using the 96 well-plate microdilution broth method against *Streptococcus mutans* and *S. sobrinus* compared with chloramphenicol as a positive control. This research showed that ethanol extract was a highest yield followed by ethyl acetate and n-hexane extract. All extracts potential scavenged DPPH free radicals at a concentration of 25, 50, and 100 ppm. This plant extracts also could inhibit all tested microorganisms. *N. ramboutan-ake* can be used as a source of natural medicinal material.

**Keywords:** Antioxidant, antibacterial, *Nephelium ramboutan-ake*, leaf





## ABSTRACTS

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**FP - 35**

### **Morphological characteristic and chemical properties of balsa fibers due to alkaline treatment**

**Marwanto<sup>1\*</sup>, R Purnawati<sup>1,2</sup>, M I Maulana<sup>1</sup>, N J Wistara<sup>1</sup>, S Nikmatin<sup>3,4</sup> and F Febrianto<sup>1</sup>**

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**Abstract.** Balsa fiber is one of the potential natural fibers to be used as polymer reinforcement. Tensile modulus of polymer composite which uses balsa fiber as filler were higher than the neat polymer. The properties of balsa fiber polymer composite were improved after alkaline treatment to balsa fiber was carried out. The improved properties of balsa fibers polymer composite were allegedly due to surface characteristics and chemical components content change during alkaline treatment. The aim of the research was to determine the morphological characteristic and chemical components content of alkaline treated balsa fibers. The alkaline treatments were conducted using 2, 4, 6, 8 and 10% NaOH solutions. Morphological and surface characteristics were observed using Scanning Electron Microscope (SEM) and sessile drop wettability determination. Chemical components content were determined according to the Technical Association of Pulp and Paper Industry (TAPPI) standard. The results showed that lignin and hemicellulose content decreased after alkaline treatment. Alkaline treated balsa fibers have more hydrophobic surface than the untreated fibers.

**Keywords:** Alkaline treatment, balsa fiber, polymer composite, surface modification, chemical properties





## ABSTRACTS

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**FP - 36**

### **Characterization of polysaccharide nanoparticles by cationic functionalization**

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**Abstract.** Cellulose nanofibrils from bleached kraft pulp and starch nanoparticles were obtained by quaternization using glycidyltrimethylammonium chloride. In order to increase the surface area, pulp was ball milled in two condition namely wet and dry condition. Water was used for the solvent in ball milling condition. While, starch granule was reacted without prior treatment. The morphology of ball milled and starch granule were observed under scanning electron microscopy and it showed that dry milled pulp was more rough and porous compared to that of wet milled. Starch granule showed round-smooth shaped. The pretreatment of raw materials is expected to improve the degree of fibrillation in nanocellulose using mechanical approach. This phenomena will be studied using fourier transform infra-red spectroscopy and X-ray diffraction analysis. In addition, the transparency, the rheological behavior, the  $\xi$ -potential and the thermal stability were also reported. Unfortunately, the results of this study are still undergoing observation. The information from this study are useful in the development of nanoparticles as stabilized Pickering emulsion agent for food and drug applications.

**Keywords:** Cellulose, starch, nanoparticles, quaternization, characterization





## ABSTRACTS

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**FP - 37**

### **Honey of stingless bee (*Homotrigona fimbriata*) as anti skin bacteria**

**Yadi<sup>1</sup>, S Paramita<sup>1</sup>, N Tandirogang<sup>1,3</sup> and E T Arung<sup>2, 3\*</sup>**

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\*This was funded by Kemenristekdikti (No. 204/UN17.41/KL/2019)

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**Abstract.** This study aims to find sources of medicinal and cosmetic raw materials by utilizing natural materials derived from forests, especially non-timber forest products, namely honey from stingless bee in East Kalimantan. *Homotrigona fimbriata* honey was use for evaluating its potent for anti bacteria in skin. We used four skin bacteria and honey of this species showed good inhibition. Based on these results, this honey has potential to be developed as a source of raw material for anti bacteria that attack human skin but further evaluation is needed.

**Keywords:** Honey, skin bacteria, *Homotrigona fimbriata*





## ABSTRACTS

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**FP - 38**

### **Characteristic of bamboo cellulose nanofibers at various delignification levels**

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**Abstract.** The aim of this research was to determine the effect of delignification levels on the properties of bamboo nanofibers. Cutter-milled (0.2 mm) bamboo powder was used as sample. Samples were delignified by sodium chlorite-acetic acid treatment at reaction of 1, 2, 3, and 4 cycles to get bamboo fibers at different lignin content. Delignified bamboo fibers were then subjected to mechanical fibrillation using wet disk mill. Lignin content of bamboo nanofibers was measured using ultraviolet (UV) spektrophotometer. Morphological characteristics of fibrillated products were observed using Scanning Electron Microscope (SEM). Lignin content of bamboo nanofiber was decrease with increasing delignification levels. The appearance of fibrillated product showed that, with lower lignin content, the color was being to be whiter. The images of SEM showed that bamboo nanofibers are getting separated with decreasing lignin content.

**Keywords:** Bamboo, cellulose nanofiber, delignification, lignin





## ABSTRACTS

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**FP - 39**

### **The diversity of terpenoid in the *Litsea* spp essential oils**

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**Abstract.** The family of Lauraceae consists of a group of flowering plants included in the *Litsea* genus. Several species of this genus have been widely used in a number of ethnobotanical methods as traditional medicines. In order to determine the similarities and differences between their volatile constituents, GC-MS examined the leaf terpenoid compositions of five species from the *Litsea* genus.

**Keywords:** *Litsea*, terpenoid, essential oil





## ABSTRACTS

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**FP - 40**

### **DPPH-scavenging activity of propolis of *Tetragonula iridipennis* from East Kalimantan**

**Sukemi<sup>1</sup>, S Paramita<sup>2,4</sup>, Yadi<sup>2,4</sup>, N Tandirogang<sup>2,4</sup> and E T Arung<sup>3,4\*\*</sup>**

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**Abstract.** *Tetragonula iridipennis* is a species of bee from Apidae family. Its honey is known as anticancer by local community in Samarinda, East Kalimantan, Indonesia. However research on propolis *T. iridipennis* from East Kalimantan is rarely conducted. This research was carried out to investigate antioxidant activity of propolis of *T. iridipennis*. The propolis was collected from a villager at Lempake subdistrict, Samarinda city, East Kalimantan province, Indonesia. The antioxidant activity was evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay and ascorbic acid was taken as a standard. The DPPH scavenging activities of the propolis was high but lower than that of ascorbic acid as positive control. However it can be concluded that the propolis of *T. iridipennis* from East Kalimantan can be used as antioxidant agent.

**Keywords:** *Tetragonula iridipennis*, propolis, DPPH, Antioxidant





## ABSTRACTS

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**FP - 41**

### **Potency of bee pollen of stingless bee (*Homotrigona fimbriata*) as anti cancer**

**E T Arung<sup>1,4\*</sup>, S Paramita<sup>2,4</sup>, Yadi<sup>2,4</sup>, Sukemi<sup>3</sup> and N Tandirogang<sup>2,4</sup>**

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\*This was funded by Kemenristekdikti (No. 204/UN17.41/KL/2019)

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**Abstract.** The objective of this study is to find sources of medicinal and cosmetic from tropical rain forests, especially non-timber forest products, such honey and its derivatived namely propolis and bee pollen. One of stingless bee, *Homotrigona fimbriata* produced honey, propolis and bee pollen. In this study focused on utilizing bee pollen for evaluating its potency as anti cancer. The MTT method was used and the results showed that the ethanol extract of *Homotrigona fimbriata* bee pollen showed cytotoxic properties in some cancer cells. Based on these results, this bee pollen has the potential to be developed as a source of raw material for cancer medicine, but certainly needs a more in-depth and comprehensive study.

**Keywords:** Stingless bee, bee pollen, *Homotrigona fimbriata*, cancer





## ABSTRACTS

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**FP - 42**

### **A preliminary study of fatliquor synthesis from candlenut oil (*Aleurites moluccana*): Effects of reaction time and reactants ratio**

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**Abstract.** Candlenut oil can be used as an alternative raw material for producing sulfated oil (fatliquor) for the leather industry through the sulfation process. The aims were to elucidate physico-chemical properties of candlenut oil and evaluate the effect of the reaction time and the ratio of reactants on percentage of SO<sub>3</sub> bond in the fatliquor production. Physico-chemical properties of candlenut oil were analyzed using Indonesian standards SNI 01-4462-1998. The fatliquor was obtained with 97% H<sub>2</sub>SO<sub>4</sub> at 17-20 °C at various equivalent ratio of H<sub>2</sub>SO<sub>4</sub>:total fatty acids of candlenut oil (R) and various reaction time. The favorable process condition can be achieved by R 1:1 in 45 minutes. The product had percentage of SO<sub>3</sub> bond of 19.35% and iodine number of 34.84. The sulfation of candlenut oil has to keep at low temperature of 17-20 °C with gradual flow rate of H<sub>2</sub>SO<sub>4</sub> to produce maximum products and avoid carbonation process.

**Keywords:** Fatliquor, sulfation, candlenut oil, reaction time, sulfonation, ratio of reaction





## ABSTRACTS

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**FP - 43**

### **Aglaforbesin, a new Aglain derivate isolated from the leaves of *Aglaia dasyclada* with new condensation pattern between flavonoid and putrecine bisamide**

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Center for pharmaceutical and medical technology

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**Abstract.** *Aglaia*, one of the interesting forest plant member in Asia have been receiving considerable attention due to the presence of a structurally unique group of cyclopentabenzofurans, the so-called rocaglamide, as well as the related compound, its benzopyran derivate, the so-called Aglain, which occur both exclusively in this genus. Those compounds exhibit pronounced antiproliferative activity against human cancer cells in vitro, comparable to that of vinblastine sulfate. A new Aglain derivate with new condensation pattern in term of biosynthetic step were isolated from the leaves *A. dasyclada*. The structure of the new compound was elucidated based on  $^1\text{H}$  and  $^{13}\text{C}$  NMR data in combination with 2D NMR data (COSY, HMBC, and HMQC). The relative configurations of hydrogen atom around chiral carbons were deduced with the aid of a ROESY spectrum.

**Keywords:**





## ABSTRACTS

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**FP - 44**

### **Evaluation of antibacterial activity and physico-chemical profiles of *Eucalyptus pellita* essential oil from East Kalimantan**

**A B Kartiko, A S Putri, E Rosamah and H Kuspradini\***

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**Abstract.** *Eucalyptus* is one of plants that used in pulp and paper industry and their leaves are known as forest harvesting waste that potential to produced essential oils. The objective of this research was to examine the physico-chemical profiles of *Eucalyptus pellita* leaf essential oils grown in East Kalimantan and its potential antibacterial activity. The essential oils distilled using water and steam distillation method. Analysis of physico-chemical profiles from this oil included yield, color, refractive index, solubility in alcohol, and chemical compositions by GC-MS. Antibacterial activity assayed by agar diffusion method against *Streptococcus sobrinus* and *S. mutans*. The results showed the physico-chemical profile of *E. pellita* oil were 0.86% of yield, 1.465 of refractive index, solubility in alcohol was 1:1. Chemical components contained in *E. pellita* oil dominated by  $\beta$ -pinene (33.49%), patchouli alcohol (13.77%), 1,7,7-trimethyl-bicyclo[2.2.1]hept-2-ene (9.81%), eucalyptol (1,8-Cineole) (6.7%), and *trans*- $\beta$ -caryophyllene (6.7%). This oil was active to inhibit the growth of all bacterias in range of 14.78-22.33 mm against *S. sobrinus* and ranging from 14.00 mm to 52.00 mm against *S. mutans*. This forest harvesting waste potential to developed as a new source of essential oil (eucalyptol oil).

**Keywords:** Antibacterial, Physico-chemical, *Eucalyptus pellita*, East Kalimantan





## ABSTRACTS

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**FP - 45**

### **Antibacterial activity of methanol extract and its fractions from Knop grass root (*Hyptis capitata* Jacq.) against *Propionibacterium acnes***

**Erwin<sup>1</sup>, C T M Andayati<sup>1</sup> and I W Kusuma<sup>2\*</sup>**

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**Abstract.** The antibacterial activity test of the methanol extract and fractions from the roots of Knop (*Hyptis capitata* Jacq.) was carried out. This study aims to determine the antibacterial activity in the fractions resulting from the separation of column chromatography from the methanol extract of knop grass. The antibacterial activity test was carried out by the agar well method while the phytochemical by the thin-layer chromatography (TLC). The results of the separation of the first column chromatography produced 19 fractions. The results of the first column antibacterial activity test showed antibacterial inhibition values at a sample concentration of 200 ppm. Separation of the second column chromatography produced 5 fractions. The results of the second column antibacterial activity test at fraction 4 at concentrations of 200 ppm, 100 ppm, 50 ppm, 25 ppm and 12.5 ppm showed inhibitory values of 6.25; 9,125; 6.75; 5.25 and 5.75. Phytochemical test results show that the AH 1.4 fraction contains alkaloid and steroid or terpenoid. The results of the research test informed that the AH 1.4 fraction of knop grass root has the potential to become a natural antibacterial compound.

**Keywords:** Antibacterial, secondary metabolites, *Propionibacterium acnes*, knop grass, *Hyptis capitata*





## ABSTRACTS

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**FP - 46**

### **Antioxidant and antibacterial capacities of the Mangrove *Sonneratia alba* and *Bruguiera gymnorrhiza***

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**Abstract.** The mangrove *Sonneratia alba* and *Bruguiera gymnorrhiza* are the most abundant mangrove found in Indonesia. The barks and fruits extract of *Sonneratia alba*, and *Bruguiera gymnorrhiza* have been evaluated for antibacterial and antioxidant activities. The fruits and barks were consequently extracted using different polarity of solvent from n-hexane, ethyl acetate, and methanol. The presence of phenolic, flavonoids, and tannins compounds were characterized by the quantitative and qualitative phytochemical method. Screening antioxidant activity was analyzed using DPPH-free radical scavenging assay. Four human pathogenic bacteria (*P. aeruginosa*, *B. subtilis*, *E. coli*, and *S. aureus*) were used for antibacterial activity by disk diffusion assay and minimum inhibitory concentration. The phytochemical analysis revealed the fruits extract *Sonneratia alba* and *Bruguiera gymnorrhiza* have the highest phenolic, flavonoid, and tannin in ethyl acetate extract. In term of antioxidant activity, the ethyl acetate extract from the fruits of mangrove extract showed the highest capacity for antioxidant using IC<sub>50</sub> value. Furthermore, all mangrove extract showed no activity against all tested bacteria.

**Keywords:** Mangrove, phytochemical, antioxidant, antibacterial





## ABSTRACTS

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**FP - 47**

### **Potency anticariogenic and antioxidant activity of some medicinal plants used by Bentian tribe in East Kalimantan, Indonesia**

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**Abstract.** Anticariogenic and Antioxidant activity of some medicine traditional plants grown in East Kalimantan, Indonesia were investigated. Plant sample are *Macaranga gigantea* leaf, *Stacytarpetha jamaicensis* leaf, *Erythrina sp.* bark, *Blumea balsamifera* leaf and *Cordyline fruticosa* leaf. The samples collected were extracted with ethanol solvent. Anticariogenic activity was determined by an agar diffusion method against *Streptococcus mutans* and *Streptococcus sobrinus*, two cariogenic-causing bacterial strains. Antioxidant activity was determined by DPPH radical scavenging mechanism. Phytochemical analysis of was determined by the presence of alkaloids, flavonoids, terpenoids, tannin, saponin, steroids, carotenoid and coumarins. The results showed that *Blumea balsamifera* leaf displayed good activity against *S. mutans* and *S. sobrinus* at 25-400 µg/well of the extracts tested. The highest antioxidant activity against DPPH was displayed by the *B. balsamifera* leaf and *Erythrina sp.* bark exhibiting 81% and 80% inhibition, respectively. The present results showed potential of medicinal plants used by Tende people from East Kalimantan as natural anticariogenic and antioxidant and also give a scientific basic to the traditional uses of the investigated plants.

**Keywords:** Anticariogenic, antioxidant, ethnopharmacology, medicinal plant, phytochemical





## ABSTRACTS

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**FP - 48**

### **Effect of location and distillation method on yield, quality and antioxidant activity of clove (*Syzygium aromaticum*) leaves oil**

**R Pujiarti<sup>1\*</sup>, H N Fauziyyah<sup>1</sup> and G Wibisono<sup>2</sup>**

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**Abstract.** Clove plants are one of the annual crops where the leaves can be used to produce essential oils. The quality of essential oils of clove leaves can be influenced by the location and extraction methods. The aims of this study were to determine and compare the yield, quality (physico-chemical properties, chemical composition) and antioxidants of clove leaf oil from three locations with some distillation method. This study used a Completely Randomized Design which arranged in factorial with factors location and distilled method. Location of material consisted of three locations were Ungaran, Ciamis, and Kulon Progo and distillation methods were water and water-steam distillation. Physico-chemical properties were tested based on Indonesian National Standards (SNI) 06-2387-2006. Chemical composition was analyzed using GC-MS which was presented descriptively. While for antioxidant test the DPPH method was used. The results showed that water-steam distillation method produced higher yield than water distillation method. The amount of dry yield obtained were 2.5% for the Ungaran sample, 1.8% for Ciamis sample and 0.8% for Kulon Progo sample. The physico-chemical analysis of clove leaf oil prescribed with SNI 06-2387-2006 standards. The main component of clove leaf oil is eugenol (C<sub>10</sub>H<sub>12</sub>O<sub>2</sub>). The amount of eugenol content for each sample (Ungaran sample with water distillation, Ungaran sample with water-steam distillation, Ciamis sample with water distillation, Ciamis sample with water-steam distillation, Kulon Progo sample with water distillation and Kulon Progo sample with water-steam distillation) were 72.23%, 61.95%, 60.39%, 71.35%, 57.43% and 54.48%, respectively. While the antioxidant assay of clove leaf oil using the DPPH method showed IC<sub>50</sub> values ranging from 16.04-34.73 mg/ml with the best antioxidant activity obtained from essential oil of Ciamis sample with water distillation.

**Keywords:** Clove oil, yield, quality, physico-chemical, chemical composition, antioxidant.





## ABSTRACTS

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**FP - 49**

### **Effect of *Heterotrigona itama* bee pollen extract on antioxidant and *Propionibacterium acnes* growth**

**A M Sari<sup>1</sup>, I W Kusuma<sup>1</sup> and E T Arung<sup>1, 2\*</sup>**

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**Abstract.** World distribution of stingless bees is found in Indo malaya as many as 41 species, 11 species of stingless bees are found in Samarinda. The potential of stingless bees products has not been widely used by the community. Stingless bees has various products such as honey, propolis and bee pollen. Bee pollen is one of the bee products that have potential as a herbal medicine and cosmetic ingredient. Bee pollen is taken from the nest of beekeeping in Samarinda. Bee pollen was dried at 40° C for 10 days then ethanol extracted. The antioxidant activity of each sample was assessed using the scavenging radical 1,1-diphenyl-2-picrylhydrazyl (DPPH) method and *Propionibacterium acnes* activity was tested using disk diffusion method. Ethanol extract of *Heterotrigona itama* bee pollen showed moderate antioxidant activity at a concentration of 100 ppm and showed strong bacterial inhibitory activity at a concentration of 50 µg/mL.

**Keywords:**





## ABSTRACTS

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**FP - 50**

### **Effectiveness of distillation models on bioactivity from essential oil fraction of *Cinnamomum camphora* (L.) J. Presl.**

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**Abstract.** The change of paradigm in forest product management was bring out the Forestry Minister's Regulation Number P.35/Menhut-II/2007, concerned Non-Timber Forest Products (NTFPs). Some genus *Cinnamomum* was including in the list of NTFPs, and *Cinnamomum camphora* (camphor) is one species of them. The recorded data mentioned that this plant found abundant in Kalimantan and used as a complement in traditional ceremonies, especially for the Dayak Tunjung community, in Pepas Asa village. So this research aimed to conduct for further explore the potential of *C. camphora* essential oil which grown in East Kalimantan as antibacterial. Essential oil fractions obtained from the leave of *C. camphora* (CP) which grown in Pepas Asa village were fractionated by water and steam distillation based on their distillation models (CP5, CP7, and CP9) and separation times (0-1 h, 1-2 h, and 2-3 h). The oils were physically analyzed by hand refractometer to determine their refractive index value. The essential oils were also examined for their antibacterial activity at concentration of 1%, 10% and 100% (pure oil fraction) by agar diffusion assay against *Streptococcus mutans*. The results showed that the yield of oil fractions for each models were 1.62% (CP51), 0.71% (CP52), 0.14% (CP53), 2.35% (CP71), 1.20% (CP72), 0.38% (CP73), 1.23% (CP91), 0.85% (CP92), and 0.30% (CP93). The result of antibacterial activity showed that all fractions from three models potential as antibacterial agents in concentration of 100% (pure oil), especially the fraction of second time distillation could inhibit the growth of *S. mutans* higher than tested positive control.

**Keywords:** Essential oil, *Cinnamomum champora*, distillation model, fraction, bioactivity





## Wildlife Ecology (WE)





## ABSTRACTS

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### WE - 01

## How to survey and conserve one of big mammals in the tropical rain forest of Kalimantan? (Nicht survey, salt-licking and camera trapping will help the estimation of rhino's population)

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**Abstract.** Normally survey in the forest is during the daytime, when es the light from the sun come in to the forest floor. For some species is important to go through the forest in the night to make nicht survey in order to meet some activities of nocturnal species. The big sources of salt is the sea water. Around 130 mill. years ago is the sea water covered many terrestrial habitat included in the tropical areas. After that some of them left within the habitat (called as Sepan) and play an important role as a key mineral for surviving many big animals in the forest. Salt is essential mineral for many big mammals, since the scarcity of salt affected the distribution and reproduction of Rhinos, Elephant, Orangutan, Bear, Deer and others. There is an idea to prepare some places for salt licking (bring salt to research location from outside), which is part of wildlife management to prosper big mammals in the region. This effort will be conducted as a part of big mammals conservation in the island of Borneo.

**Keywords:**





## ABSTRACTS

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**WE - 02**

### **Biodiversity of bird and mammal in the Wanapatra Lestari area of PT. Pertamina Refinery unit V Balikpapan, Indonesia**

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**Abstract.** Wanapatra Lestari area was a remnant forest fragment in the center of Balikpapan city, Indonesia. This area was located in the concession area of PT Pertamina Refinery Unit (RU) V Balikpapan. Wanapatra Lestari area has high value of environmental services as habitat for wildlife as well as historical values. This aim of this study is to analyze the biodiversity of bird and mammal around the Wanapatra Lestari area. The method of bird survey was conducted using combination of point count and mist net. Furthermore, for observing mammal was carried out using combination of line transect, small mammal trap, camera trap, and also mist net. Data analysis was carried out descriptively by grouping each species according to their family and conservation status. The results showed that 17 species of bird and 6 species of mammal were identified in Wanapatra Lestari area. Of all the species was identified, there was only one species which is protected in Indonesia, namely the brahmny kite (*Haliastur indus*). Periodic monitoring was needed to find out more about population dynamic and the richness of wildlife species in the Wanapatra Lestari area.

**Keywords:** Environmental services, PT Pertamina RU V, urban forest, wildlife





## ABSTRACTS

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**WE - 03**

### **Community of Psittacidae family in Aketajawe Lolobata National Park North Maluku**

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**Abstract.** Aketajawe Lolobata National Park has a variety of habitat types and diversity high bird species. North Maluku including one of EBA areas (Endemic Bird Area) most important in the world because it has a large number of endemic bird species. Research activities aims to describe the type of habitat, identify the type of Psittacidae bird, and utilization of vegetation in bird habitat, especially in the Lolobata block area. Research carried out on August 20-28 2018. The calculation of bird species is carried out by the type list method MacKinnon and the IPA method. There are nine types of parrots found at Tukur - Tukur site and Beringin Lamo site. The type of bird that dominates is Chattering lory (*Lorius garrulous*). Type non-dominant ones include White Cockatoo (*Cacatua alba*) and Violet-necked Lory (*Eos squamata*). The habitat in the two locations observed showed a variety of types, namely lowland forests and riparian. Human activities that live around the habitat have a considerable influence on distribution and population size of existing species groups. Based on the Minister of Environment Regulation Life and Forestry No. 20 of 2018 all types of birds found are protected.

**Keywords:** Aketajawe Lolobata National Park, bird, bird habitat, Tukur Tukur, Beringin Lamo





## ABSTRACTS

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**WE - 04**

### **Odonata communities on the three habitat types in landscape of the Mulawarman University Education Forest**

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**Abstract.** The study was aimed to determine the biodiversity of odonata (dragonflies and damselflies) and their patterns on secondary forests, grassland areas and as well as on revegetation areas former coal mining. The patterns of biodiversity were illustrated by indexing of diversity, evenness, similarity, and also family composition, main species, as well as the attribute of species through their distribution areas. Through 100 hours sampling in every habitat, 442 individuals of 30 odonata species were recorded (17 Libellulidae, 6 Coenagrionidae, 4 Platystictidae, 2 Protoneuridae, 1 Chlorocyphidae). The indices of diversity (Shannon-Wiener) and evenness showed similarity of the habitats. The communities were medium stability and high evenness categories. However, the sites on grasslands and revegetation appeared closer than to secondary forests, based on phylogeny calculation. In each habitat had 4-8 main species and 3 species of them were found in all habitats. The distribution of odonata was categorized in world-wide, Oriental, Sunda Islands and Kalimantan (endemic). The secondary forest exhibited narrower distribution than grassland and revegetation sites.

**Keywords:**





## ABSTRACTS

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**WE - 05**

### **Population ecology and potential food sources of the Siamese crocodile in Mesangat swamp, East Kalimantan**

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**Abstract.** Mesangat swamp is expected to become the last habitat of the Siamese crocodile (*Crocodylus siamensis* Schneider, 1801) remaining in Indonesia. Biophysical studies of Siamese crocodile habitat and population status is needed for habitat conservation Siamese crocodile which is outside the conservation area. Research done by the method of spotlight survey, daylight survey, drone survey, interview and desk study. Data and information survey results analyzed are descriptive. Siamese crocodile population is estimated at less than 700 tail and concentrated on three locations namely Loa Toh, Long Balau and Abang. Water quality showed that levels of dissolved oxygen (DO) ranges from 2.86-3.19 mg/L with an average of less than 3 mg/l. for the level of acidity (pH) water 6-7.4, BOD ranging between 0.12-1.25 mg/l. Results of several indicators can categorized under conditions of habitat is still relatively good and still comply with the Siamese crocodile population capacity in Mesangat swamp. Population to less than 10-15 years it is predicted will not experience an increase in the mean. Most of the parameters of water testing indicates that the quality of the waters of Mesangat swamp is still relatively good as the Siamese crocodile habitat and fish populations. The results of the needs analysis of feed the crocodiles are estimated to have not led to competition with fishermen. Some indicators of the results of the survey showed that in general the condition of Siamese crocodile habitat in Mesangat swamp is currently still relatively good and appropriate. Change does not occur during the land management in habitat area of Siamese crocodile on Mesangat swamp, then population can be preserved for the next few years (< 10 years). While the threat of future (> 10 years) can be derived from the increase in the population which is inversely proportional to the decrease in quality of habitat affecting the production of fish and cause competition or conflict between the fishermen and the crocodile.

**Keywords:** Siamese crocodile, population, habitat, potential food





## **Social Forestry (SF)**





## ABSTRACTS

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**SF - 01**

### **Local people knowledge for managing insect pest infestation in agroforestry: an ethnoecological study**

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**Abstract.** Plants provide sources of bioactive substances which may be used as novel and safer plant protecting agents. Use of bioactive substances from plant extracts as natural insecticides is well-known since ancient and has enormous intuitive appeal. Application of plant extracts as natural insecticides emphasizes its great potential in pest management. Natural insecticides are low cost, local availability and safe to the environment. The use of natural insecticides in Indonesia is promising and has good prospect, because the availability of plant biodiversity richness is very huge. Indonesia has 37.000 species of identified plants, and 18.000 – 20.000 species of unidentified plants. A constraint of natural insecticide use in Indonesia is lack of publicity such as extension to the farmers or growers. Pest management application based-on traditional and indigenous knowledge by local people in context of agroforestry – known as ethnoecological knowledge - have been coupled by acclamation Integrated Pest Management (IPM). An ethnological approach study has been carried out on people who are living around and inside the forest in South Sumatra Province, Indonesia. Studies have been aimed to (1) assess farmer's perception of insect attacking their forest trees, (2) identify farmer's knowledge in practicing pest management methods, and (3) disseminate current method to prepare plant extracts as botanical insecticides. Data were collected direct from the local people or farmers through observation, meetings, and interviews. Farmers perceived that insect pest infestations could be major cause of tree mortality and product loss. Most farmers have inappropriate sustainable plans and strategies to protect trees from insect pest infestation. Studies suggested showed that agroforestry education is needed as a tool of insect pest management intensive technology. Farmer's education level could become an important role and will be linked to better insect pest management.

**Keywords:** Bioactive substances, pest management, indigenous and ethnoecological knowledge, agroforestry





## ABSTRACTS

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**SF - 02**

### **A strategic approach of an integrated supply chain management and scor model for palm sugar business**

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**Abstract.** This research aims to develop a model of supply chain management and enhance the performance and value of Supply Chain ranging from upstream to downstream with. The location of the research that is in the village of Bonto Sinala sub district of Sinjai Regency, entire stock of Sinjai, South Sulawesi. Method of collecting data through observation, interview and FGD at the community involved in the efforts of Palm sugar, local traders as well as local government. The plan of implementation of the research done at some stage i.e. pre conditions, stage of data collection and data validation stage. Analysis of the data is done through the Implementation through the application of Supply Chain Operations Reference (SCOR) and the Analytical Hierarchy Process. The results showed that the performance of the business performance of Palm sugar is included in the category of marginal (medium) with a total of 46. The final value of the highest performance shows that are on the process of source and lowest performance on the process of return. This means that the process of hail return requires a priorities repair efforts on this Palm sugar.

**Keywords:** Palm sugar, superior product, Hayami, Supply chain, SCOR





## ABSTRACTS

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**SF - 03**

### **Effect of community migration and remittance on local forest and land management in north Kalimantan, Indonesia**

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**Abstract.** This research was conducted in four forest-dependent villages of Kalimantan Indonesia which were traditionally migrated outside village looking for job. The purpose of this study is to determine the impact of migration and remittance to socio-cultural changes in forest management. From out-migration, return migrants contribute thoughts for the development of family businesses, agriculture and plantation. In-migration contributes to science and education of local community. Meanwhile, out-migration leads to a decrease in productivity to manage the land and increase non-arable land. Further in and out-remittances have an impact on the utilization of agricultural and forest products. Out-remittances are used to finance the education and usually met by utilizing agricultural and forest products. While in-remittances are used to meet daily households' needs.

**Keywords:** Migration, remittance, social culture, local policy, forest and land





## ABSTRACTS

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**SF - 04**

### **Diversity and local knowledge of local fruits in North Sulawesi**

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**Abstract.** North Sulawesi is located in the Wallacea zone and has a high biodiversity of local fruits that are not yet fully exploited. Local edible fruits are available as rich sources of vitamins, fibres, minerals, and phytochemicals for local people's diet and health. This study aimed at examining local people's knowledge and perceptions of local fruits and their conservation. Data were collected between April and May in 2019 using a purposive sampling approach of local communities in five regencies in North Sulawesi. Data was collected through the use of questionnaires and personal interviews during field trips to the sites. There are 27 recorded families of local edible fruits, predominated by Myrtaceae and Anacardiaceae. Some fruits are found abundantly, but some are rarely found, especially those which are endemic to North Sulawesi. The fruit trees are mostly self-grown, and eaten by the community themselves. In general they are well aware of the types of local fruits that can be eaten raw. Knowledge of local fruits is most widely obtained through generations. Most people claim that local fruits which can be eaten raw are also used for medicine and maintaining health. Most of the local fruits used as medicines are not made as medicinal preparations, but eaten raw or cooked. However, most people do not know exactly about the efficacy of the fruits. Types of diseases that are claimed to be cured by using local fruit are sprue, high cholesterol and digestive disorders. The possibility of future youth to consume these fruits is very high, according to most people. But they are worried that the younger generation in the future will prefer imported fruit. The community in general knows that these local fruits need to be preserved, but they do not yet know how to maintain the existence of these local fruits in the future, apart from their current practices.

**Keywords:** Local fruit, biodiversity, North Sulawesi, Wallacea





## ABSTRACTS

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**SF - 05**

### **Sustainable livelihood and language in ethnomedicine of the Dayak in North Kalimantan**

**R Susanti\* and T Ichinose**

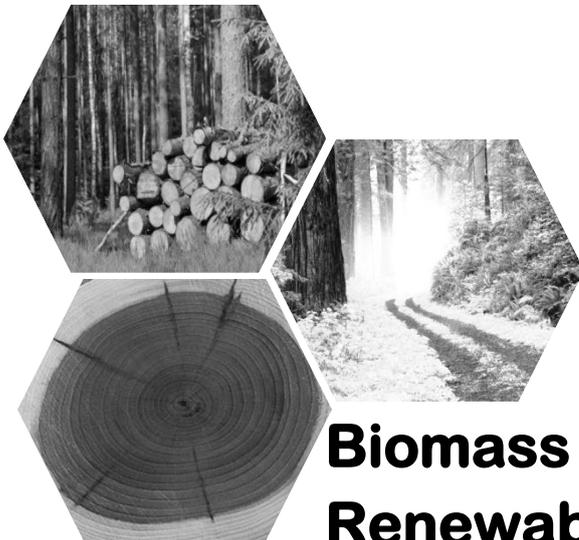
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**Abstract.** Kalimantan is the island of home for one of the forest dependent communities in Indonesia, the Dayaks. Addressing these communities' situation, they have developed a knowledge using natural resources intact in their surroundings, for basic necessities and livelihood. As a result, their traditional knowledge predominantly in forest and biodiversity conservation. Therefore, they developed the knowledge which lexicons of their ethnic language denote the words refer to particular shape, landscape and persons. This article discusses the knowledge of the Dayak Kenyah and Dayak Lundayeh in Malinau and Nunukan of North Kalimantan province of plants for medicine. It attributes to the language, cultural representation, and potential for sustainable livelihood for the communities.

**Keywords:**





## **Biomass Conversion and Renewable Energy (BCR)**





## ABSTRACTS

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**BCR - 01**

### **Utilization of Coconut shells (*Cocos nucifera*) for improving calorific value of pellet from Mahogany wood (*Swietenia macrophylla*)**

**J P G Sutapa\* and A Wicaksana**

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**Abstract.** The study was conducted to determine the effect of the proportion of raw materials and particle size on the quality of pellet. The raw material are Mahogany (M) wood waste originates from the sawmill industry in Wonosobo and Coconut shell (K) originates from the coconut milling industry in Galur, Kulonprogo. The study was conducted with particle size of raw material (20-40 mesh, 40-60 mesh, and 60-80 mesh) and the proportion of material (M 100% - K 0%; M 75% - K 25%; M 50% - K 50%, and M 25% - K 75%). Pellet quality parameters were measured by radial compressive test, heat test, proximate test (moisture content, volatile content, ash content, carbon bound content, absorbency test, and pellet development). The results shows that the best quality of pellet were obtained from particle size 60-80 mesh and the proportion of raw material of 75% Mahogany sawdust and 25% Coconut shell. This combination produced radial compressive strength of 113.26 N/mm increased the calorific value from 4421 kal./g to 5671 kal./g or 28.26%.

**Keywords:** Wood pellet, Mahogany wood, Coconut shell





## ABSTRACTS

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**BCR-02**

### **Environment friendly method for improving quality of wood pellet**

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**Abstract.** The result of the former research showed that increasing calorific value of wood waste of Mindi and Teak which has been treated on the charcoal heating stove were 12.59% and 25.91% respectively. Advantages of the heating process is not dependent on electricity, furthermore this friendly technology can be applied in various remote region. In this study those method will be develop for pellet production the difficulties of pellet formation and the solution are investigated and quality parameters of pellet such as proximate test (moisture content, volatile content, ash content, fixed carbon content, and calorific value will be evaluated. The increase of calorific value of pellet is very valueble because with the same weight of pellet higher calorific value could be obtained.

**Keywords:** Wood pellet, environmental friendly, calorific value





## ABSTRACTS

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**BCR - 03**

### **Mechanical properties, pollutant adsorption, and self-healing capability of mortar from oil palm shell and empty fruit bunches fiber**

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**Abstract.** Cracks recovery in mortar and materials using cement as a binding agent is an important step in anticipating damage and reducing the building age. Self-healing mortar can be created by adding material that able to minimize crack size and can act as a self-healing medium for the formation of calcium carbonate ( $\text{CaCO}_3$ ) and calcium silicate hydrate ( $3\text{CaO}\cdot 2\text{SiO}_2\cdot 2\text{H}_2\text{O}$ , CSH). Material that can minimize the cracks is activated charcoal from oil palm shell (OPS), while the material that can be used as a medium for self-healing mortar is oil palm empty fruit bunches fiber (OPEFB). In particular for OPS activated carbon, besides it can minimize the crack size, it also has a function as gaseous pollutant adsorber. The main purpose of this study is to produce mortar by adding OPS activated carbon and hydrochar from OPEFB, which has high mechanical properties, the ability to adsorb pollutants, and has self-healing cracks capability. In this research, the manufacturing of mortar was carried out through two stages. The first stage, mortar manufacture with OPS activated charcoal at 1, 2, and 3% based on cement weight. The second stage, mortar manufacture using selected levels of OPS activated charcoal and OPEFB hydrochar at 1, 2, and 3% based on the volume fraction of the mortar sample. After 28 days of immersion, the test was carried out on mortar, including the mechanical properties (compressive strength, modulus of rupture (MOR), modulus of elasticity (MOE), and the ability to adsorb gaseous pollutants. Observation of crack's recovery has also conducted. For this test sample, an artificial crack was first made. After that, the test sample that has had cracks was given a wet/dry cycle for 14 cycles. The one wet-dry cycle consisted of soaking in water for 12 hours and continued with conditioning at 12 hours in room temperature. The results showed that the mortar with the addition of 3% of oil palm shell activated carbon, and 1% of OPEFB fiber hydrochar had the best mechanical properties, pollutant adsorption, and crack recovery capability.

**Keywords:** Hydrochar, activated carbon, mortar, pollutants adsorption, self-healing mortar





## ABSTRACTS

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**BCR - 04**

### **Physico-chemical characteristics of pellet made of sawdust waste from Papua's commercial wood species and sago pulp**

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**Abstract.** The objectives of this research were to elucidate the best formulation for making pellet from sawdust of Merbau and Binuang wood and sago pulp, to determine physico-chemical characteristics and caloric values of those bio-pellets, and to determine the quality of the pellets on the basis of SNI Standard. Ratio between sawdust and sago were 50:50, 40:60, 30:70, 20:80, 10:90 and 0:100, on w/w% basis. Pellet was produced using manual meat grinder and then addressed to physical and chemical analysis. The results showed that pellet generated from Merbau sawdust had better characteristics compared to the pellet generated from Binuang sawdust. According to the ratio between sawdust and sago pulp, pellet with 70% sago pulp was recommended for making pellet with 30% of either Merbau or Binuang sawdust. Although the pellets resulted in this research did not fulfil all the parameters in the SNI standard, the utilization of sawdust and sago wastes are still potential for biofuel with improving the pellet properties.

**Keywords:** Sawdust and sago wastes utilization, biopellet, Merbau sawdust, Binuang sawdust, biofuel





## ABSTRACTS

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**BCR - 05**

### **Effect of temperature and slicing thickness on extractive and colour change of superior teak wood**

**T Listyanto<sup>1\*</sup>, Y S Lubis<sup>2</sup>, J Sulisty<sup>1</sup> and G Lukmandaru<sup>1</sup>**

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**Abstract.** This study aims to determine the effect of treatment temperature, duration, and slicing thickness on the extractive and color changes of Superior teak wood. Temperature of 180 and 200 °C with different duration applied to the sample. Three different thickness were observed on extractive and colour change. The resulting temperature, treatment duration, and slicing thickness interaction had a significant effect on the brightness ( $L^*$ ), yellowness ( $b^*$ ), and total color change ( $\Delta E$ ). Redness ( $a^*$ ) did not significantly affect the interaction of the three treatments, but the reddish change value ( $\Delta a$ ) significantly affected the interaction of temperature and slicing thickness. The temperature, treatment duration, and slicing thickness interaction had also a significant effect on hot-water extractive content.

**Keywords:** Extractive, heat treatment, color properties, superior teak





## ABSTRACTS

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**BCR - 06**

### **Pretreatment of *Macaranga hypoleuca* (Reichb.f. and Zoll) Mull.Arg. using peroxo metal catalyst, silicomolybdic acid**

**D Mujiasih<sup>1</sup>, E Septia<sup>1</sup>, W Suwinarti<sup>1</sup>, Yuliansyah<sup>1</sup>, T Watanabe<sup>2</sup> and R Amirta<sup>1\*</sup>**

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**Abstract.** *Macaranga hypoleuca*, is one of the pioneer plant species that commonly and easily found in regenerated secondary forest after abandonment in East Kalimantan. This plant species was also reported as the pioneer plant species that usually grow sporadically on the gap of forest canopy, and disturbed areas after forest fire or opening area for the shifting cultivation. Due to its high growth adaptability, this plant species is potential to be developed and used as energy plant feedstock, including for ethanol and other chemical production. In terms of that, here in this paper potential utilization of *M. hypoleuca* as ethanol feedstock was studied using a peroxo metal, silicomolybdic acid as catalyst in pretreatment process. Pretreatment was conducted in various temperatures, time reactions, and also concentrations of silicomolybdic acid and hydrogen peroxide. The results showed that the highest sugar yield was obtained from 2.5% of silicomolybdic acid, and 1.5% of hydrogen peroxide at 170°C for 120 min to give the highest sugar yield 64.55% (pulp basis) or 34.82% (wood basis), which correspond to 464.50 ml ethanol/kg biomass. The sugar and ethanol yields were high enough compared to other woody plant species. In general, we concluded that *M. hypoleuca* is a plant species that promising to be used as biomass feedstock for Indonesia energy security, particularly to produce ethanol in the future.

**Keywords:** Catalyst, ethanol, *M. hypoleuca*, peroxo metal complex





## ABSTRACTS

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**BCR-07**

### **Bioplastic based on carrageenan and cellulose from Sengon wood**

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Laboratory of Forest Product Utilization and Processing, Faculty of Forestry, Hasanuddin University, Makassar, Indonesia

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**Abstract.** Bioplastic based on carrageenan with cellulose was produced in this study. The mechanical properties and biodegradation of produced bioplastic were evaluated. The bioplastic sheet was prepared from seaweeds as a source of carrageenan and sengon wood particles as a source of cellulose. Three ratio of carrageenan and cellulose mixture were used, namely 95 : 5, 90 : 10, and 85 : 15. These ratio were based on weight of 2 g total mixture. The result showed that tensile strength of bioplastic was increased as the amount of cellulose increased. The bioplastic sheet with the ratio of 85 : 15 has the highest tensile strength of 8.9 N/mm<sup>2</sup>. This tensile strength value did not fulfill the SNI 7818: 2014 which required minimum of 13.7 N/mm<sup>2</sup>. However, it was nearing to the standard value. The elongation at break was found conversely value to the tensile strength. The ratio of 95 : 5 has the highest elongation at break with the value of 2.98%. Biodegradation test after 3 weeks found that bioplastic sheets containing higher cellulose were more attacked by microorganisms than that of containing less cellulose. The weight loss of bioplastic with the ratio of 85 : 15 was found to be 28.4% after biodegradation test.

**Keywords:** Bioplastic, cellulose, carrageenan, sengon





## ABSTRACTS

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**BCR-08**

### Ultrastructure and quality of paper

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**Abstract.** Wood crystallinity is defined as the weight fraction of crystalline material to non-crystalline material in the wood fibers. Degree of crystallinity is one of the most factors affecting the physical and chemical properties of cotton cellulose as well as regenerated cellulose fibers. It is an important property of woody materials which is affected by tree growth, anatomical structure, chemical properties, and is related to Young's modulus, dimensional stability, tensile strength, alpha-cellulose content, density, and hardness. These properties increase with increasing 'crystallinity' while moisture absorption, dye sorption, chemical reactivity, swelling, and flexibility decrease with decreasing 'crystallinity'. Extensive research on crystallinity has been done mainly with pulp or cotton cellulose, to determine the effects on physical and chemical properties. This paper presents the study on the effect of wood ultra-structure that is crystallinity to the quality of paper. Two wood species, Manggis Hutan (*Garcinia cornea* Miq.) and Tampui (*Baccaurea macrocarpa* Miq.), were pulped using the sulphate method (Kraft process). Bursting strength, tearing strength, tensile strength, and folding endurance of each paper were determined according to SNI 14-0493-1989, SNI 14-0436-1989, SNI 14-4737-1989, and SNI 14-0491-1989, respectively. Degree of crystallinity was calculated by using X-Ray Diffractometer (XRD) on a paper form. The results showed that Manggis Hutan, with higher degree of crystallinity (64.4%) had better bursting strength, tensile resistance, and folding endurance, compared to Tampui with the degree of crystallinity 57.4%. Meanwhile, lower degree of crystallinity in Tampui produced higher tearing resistance.

**Keywords:** Degree of crystallinity, bursting strength, tearing strength, tensile strength, folding endurance





## ABSTRACTS

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**BCR-09**

### Optimizing enzymatic hydrolysis of Jabon alkaline pulp

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<sup>2</sup>Research Center for Bio-material, Indonesian Institute of Sciences (LIPI), Indonesia

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**Abstract.** The optimum condition of enzymatic hydrolysis of the jabon wood pulp was determined in the present works. Two methods of ethanol production, i.e. separated hydrolysis and fermentation (SHF) and simultaneous saccharification and fermentation (SSF) were compared. Soda pulping with active alkali of 25% (w/v as NaOH) was used in the pulp preparation. The resulted pulp was then beaten to a freeness of 600, 400 and 200 mL CSF. During enzymatic hydrolysis, Tween 80 surfactant was added. Response surface method according to Box-Behnken design was used to optimize the effect of pulp freeness, enzyme loading, and surfactant concentration on enzymatic hydrolysis. Under optimized condition, reducing sugar yield was eight-fold higher than that of control and up to 24% increase of ethanol yield achieved. SHF process was found a better process than that of SSF in the ethanol production yield. The surfactant addition increased cellulose conversion into bio-ethanol by 27%.

**Keywords:** Bio-ethanol; enzymatic hydrolysis; jabon wood; response surface methodology; tween 80 surfactant





## ABSTRACTS

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**BCR-10**

### **Microbial enzyme for pulping process**

**S Setyahadi\***

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**Abstract.** Chemical technology, where manufacture of a variety of commercial products on large scale have serious effluent and hazardous waste disposal problems. For solving these problems, the technologies or scientist need for safer and environmental friendly technologies has become imminent. This has resulted that scientist attempting to learn from natural process, and therefore a new aspect to microbiology and biotechnology has rapidly begun. Microorganisms perform their myriads of biochemical reactions under ambient conditions with a few or no toxic and hazardous by-products. Pulp and paper industry where the quantities or raw materials processed are huge, as well as the use of hazardous chemicals are also large amount. Xylanase as a bioactive compound as an effective to achieve biobleaching in place of poisonous chlorine compounds conventionally used to achieve pulp brightness of a higher order in the manufacture of high quality paper product.

**Keywords:** Pulp and paper industry, biobleaching, enzyme, xylanase





## ABSTRACTS

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**BCR - 11**

### **Assessment of agricultural wastes as wood substitute fuel for modern biomass cook stove using briquettes and pellets**

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**Abstract.** The purpose of our study is to assess the agricultural wastes as wood substitute fuel for modern biomass stove using briquettes and pellets. With the success of the government converting kerosene to LPG for households, it is estimated that LPG needs will reach 18.1 million tons in 2050. So, to fulfil this, Indonesia must import from other countries, just like fuel oil. As an agricultural country, Indonesia can use biomass fuel from agricultural waste as household fuel. Unfortunately, this potential has not been utilized properly. This is due to policies that have not been very supportive, in addition to the lack of research related to biomass waste for cooking needs in households. As a result, the contribution of biomass as one of the renewable energy sources in the final energy mixture is still very low. For this reason, we try to design modern biomass cook-stoves with specifications of agricultural waste products. As a first step, this study conducted a literature study which was obtained online from scientific papers, reports, case studies, etc., which were related to the utilization of various agricultural waste products as cooking fuel. After that, a comparison was made for each of the agricultural wastes with briquettes and pellets. Based on the comparison table, it is shown that lighter corncobs with briquettes provide more energy than other agricultural wastes. This research will be developed in adjusting design specifications between hi-tech cook stove and biomass fuel. In addition, this stove must also have minimal problems with carbon dioxide emissions.

**Keywords:** Agricultural waste, non-wood biomass, cook stove, briquette, pellet





## **Peatland and Mangrove (PMR)**





## ABSTRACTS

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### PMR - 01

# Litter production and decomposition of mangrove in the northern coast of Aceh Besar district, Aceh province

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**Abstract.** Mangrove ecosystem is a productive ecosystem that provide nutrient to coastal area and its surrounding environments pass through litter production and litter decomposition. Mangrove vegetation plays an important role and supplier of organic matter derived from the leaves, branches, twigs, flowers and fruits. Litter production is an important part in transferring organic material from vegetation into the soil and water. The purposes of this research was to obtain the productivity of mangrove vegetation by analyzing the litter fall and also the factors that affected the mangrove litter, decomposition coefficient, and percentage of litter decomposed in the northern coast of Aceh Besar District, Aceh Province. This research was conducted in Mei to Desember 2018 consisted of 6 stations. Each substation was put of one litter trap. The litter trap method was used to know the mangrove litter production. Litter decomposition focused on *R. mucronata* leaves were studied by using litter bag technique. The litter bags were made of synthetic nylon which had size 20cm x30cm and mesh size was 1x1.25 mm<sup>2</sup>. Senescent leaves were used because they are the majority of leaves on the forest floor and they started to decay. Leaf litter that had been collected were put in the litter bag, then placed on rooting of mangrove to observe the process of decomposition. The initial weight of litter used was 12 g/bag. There were 3 types of mangrove found in study site, litter production of *Rhizophora mucronata* as much as 79.21 g/m<sup>2</sup>/day, *Avicennia marina* as much as 0.70 g/m<sup>2</sup>/day and *Sonneratia albawas* 17.46 g/m<sup>2</sup>/day. Based on the substation influenced by tidal, mangrove litters found in the seaward higher than in the landward, the average litter fall was 52.05 g/m<sup>2</sup>/day and 43.32 g/m<sup>2</sup>/day. Result of mangrove decomposition showed that the percentage of decomposition for the 49<sup>th</sup> day in the seaward substation was 48.58 % and the landward was 41.53 %. Mangrove litter decomposition increased during the time at both substation. The value of the remaining of the leaf litter on the last day for the seaward was 51.42 % and the landward was 58.47 %. Decomposition rate of litter for *Rhizophora mucronata* species classified very quickly where the substation on the seaward was 0.012 (d<sup>-1</sup>) and landward was 0.010 (d<sup>-1</sup>). The half-time took in the leaf litter of mangroves for the landward was 69 days and seaward was 57 days, it was concluded that *R. mucronata* leaves letter decomposed in seaward substation was faster than landward substation and litter fall was more in seaward than landward.

**Keywords:** Aceh province, decomposition, litter production, mangrove productivity, *R. mucronata*





## ABSTRACTS

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### PMR - 02

## Accumulation pattern of Na<sup>+</sup> AND Cl<sup>-</sup> concentration in mycorrhizal plant grown on saline soil

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**Abstract.** Saline soil has a high salt content with pH between 7,3 – 8,5. These conditions contribute decreased of plant growth, yield quality and metabolic disorders related to salt (Na and/or Cl) toxicity. Although the saline soil is potential to be used due to the huge area in Indonesia. The series of experimental studies using randomized completely block design have been conducted to describe the effect of mycorrhizae on the accumulation pattern of Na<sup>+</sup> and Cl<sup>-</sup> in plant grown on saline soil, including the growth parameters and phosphate uptake in two different plant. The data were analyzed statistically by ANOVA continued by LSD. The results showed that mycorrhizae fungi increased significantly the growth parameters and P uptake, but decreased significantly the Na<sup>+</sup> concentration in the shoot. Interestingly the Na<sup>+</sup> concentration in the root were higher than the one in the shoot in both of the tested plants. These finding revealed that mycorrhizal plant were able to screen the toxicity amount of Na<sup>+</sup> that could be passed to the shoot both in tripartite symbiotic plant or non tripartite symbiotic plant. Although the mycorrhizal plant could not decrease the Cl<sup>-</sup> concentrations in the shoot.

**Keywords:** Mycorrhizae, Na<sup>+</sup> and Cl<sup>-</sup> concentration, saline soil





## ABSTRACTS

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**PMR - 03**

### **The dynamics of wetlands in the Karangmumus Sub-Watershed of Samarinda**

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**Abstract.** Karangmumus River is a river that divides the city of Samarinda. The area that has become the Karangmumus river basin has undergone many changes and degradation over time. Degradation due to pressure on the need for space for settlements and various other economic activities which causes a decline in regional functions (land degradation) which causes increased flood potential caused by the inability of the land to quickly intercept water into the soil and cause long periods of inundation, both periodic during the rain or because of the slow decline in the distribution / drainage of water from upstream watersheds to outlets causing the emergence of new wetlands in the Karangmumus Sub-watershed area. To see how flooding can occur due to the occurrence of rain, it is necessary to identify the dynamics of wetlands as an area where falling rainwater can be intercepted. Review of land cover conditions in Karangmumus Sub Watershed by using old satellite image data to delineate which areas have the potential for wetlands and conduct a study of current land cover and calculate the potential of remaining wetlands to obtain how large wetlands which has been degraded The presence of wetlands in the Karangmumus watershed compared to the area of the Karangmumus river can be said to be very minimal. In 1944 the wetlands of the Karangmumus Sub-watershed were in the proportion of 12.08% or an area of 3,860.27 of the Karangmumus Sub-watershed. For 1991 the proportion was 7.36% or an area of 2,351.11ha with area. The potential for wetlands in 2016 occupies a proportion that is not much different from 1991, which is 7.41% or an area of 2,368.48 ha from 31,960.17 ha of Karangmumus Sub-watershed.

**Keywords:** Dynamics of wetlands, Karangmumus sub Watershed





## ABSTRACTS

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**PMR - 04**





## General Forestry (GAF)





## ABSTRACTS

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**GAF - 01**

### **Isolation of agarose from agar and its use as medium for identification of DNA plasmid fractions of *Escherichia coli* by electrophoresis method**

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**Abstract.** Agar is a hydrocolloid compound consist of two galactan polymer, namely agarose and agarpectin. Separation of agarose from agarpectin was designed based on differences in the polarity of the two compounds. A total of 20 gram of agar powder (from *Gracilaria gigas*) were used to isolate agarose using propylene glycol and isopropanol as solvents. Agarose and agarpectin will be dissolved completely by heated properly in propylene glycol at a temperature of 105° C. The polarity of the solvent mixture will be reduced by the addition of isopropanol and by the cooling process at -10 ° C, so that relatively more lipophilic agarose will begin to settle. Precipitate agarose was then separated by centrifugation and filtration process, then dried in a vacuum desiccator. Agarose obtained was evaluated based on its physical and chemical properties using standard measurement methods, including determination of yield, sulfate content, gel strength, gel formation point and gel melting point. *E. coli* plasmid was used as a sample to assess the ability of agarose as an electrophoretic medium. The results showed that the percentage of agarose yield from isolation was 66.05%, a total sulfate content of agarose was 0.13%. The strength of agarose gel was 1000.8 g/cm<sup>2</sup>, and the gel formation point and a melting point of agarose gel were 37° C and 88° C, respectively. This results showed that isolated agarose had fulfilled the physical properties of agarose. Identification of *E. coli* DNA plasmid fractions by 1 % isolated agarose gel showed a separation of DNA fragmentation at >1000 bp molecular size and DNA ladder identification by isolated agarose gel showed a similar result with agarose standard, TopVision®, and isolated agarose has already met the criteria as an electrophoresis medium.

**Keywords:** Agarose, electrophoresis, *Escherichia coli*, isolation, plasmid





## ABSTRACTS

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**GAF - 02**

### **Machine learning based recognition of golden teak leaf**

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**Abstract.** One characteristic of plants is leaf shape. There are several types of leaves, but even though the leaves are the same, the ratio of the length and width of the leaves forms different leaf sizes. Golden teak is a production forest plant where growth is relatively fast. Machine learning is a method in which a computer can recognize objects through learning a series of information given to them. This study uses machine learning to predict the shape of golden teak leaves, compared to other types of teak leaves that are planted in several different places. Identifying variables given are data on the length and width of leaves.

**Keywords:** Golden teak, machine learning, leaf length, leaf width





## ABSTRACTS

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**GAF - 03**

### **Journalism environment on forest fires of Seulawah in Aceh through online news**

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**Abstract.** Online media has raised much attention through the speed of published compare to traditional media. Mass media helps public define themselves by responding through the issues or other environment problem. Journalism environment can be defined as the process of journalism work through the collection, verification, distribution and delivery of the latest information related to various events, trends, and problems of society, which is associated with the non-human world in which humans interact in it. By using Entman framing theory on two popular online media in Aceh; Acehtrend.com and AJNN.net. This study try to explore the form journalist environment which report the environmental issue of Seulawah forest fires recently.

**Keywords:**





## ABSTRACTS

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**GAF - 04**

### **Policy changes in ecotourism governance in national park and others forest conservation**

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**Abstract.** Indonesia had established 298 natural tourist destinations in forest conservation areas across the country, but in 2016, total revenue from those destinations through ticket entrances were only IDR 132.2 billion, equal to 3.4% of total non-tax revenue (PNBP) from forestry sector or 0.05% of total PNBP from national natural resources sector. This study aimed to provide policy recommendations in ecotourist destination governance in forest conservation areas in Indonesia. Research methods used in this study were desk study, focused group discussions, in-depth interview, assessment of 12 tourist destinations in national parks, forest parks, nature parks and hunting parks in Indonesia. Results showed that a sub-ministerial regulation namely, SK Dirjen PHKA No.113/IV-Set/2014 regulating on zone determination in national parks, forest parks, nature parks and hunting parks should be canceled due to: (a) inconsistent to assessment time mechanism based on the article 15 of Ministry of Forestry Decree No. 36/2014, and (b) conducted by un-trained appraisal team. Moreover, zone determination can only be conducted by revising criterion and indicators stated in Ministerial Decree No.P.36/2014 about zone determination procedures. The criteria and indicators were based on mass tourism development concept rather than eco-tourism concept, and they were also ignored the specific interest tourism, which were abundantly available. Those 2 recommendations could lead to more professional tourism governance and potentially increasing revenue by 50%.

**Keywords:** Eco-tourism, national park, conservation areas, criteria and indicators





## ABSTRACTS

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**GAF - 05**

### **Estimation of river capacity through multi-temporal drone imagery**

**Y B Sulistioadi<sup>1,2\*</sup> and A Rahmandana<sup>1</sup>**

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**Abstract.** The measurement of water level is one important effort to ensure the availability of freshwater supply in a river system. Continuous measurement using staff gage or automatic water level recorder (AWLR) poses various problems including manpower, electricity and telemetry system, systematic errors and intensive maintenance of the equipment. The Unmanned Aerial Vehicle (UAV) or widely known as drone has been progressively developed and reached a very competitive price point. Various sensors can also be deployed in the drone system and allows researchers and professionals to acquire multi-spectral orthophotos and many other products in a very effective survey. This research estimates the capacity of a river segment based on drone imagery taken in a segment of small river during the lowest water level and the highest water level in the flood period. The capacity of the river segment is estimated as the volumetric difference between the highest water level during flood period and the lowest water level during dry period. Field measurement of the river bathymetry were used to evaluate the estimation of the river capacity. Preliminary result of this research reveals that it is possible to estimate the river segment capacity from drone imageries from the highest and lowest water level condition with modest accuracy. However, it is very important to carefully define the lowest water level along with the volume since it determines the error of the estimation of the river segment volumetric capacity.

**Keywords:** Bathymetry, drone, UAV, optical, terrain, DTM, remote sensing





## ABSTRACTS

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**GAF - 06**

### **Composition and structure of vegetation species on different age of logged-over forest in PT Karya Lestari, East Kalimantan**

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**Abstract.** This research was conducted in logged-over forests (LOF) in the area of PT Karya Lestari in East Kalimantan, by using the stratification random sampling method which aims to determine the species composition of vegetation after several years of logging. The sample plot was established in the area of 5 years, 3 years and 1 year after logging. The composition changes of species represented from the number of species and dynamics based on growth rate. In each of the different LOF there is an uneven spread of species richness in different clusters of growth, but there is a slight similarity in the final cluster of growth (50 cm up) of almost all species. The similarity index, a pattern of community similarity is uncertain, which reaches more than 50% at the beginning of the cluster and drops to less than 20% stepping over the beginning of the tree then rise down again on the next clusters. Thus the similarity of the vegetation community starting from seedlings, sapling and then trees cluster appear to decrease with the magnitude of the cluster dimension. The results showed that there was change in species composition occurs after logging especially in the final stage of tree (50 cm up) and there is a continuity of horizontal structures.

**Keywords:** Logged-over forest, species composition, species richness





## ABSTRACTS

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**GAF - 07**

### **Overlapping forest ownership between mukim (indigenous peoples) and PT ANI (analysis of sense of place)**

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**Abstract.** This paper attempts to analyze the problem of overlapping land ownership between Mukim (indigenous peoples) and PT Aceh Nusantara Indrapuri (ANI). PT ANI has Industrial Plantation Forest Management Rights (HTI) in the Aceh Besar and Aceh Pidie areas, the presence of PT ANI in the area has caused the loss of customary forests, which in turn creates conflicts between PT ANI and indigenous peoples. Conflicts that occurred as a result of PT ANI's presence included overlapping regulations and determining boundaries. Referring to the customary rules that the Mukim Customary Forest area, as far as a day trip travels or commutes from the village to the forest. While referring to Article 38 of Government Regulation Number 6 of 2007 that "Plants produced from Business Permits for Utilization of Timber Forest Products in Natural Forests (IUPHHK) in HTI are assets of business license holders, and can be used as collateral as long as they are still valid". In addition to border conflicts, the presence of PT ANI was also considered to have caused environmental damage, which was a major flood that occurred in early 2016 in the districts of Aceh Besar and Aceh Pidie. Bajir occurs because of the overflow of rivers in the HTI area of PT. ANI due to flooding caused thousands of people to be displaced by their flooded homes. This study uses the theory of sense of place by Agnew and the method used in this study is a qualitative method with in-depth interviews.

**Keywords:**





## ABSTRACTS

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**GAF - 08**

### **Productivity and cost analysis of felling using *Chainsaw MS 381* in plantation forest**

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**Abstract.** The use of chainsaws for logging activities has been carried out in plantation forests in Indonesia. In meeting the needs of industrial raw materials, fast and efficient logging processes are needed to save time and costs, which in turn will affect logging productivity. The purpose of this study are to measure work time, calculate productivity, and analyze costs incurred, on logging activities in plantation forest. This research was conducted in a plantation forest, with a total sample of 558 trees felled. The cutting method applied is clear cutting, using the Stihl MS 381 chain saw, and the type of tree is *Eucalyptus pellita*. From this study, the results obtained that the average time of logging activities is 0.04 hours/tree, the average pure working time is 0.02 hours/tree, and logging productivity is 7.78 m<sup>3</sup>/hour. While the costs incurred in logging activities are Rp. 42,596/hour and business costs Rp. 5,475/m<sup>3</sup>. It is better to increase work supervision on chainsaw operators, to increase pure work time and reduce inefficient time.

**Keywords:** Cost, felling, plantation forest, productivity, work time





## ABSTRACTS

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**GAF - 09**

### **Data collection methods of training evaluation and green innovation development on forest industries**

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**Abstract.** From psychological perspective, green innovation on forest industries is about how to develop knowledge, skill and attitude related to innovative forest products or processes toward sustainable livelihood. Training is an effective tool for increasing cognitive and behavioral aspects of green innovation development. This paper aims to describe two methods of training evaluation based on behavioral science that increase effectiveness of training. The first is psychometric tool and the second is observation-interviews data collection methods supported by BORIS software. The strengths and limitations of them are discussion. The applications of the two methods and directions of future transdisciplinary research in green innovation are presented.

**Keywords:**





## ABSTRACTS

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**GAF - 10**

### **Identifying logging road as sources of forest degradation in tropical forest using Sentinel-2 satellite image**

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**Abstract.** Forest degradation in tropical forests is often difficult to be identified compare to deforestation. Degradation on forests is defined when forests remains forests but their ability to provide ecosystem services were reduced. Forest degradation can also be identified from ground survey by investigating changes in species composition. Degradation of forest in tropics mainly caused by timber exploitation as well as road construction especially in the logging area. In this study, logging road as source of forest degradation in the cutting block of PT Gunung Gajah Abadi concession were identified using Sentinel-2 satellite image. In order to understand the forest recovery after logging, three different acquisition date of the Sentinel-2 image were selected which is 2015, 2016 and 2017. Laplacian filter that is tool in digital image analysis was used to segregate road and non-road object over the targeted image. Logging road for each year were then analyzed by calculating the total road segment and divided into three categories (main road, branch road and skidding road) as well as road density calculation. In this study, Sentinel-2 image has succeed to identify logging road from timber harvesting in forest concession. Logging road construction is extent to approximately 24.6 km in a year or 256.23 m/ha. However, this number are significantly reduced two years after timber harvesting due to recovery process inside the forest. Approximately 35% of logging road are no longer tracable using Sentinel-2 image. Sentinel-2 image may captured logging road only 15.9 km in 2017 which clearly indicated that forest recovery is quite fast in the last two years. This study may conclude that identification of forest degradation in tropical region using Sentinel-2 image has time constraint although it is effective and relatively low cost. Identification of forest degradation need to be conducted soon after harvesting time ended in order to capture recent activities over targeted areas.

**Keywords:** Forest degradation, logging road, forest recovery, Sentinel-2, Laplacian filter





## ABSTRACTS

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**GAF - 11**

### **Land rehabilitation by using Sengon and Jabon to reduce run off and erosion**

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**Abstract.** Human activities has important role to increase soil erosion as well as to reduce soil erosion by soil and water conservation techniques. One alternative to prevent and overcome erosion can be done by the vegetative method. The aim of this study was to estimate the amount of run off and erosion potential that occurred on land which had been rehabilitated vegetatively. It is expected that the best type of economic and conservation can be obtained, which can reduce the rate of runoff and erosion and improve the physical soil. The study was established on open land in the Education Forest of Forestry Faculty, Mulawarman University, Samarinda, East Kalimantan. Erosion Measuring Plot (EMP) in by different slope classes: EMP I was characterized by slopes of 15- <25% (rather steep) with the age of Jabon  $\pm$  1 year, EMP II has slopes of 15-25% (rather steep) with Jabon  $\pm$  2 years old, EMP III was a slope of 25- <40% (steep) with age  $\pm$  1, and EMP IV was in slopes of 25-40% (steep) with planted jabon  $\pm$  2 years old. The measured hydroorological parameters were rainfall, run off (only water mass measured), potential erosion rate (A), erosion hazard class (EHC), erosion hazard level (EHL) and depth of soil solum. The amount of runoff that measured on land that has been rehabilitated vegetatively by sengon and jabon in the slope class is rather steep at the age of 1 year and 2 years smaller than in land with steep slope classes. The potential erosion that occurred in the area planted with sengon in the slope class is rather steep - steep and jabon in the slope class is rather steep with different plant ages (1 year and 2 years) was less than 15 tons / ha / year. The rehabilitation of land by using sengon and jabon can recommend reducing runoff rates and eroded soil mass.

**Keywords:** Run off, erosion potential, erosion hazard class, erosion hazard level





## ABSTRACTS

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### GAF - 12

## Spatiotemporal rainfall analysis in the eastern region of Kalimantan island

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**Abstract.** Anticipation to climate changes is very important and the important one is to examine changes in spatial rainfall following and time. This study was aimed to assess spatiotemporal rainfall on the eastern region of Kalimantan island. The source of data was originated from 7 rainfall stations namely Nunukan, Tarakan, Tanjung Selor, Tanjung Redeb, Bontang, Samarinda and Balikpapan with the 2000-2015 data period. Analysis for the average annual rainfall was done using the average of 5-years period rainfall combined with isohyet maps. Rainfall type was analyzed by applying criteria of monsoon, equatorial, and local rainfall based on the rainfall curve. The climate index was determined using the Schmidt-Fergusson approach based on the number of wet, humid, and dry months. The results showed that annual rainfall average in the eastern region Kalimantan island was 2,552.4 mm. The largest annual rainfall average was Tarakan (3,927.1 mm) and the lowest was Bontang (1,329.4 mm). During the period of 2000-2015, the 2006-2010 was the period with the largest annual rainfall average except Bontang. The rainfall was dominated by the equator type (Samarinda, Balikpapan, Bontang, Tarakan, Tanjung Selor and Tanjung Redeb) and 1 local type (Nunukan). Based on the comparison of dry months number to wet months, the climate index shows 6 locations characterized by very wet (Samarinda, Balikpapan, Tarakan, Tanjung Selor, Tanjung Redeb and Nunukan) and 1 location was rather wet (Bontang). To make a more clear picture of the climate change indications, this study has limitations of rainfall data series availability due 15 years only of which ideally requires an additional 15-years more data series.

**Keywords:** Climate change, rainfall, type of rainfall, climate index





## **Sustainable Forest Management (SFM)**





## ABSTRACTS

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**SFM - 01**

### **Mined-out forest land rehabilitation and it's ecosystem recovery in East Kalimantan, Indonesia**

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**Abstract.** Coal Mining operation in the forest land causes a significant forest ecosystem disturbance, and therefore ecosystem recovery have to be immediately carried out of mined-out landscaping, soil erosion-sedimentation control, and land revegetation. Both of three aspects were evaluated to assess land reclamation (*backfilling, land preparation, slope stability, topsoils spreading*), soil erosion-sedimentation control (*soil and water concervation infrastructure and it's function, under growth coverage*), and land revegetation (*planted areas, growth percentage, planting area, fast growing and longlife species composition, plant health*). This study was conducted at PT Singlurus Pratama (SGP) mining concession of 184 ha in area. Forest reclamation activities that have taken place well were: voids bacfilling (>90%), planted areas (>90%), soil and water conservation infrastrucutre - cover crops - erosion-sedimentation control (5-10%), topsoil spreading (>90%), fast growing and longlife species composition (>90%), and plant health (>90%). Conversely, reclamation activities that still require improvement were plant growth (80 - 90%) and number of tree plants / ha (<625 trees/ha). Plants species found in the rehabilitated forest land covering 184 ha was classified of fast growing and longlife species. Based on technical guidelines for evaluating forest reclamation, the score of forest reclamation with an area of 183.69 ha was 83.5 (good). Moreover, the score of ecosystem value related with foodweb recovery based on incoming herbivores - predators - carnivores without top carnivores was found 70, indicating the prospective status of forest ecosystem recovery. The prospective status indicates that the processes and stage of forest ecosystem recovery has been on the expected direction of pre-mining exploitation.

**Keywords:** Soil erosion-sedimentation, ecosystem recovery, land reclamation, forest rehabilitation, land revegetation





## ABSTRACTS

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**SFM - 02**

### **$\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotope ratio analysis of fish species and mangrove leaf in mangrove ecosystem of Muara Badak coastal area – East Kalimantan**

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**Abstract.** The ecological structure link between mangrove ecosystem and aquatic food production is of great importance for fisheries management. The objectives of the research to know well about are to (1) determine the stable C and N isotopic compositions of fish species and mangrove leaf use bulk and compound-specific isotopic ratios to determine relative trophic positions for fish species in mangrove ecosystem of Muara Badak coastal area - East Kalimantan. A few of fish species found in mangrove ecosystem was examined on the basis of carbon and nitrogen stable isotope distributions. Result of the study revealed that significant differences in stable isotope signatures (C and N) exist in some species from different habitats in Muara Badak coastal area, which could be used to delineate feeding habitats of fishes. The sparse mangrove area and dense mangrove area do not appear to be direct sources of carbon in the diets of studied fish species; rather, they probably serve as refuge as well as a substratum for a variety of primary producers and consumers that are important in the food webs of these habitats. All fishes showed higher  $\delta^{15}\text{N}$  values suggesting with a higher trophic level. Some fish species of similar feeding guilds showed some degree of segregation by feeding on different food resources. The food web in the mangrove ecosystem of Muara Badak coastal area showed various trophic levels. The fishes were the most enriched in  $\delta^{15}\text{N}$ . Also, clear gradients in both  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  could be observed for different feeding guilds of fishes and for different habitats such as mangrove area and rivermouth of Muara Badak coastal area. Based on analysis of stable isotope ratio (both  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) of fish species showed that the mangrove plan have basically food chain on mangrove ecosystem. Nevertheless, the biodiversity and community structure of mangrove had been decreasing presently in Muara Badak coastal area, it that reason to keep and to save mangroves ecosystem and also promote the sustainable use management of mangrove ecosystem.

**Keywords:**  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  ratio, carbon sources, community structure, fish and mangrove communities, stable isotope signature





## ABSTRACTS

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**SFM - 03**

### **Synergy with nature in an effort to restore long-cycle local tree species on post-mining land**

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**Abstract.** Reclamation and revegetation activities of post-coal mining land in the forest land have been regulated in both of Ministry of Energy and Mineral Resources Regulation and Ministry of Forestry Regulation. Those regulation states that one indicator of the success of reclamation and revegetation is the use of local species. The choice to use local tree species is a priority not only because they are adaptive to the microclimate and soil conditions, but also to maintain genetic integrity and prevent the possibility of invasion from exotic species. In line with the concept of synergy with nature, using local tree species is a prerequisite for plant selection and planting. The selection of local tree species in the concept of synergy with nature is prioritized on fast-growing species and the ability to invite the presence of wild animals such as birds and bats. In addition, other plants that are present through natural succession processes also need to be maintained to accelerate the succession process towards the forest condition. For this reason, the ability to recognize plant species is absolutely necessary. Carefully selection of the plant species to be planted and natural plants to be maintained must be carried out because it can have implications to the failure of revegetation activities. The pioneer species are generally resistant to light and fast growing, but short-cycle. Contrary to the climax species that generally requires shade in the early stages of growth and long-cycle. Efforts to restore long-cycle tree species on post-coal mining land can be carried out by planting adaptive pioneer species, planting cover crops if needed and providing silvicultural action on naturally occurring species. Further enrichment is carried out by planting long-cycle species or species that meet the criteria of 3P + 1M (planet, profit, people, market) or MPTS tree species. A series of field trials on the planting of long-cycle local tree species are still needed, including cultivation techniques. This information is limited, but from the results of research shows that there are several climax tree species that can be planted directly in open land such as post-mining land.

**Keywords:** Local tree species; long-cycle, reclamation and revegetation, post-mining land





## **Silviculture (SC)**





## ABSTRACTS

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**SC - 01**

### **Biochar Application on Spodosols Soils Promotes Higher Plant Growth and Survival Rate**

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**Abstract.** Interests on biochar application for the improvement of soil properties and fertility are increasing worldwide nowadays and numerous of production techniques, raw materials and application options are now available. This research was aimed at the investigation on the effects of biochar application on growth rate (height, stem diameter, leaf number and survival) performance of *Anthocephalus cadamba* seedling planted on degraded Spodosols on bioassay trial in the nursery. Bioassay trial was carried out in nursery of Forestry Faculty of Mulawarman University, Samarinda, Indonesia and was in accordance with Completely Randomized Design (CRD) applying 6 level of treatments, i.e: 0, 2, 5, 10, 25 and 100%v of biochar, and 3 replications. The 100%v biochar treatment was aimed at the investigation on the potential of the application of biochar for main media in raising seedling in the nursery as the replacement of the conventional media. Of those 6 level of treatments, the the 10%v biochar treatment gave best height growth at  $p = 0.05$  and 25%v gave best stem diameter growth but not statistically significant. Even though it was not statistically significant, low level application of biochar (up to 5%v) on spodosols soils improved plant survival. Base on the results of this preliminary on the effect of biochar application on plant growth and survival on spodosols soils, it is concluded that: (1) the application of biochar on such soils might be promising and (2) the development of biochar as main media for raising seedling in nursery might also be beneficial.

**Keywords:** Biochar, spodosols, growth rate, plantation media, *Anthocephalus cadamba*





## ABSTRACTS

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**SC - 02**

### **Assessing ecotoxicological risk of agrochemicals on non target microbial activities in soils**

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**Abstract.** Ecotoxicological risks of agrochemicals such as nitrification inhibitors include NIs, 3,4dimethylpyrazolephosphate (DMPP), 4-Chlor-methylpyrazolephosphate (CIMPP) and dicyandiamide (DCD) on non-target soil microbial processes were determined using three standard methods in three different type of soils. The following parameters were used for general microbial activity such as dehydrogenase activity (DHA) and dimethyl sulfoxide reductase activity (DRA). The potential denitrification capacity (PDC) is a specific microbial process in soils. The determination of DHA was carried out spectrophotometrically, whereas DRA and PDC were determined using gas chromatography. To evaluate the inhibition, dose response curves were presented as no observable effect level (NOEL) and as well as effective dose at ED<sub>10</sub> and ED<sub>50</sub> (10% and 50% inhibition) were calculated. The inhibition in presence of increasing NI concentrations was calculated as NOEL at effective dose ED<sub>10</sub> and ED<sub>50</sub>. Dose response curves showed the inhibition effectiveness, which, was a most distinct in sandy soils. The NOEL for microbial non-target processes were about 30-70 times higher than base concentration in all investigated soils. The PDC revealed to be the most sensitive parameter. Sensitivity to the three NIs decreased in the order of PDC>DRA>DHA. CIMPP exhibited the strongest influence on the non-target microbial processes in soils.

**Keywords:** Dose response, ecotoxicology, agrochemicals, non target microbial activity





## ABSTRACTS

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**SC - 03**

### **Identifying the deforested and degraded forest to formulate appropriate restoration strategy**

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**Abstract.** Tropical deforestation is one of the leading causes of greenhouse gas (GHG) emissions and biodiversity reductions. Identifying the patterns of land cover change within the forested areas is an urgent mission for formulating appropriate forest restoration strategies. This study used the spatial analysis by comparing spatial data of the forested areas designated by the government and land cover map to identify the deforested and degraded forest in East Kalimantan Province, Indonesia and formulate forest restoration strategy. The research findings reported that East Kalimantan has the potential forests of 9.5 million ha where some forested areas (designated by the government) have occurred deforested and degraded, while lands with the highest biodiversity values and ecological significances have been classified as the non-forest areas. Based on the analysis results, this study recommended the strategies for restoring and managing targeted in the large areas of the state and private forests using the landscape-based method stressed the functional ecosystems that might be more effective than traditional method focused on the tree composition and forest structures.

**Keywords:** Deforested, degraded forest, restoration





# POSTER PRESENTATION





## ABSTRACTS

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**P-01**

### **Optimum formula of zein-secang (*Caesalpinia sappan*) nanoparticles as antioxidant and antibacterial agents**

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**Abstract.** Secang (*Caesalpinia sappan*) extracts as antioxidant and antibacterial agent has been reported by previous researchers. In order to increase its activity, secang extracts were synthesized in nano size using zein protein as the carrier. Compositions of secang:zein solution were designed using *Design Experimental 7.0.0* software. Antioxidant activity was tested using 2,2-diphenyl-1-picrylhydrazil protocol while the antibacterial activity against *Propionibacterium acne* was tested using disk method. High antioxidant and antibacterial activities indicated the optimum formula of zein- secang nanoparticles. The result of data processing showed that secang extract with concentration of 100 mg/100 mL, zein with concentration of 150 mg/100 mL and 20 minutes sonication time was the best formula. This formula showed antibacterial inhibition value of 11.50 mm, IC<sub>50</sub> 7.69 µg/mL, 14.33% entrapment efficiency, and particle size of 31.61 nm.

**Keywords:** Antibacterial, antioxidant, zein–secang nanoparticle





## ABSTRACTS

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**P-02**

### **Stable thermoplastic starch bioplastic for packaging application**

**W B Kusumaningrum<sup>1\*</sup>, B A Widyaningrum<sup>1</sup>, D J Pramasari<sup>1</sup>, D Triwibowo<sup>1</sup>, S S Kusumah<sup>1</sup>, N Masruchin<sup>1</sup>, F A Syamani<sup>1</sup>, R Ermawati<sup>2</sup>, G Supeni<sup>2</sup> and A A Cahyaningtyas<sup>2</sup>**

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**Abstract.** Indonesia meets crisis waste management nowadays. As reported that Indonesia is the second place on marine pollution, largely of plastics product, encourage to solve the problems. This condition should not be encountered due to the biodiversity of Indonesia that is possible for making bioplastics from numerous resources. Starch based bioplastic becomes favorable that fills requirements for biodegradable, inexpensive, non-toxic, extraction during service life, and abundantly available starch resources in Indonesia. However, starch based bioplastic faces their low mechanical properties which are brittle, low strength and elongation which become challenging to enhance these properties so could meet industrial processing for plastic bags. Some additives such as polyvinyl alcohol, lubricant, cellulose, and citric acid were applied to enhance strength and elongation of bioplastics. The objective of this research is to obtain optimum formula of thermoplastic starch bioplastic that could meet industrial criteria for molding process. Thermoplastic starch and additive in various compositions were mixed as a solution at 75 °C for 1 h, then cast in 20 x 20 cm molding and dried in room temperature for 3 days. All samples were analyzed for mechanical properties using UTM based on ASTM D882-75b, chemical composition using FTIR, thermal properties using DSC and TGA.

**Keywords:** Starch, polyvinyl alcohol, cellulose, citric acid, mechanical properties





## ABSTRACTS

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**P-03**

### **Antidiabetic activities of ethanolic extracts from leaves, bark and stem of Baraan (*Dracontomelon dao* (Blaco) Merr & Rolfe) against $\alpha$ -glucosidase enzyme**

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**Abstract.** Empirically some traditional medicinal plants have been shown to reduce blood glucose levels. One of them is the Baraan (*Dracontomelon dao*) plant which is believed by Dayak tribe in East Kalimantan as traditional medicine to treat diabetes. Diabetes mellitus is a metabolic disease characterized by an increase in blood glucose levels due to lack of insulin secretion, insulin action, or both. The purpose of this study was to determine the potential of antidiabetic in ethanol extract of leaves, stems and bark of Baraan plants. Determination of total phenolic content was carried out using the folin carbonate method, and the antidiabetic potential was tested using the method of inhibiting the activity of  $\alpha$ -glucosidase enzyme. Acarbose was used as a positive control. The Baraan bark extract revealed the higher total phenolic content of 205.593  $\mu\text{g}$  GAE / mg extract. Inhibition of the  $\alpha$ -glucosidase enzyme in the bark section was 98.81% with an  $\text{IC}_{50}$  value of 676.07 ppm at a concentration of 1000 ppm. While on the leaves extract showed inhibition of 58.27% with  $\text{IC}_{50}$  value of 933.03 ppm. Whereas the stem extract did not show inhibition of the  $\alpha$ -glucosidase enzyme at the same concentration. High content of phenolic compounds in Baraan bark extract plays an important role in inhibiting the  $\alpha$ -glucosidase enzyme. This leads to the Baraan plant bark as a potential natural antidiabetic.

**Keywords:** Antidiabetic, *Dracontomelon dao*, total phenolic





## ABSTRACTS

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**P-04**

### **Bioactivity and phytochemicals of two ferns in East Kalimantan**

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**Abstract.** The ferns included in the division of Pteridophyta are one of the groups of plants that can be found in almost every region in Indonesia. The aim of this study was to analyze the content of secondary metabolites, antimicrobial activity and toxicity two fern species, *Ceratopteris thalictroides* and *Blechnum orientale*. This study included a phytochemical analysis and antimicrobial assay against *Propionibacterium acnes*, *Escherichia coli*, *Streptococcus sobrinus*, and yeast-like fungi, *Candida albicans*. Toxicity of the plant was evaluated with Brine Shrimp Lethality Test using gallic acid as a positive control. The results of the phytochemical showed the appearance of coumarin, tannins, carbohydrates and steroids. The results showed that *Ceratopteris thalictroides* and *Blechnum orientale* have potent inhibitory activities against fungal or bacterial testing at concentration 250 - 125 µg/well. *Ceratopteris thalictroides* displayed moderate toxicity with LC<sub>50</sub> value of 478,091 ppm, while *Blechnum orientale* is classified as non-toxic with a LC<sub>50</sub> value of 1410 ppm.

**Keywords:** Antimicrobial, *Blechnum orientale*, *Ceratopteris thalictroides*, ferns, phytochemical, toxicity





## ABSTRACTS

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**P-05**

### **Bioactivity and phytochemicals of honey from several locations in East Kalimantan**

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**Abstract.** Honey is a natural liquid that generally has a sweet taste produced by honey bees from plant flower extracts (floral nectar) or other parts of plants (extra floral nectar) or insect excretion. Due to its high diversity, there is a problem with quality and purity of the honey. Report on the quality and bioactivities of honey from East Kalimantan are limited. This study aims to examine the antimicrobial activity of honey from East Kalimantan and analyze the characteristics of secondary metabolites. The method used in this study is the Thin Layer Chromatography (TLC) method, phytochemical analysis, moisture content testing, and antimicrobial testing by agar diffusion. All tests are carried out with 3 repetitions. The test results were compared against positive and negative controls in each test to assess bioactivity potential. The results of phytochemical studies showed that honey was found to contain carbohydrate compounds, saponins, steroids and flavonoids. With the highest water content in the sample of Meraang honey and the lowest in Long Ikis honey. However, it did not show any inhibitory activity on antimicrobial testing carried out on the *Candida albicans*, *Propionibacterium acnes*, *Escherichia coli*, *Streptococcus sobrinus* and *Staphylococcus aureus* with concentrations used in testing is 90%, 80%, 70% and 60%.

**Keywords:** Honey, non-wood forest products, bee products, chromatography, phytochemicals





## ABSTRACTS

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**P-06**

### **Phytochemicals and biological activities of *Hyptis capitata* Jacq plants from four growing locations in Indonesia**

**E Suryanti<sup>1</sup>, E T Arung<sup>1</sup>, Supomo<sup>2</sup> and I W Kusuma<sup>1\*</sup>**

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**Abstract.** *Hyptis capitata* is a plant from the Lamiaceae family which is an invasive species. *H. capitata* has been reported to have antioxidant activity in free radicals scavenging mechanism. The purpose of this study was to analyze the potential for antioxidant, antidiabetic, total phenolic and total flavonoid contents from plant extracts of *H. capitata* from several regions. Analysis of secondary metabolites was carried out by the antioxidant test method with TLC bioautography, total phenolic content using the Folin-Ciocalteu method, total flavonoid content with the colorimetric AlCl<sub>3</sub> method, analysis of antidiabetic potential was carried out by testing the inhibitory activity of  $\alpha$ -glucosidase enzymes. The root part of the methanol extract of *H. capitata* from the Tarakan region had the highest total phenol content of 127,654  $\mu$ g GAE/mg extract. Methanol extract of *H. capitata* stem from Tarakan region has the highest total flavonoid content of 132,161  $\mu$ g CE/mg extract. The test results of  $\alpha$ -glucosidase inhibition activity on methanol extract of *H. capitata* from Tarakan, Kutai Kartanegara, Samarinda, and Sukabumi regions showed that the *H. capitata* samples did not have the ability to inhibit the  $\alpha$ -glucosidase enzyme. Based on these results, *H. capitata* has potential to be developed for herbal products if the safety issue can be confirmed.

**Keywords:** *Hyptis capitata*, Total Phenol content, Total Flavonoid content, Antidiabetic





## ABSTRACTS

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**P-07**

### **Antioxidant activity of methanol extract of *Gmelina elliptica* flower from East Kalimantan**

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**Abstract.** *Gmelina elliptica* was used by villager at Talisayan village, East Kalimantan, to treat otorrhea. Researches on biological activities of *G. elliptica* have been done. However researches on biological activities of *G. elliptica* from East Kalimantan have not been conducted. This research was carried out to analyze 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity of crude methanol extract of *G. elliptica* flowers (CMGEF). The flowers were obtained in Talisayan subdistrict, Berau district, East Kalimantan province, Indonesia. The DPPH radical scavenging activity of CMGEF reached 90% at the concentration of 0.0050 mg/ml. Thus the flower of *G. elliptica* from East Kalimantan is potential as antioxidant sources.

**Keywords:** *Gmelina elliptica*, Flower, DPPH, Antioxidant





## ABSTRACTS

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**P-08**

### **A new compound (8,9)-furanyl-pterocarpan-3-ol used for standardization of Bengkoang extract as sunscreen and skin whitening agent**

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**Abstract.** Bengkoang (*Pachyrhizus erosus*) has been traditionally used as sun screening and skin whitening. The active compounds in bengkoang extract already published included their activities in antioxidant and skin whitening. However, standardization of bengkoang extract has not been studied. This research aims to find out the analysis procedure by High Performance Liquid Chromatography to make standardization bengkoang extract. The first step of this research was collecting bengkoang from Prembun, Central Java, Indonesia in dry season. After cleaning and peeling, bengkoang root was sliced, dried and ground to make powder. Then followed by extraction using Soxhlet in petroleum ether and subsequently in methanol. Methanol extract was evaporated and then partitioned with ethyl acetate - water. Ethyl acetate fraction was evaporated and then separated in open column chromatography using silica gel as stationary phase and a gradient mixture of chloroform-ethyl acetate-methanol as mobile phase. Bio guided fraction method was used for separation and purification to get isolated compounds. The isolated compounds obtained from this fractionation were then elucidated and analyzed their activities. A new compound (8,9-furanyl-pterocarpan-ol) has been selected as a biomarker for extract standardization. The optimum of HPLC condition for standardization consisted of a column (Zorbax SB-C18; i.d. 0.46 cm; 5  $\mu$ m particle size), mobile phase (gradient elution of MeOH-water) with flow rate of 1 ml/min and detector (UV-detector at 293 nm). The obtained LOD value was  $0.51 \pm 0.02$   $\mu$ g. The potentials of this compound to absorb UV ray, antioxidant and anti-tyrosinase were 4.018 mAU\*S/mml;  $2.113 \pm 0.001$  mM (SC<sub>50</sub>);  $7.19 \pm 0.11$  mM (IC<sub>50</sub>), respectively.

**Keywords:** Bengkoang extract, (8,9)-furanyl-pterocarpan-3-ol, standardization, sunscreen, skin whitening





## ABSTRACTS

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**P-09**

### **In vivo antimalarial activity of ethanolic and aqueous extracts of *Strychnos ligustrina* wood against *Plasmodium berghei* in mice**

**W Syafii<sup>1\*</sup>, R K Sari<sup>1</sup>, U Cahyaningsih<sup>2</sup> and SSa'diyah<sup>2</sup>**

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**Abstract.** *Strychnos ligustrina* wood (S) used traditionally as antimalarial drug and showed in vitro antimalarial activity. The aim of this study was to evaluate the in vivo antimalarial activity of ethanolic and aqueous extracts of S in mice. The each sample was extracted by maceration using 75% ethanol (75E), 50% ethanol (50E), 25% ethanol (25E), and aquadest (A). Based on acute toxicity test, three doses were used for all extracts (200, 400, and 800 mg/kg/day). Each mouse used in the experiment was inoculated intraperitoneally with 0.2 ml of  $1 \times 10^7$  *Plasmodium berghei* infected red blood cells. After parasite inoculation, the mice were randomly assigned into five groups (three treatment groups and two controls). The doses were administered orally at a volume of 10 ml/kg. The mice were treated after three hours of infection and continued for three days. Weight, rectal temperature, and packed cell volume (PCV) were recorded just before infection and on day four postinfection. On day four, a thin blood film was prepared from the tail blood of each mouse. Blood films were examined microscopically to determine parasitemia and parasite suppression.

**Keywords:** Aqueous extract, ethanolic extract, in vivo antimalarial activity, *Strychnos ligustrin*





## ABSTRACTS

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**P-10**

### **Antioxidant, photoprotective, and physicochemical properties of antiaging cream formula containing phytosomal extract of *Daemonorops draco* resin and *Centella asiatica* leaves**

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**Abstract.** The aim of this study was to determine the antioxidant, photoprotective, and physicochemical properties of the antiaging cream formulas containing the phytosomal extract of *Daemonorops draco* resin (D) and *Centella asiatica* leaves (C). The D and C were extracted using 100% ethanol. Phytosome formulations were made with the ratio of extract and lecithin soya was 1:1. The antioxidant and photoprotective activities of the extracts and its phytosome were evaluated using in vitro assays with DPPH methods and sun protection factor (SPF). The best extracts and phytosomes were formulated in the antiaging creams with the combination ratio of D and C were F1 (1:0), F2 (1:1), F3 (2:1), F4 (1:2), F5 (0:1). The cream formulas were evaluated the antioxidant and photoprotective activities and physicochemical properties. The result showed that the D and C extracts have antioxidant value of  $107.9 \pm 1.5$  and  $36.3 \pm 1.5$   $\mu\text{mol trolox/g}$  and SPF value of  $17.1 \pm 1.2$  and  $14.8 \pm 0.4$ . Phytosomization of the extracts increased antioxidant activity, but decreased photoprotective. The D and C phytosome extracts have antioxidant value of  $277.4 \pm 0.1$  and  $81.7 \pm 0.1$   $\mu\text{mol trolox/g}$  and SPF value of  $16.1 \pm 0.1$  and  $16.4 \pm 0.1$ .

**Keywords:** Antiaging cream, antioxidant, *Centella asiatica*, *Daemonorops draco*, photoprotective





## ABSTRACTS

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**P-11**

### **Surface roughness and mechanical properties of particleboard made from alang-alang and sorghum stalks**

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**Abstract.** Indonesia has numerous sources of lignocellulosic materials that can be applied to produce composite panel. The research was conducted to investigate several applied properties of experimental particleboard made from alang-alang and sorghum stalks, as potential substitute for particleboard's raw material. Flexural strength includes modulus of rupture (MOR) and modulus of elasticity (MOE) was evaluated. Internal bond strength (IB) and thickness swelling (TS) also observed in this research. In addition, surface roughness (Ra) and mean peak-to-valley (Rz) were applied to determine the quality of particleboard's surface roughness. One-layer particleboard were made with dimension 30 x 30 x 1 cm and targeted density 0.8 g/cm<sup>3</sup>. Adhesive used in the research were urea formaldehyde (UF) and phenol formaldehyde 10% based on particle dry weight. Variable factors were ratio of alang-alang and sorghum, and the adhesive type. Result shows that particle board made from 100% sorghum with UF adhesive perform superior properties.

**Keywords:** Particleboard, alang-alang, sorghum stalks, surface roughness





## ABSTRACTS

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**P12**

### **Characteristics and potential utilization of Yopo wood (*Piptadenia peregrina* Benth.)**

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**Abstract.** The increasing of forest degradation and deforestation in Indonesia has inspired the use of lesser-known wood species. Yopo wood (*Piptadenia peregrina* Benth.) is one of lesser-known species with an MAI of 2.77 cm/year. The purpose of this research was to study the characteristics of wood: physical and mechanical properties; anatomical features; and chemical components of Yopo wood. The materials were obtained from the Purwodadi Botanical Garden in Pasuruan (East Java). The specimens used were the branch of Yopo wood (= 10 cm). The results showed that according to the physical-mechanical properties and chemical components, Yopo wood could be categorized into the strength class III-II; this wood was potential to be used for construction material, furniture, and as raw material for bioethanol production.

**Keywords:** Lesser-known wood species, characteristics, potential utilization, yopo wood





## ABSTRACTS

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**P-13**

### **Mold staining phenomenon on rubber sheet: comparison between commercial formic acid reagent and wood vinegar as latex coagulant**

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**Abstract.** Currently, commercial formic acid and wood vinegar were used on coagulation of latex in daily practices. Both of coagulants were showed good respond on conversion of liquid rubber (latex) to form rubber sheet. However, in the low concentration of coagulants used and high water contain, rubber sheet was easily stained by mold. Herein this paper, mold staining on rubber sheet that produced using both of chemical and natural coagulants (wood vinegar) were studied to point out the effects of itsconcentration on rubber sheet quality. Concentration of wood vinegar and formic acidapplied were 2, 4 and 6% (v/v), respectively. The mold were stained all of rubber sheetcoagulated by wood vinegar in concentration 2, 4, and 6% (v/v) and formic acid in concentration 2 and 4% (v/v). In contrast, the rubber sheet produced from formic acid in concentration 6% (v/v) wasn't stained by the mold. We analyzed that the low concentration just coagulated the latex but couldn't prevent the mold staining.

**Keywords:** Concentration, formic acid, mold, rubber sheet, wood vinegar





## ABSTRACTS

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**P-14**

### **Physical and mechanical properties of wood plastic composites from Mahang wood (*Macaranga gigantea* Muell.Arg.) based on variation of heat press time**

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**Abstract.** The purpose of this study was to utilize Mahang wood (*Macaranga gigantea* Muell.Arg.) and waste of plastics packing cup of mineral water as raw material for wood plastic composites and to determine the effect of heat press time on the physical and mechanical properties of the plastic-wood composite produced. The variation of heat press time used is 15 minutes, 20 minutes and 25 minutes, with a hot press temperature of 170 °C and a pressure of 20 bar, while the ratio of plastic and Mahang wood particles used is 50:50. Testing the physical properties of wood plastic composites including density, moisture content, water absorption and thickness swelling. While testing the mechanical properties include modulus of elasticity (MoE), modulus of rupture (MoR), and internal bonding strength (IBS). The test results show that the longer the pressing time used will improve the physical and mechanical properties of the wood plastic composites produced. The highest physical and mechanical properties of wood plastic composites resulted from the press time of 25 minutes with an average density of 0.5 g/cm<sup>3</sup>, a moisture content of 6.53%, water absorption of 51.09%, thickness swelling of 10.85%, MoE of 2,220.10 N/mm<sup>2</sup>, MoR 23.13 N/mm<sup>2</sup> and IBS 0.30 N/mm<sup>2</sup>. In general, the physical and mechanical properties of wood plastic composites produced for all heat press time treatments were a suitable according to the JIS A 5908 (1994) standards.

**Keywords:** Mahang wood, waste plastic packing cup of mineral water, heat press time, wood plastic composite





## ABSTRACTS

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**P-15**

### **The properties of cement bonded particleboard from Ketapang (*Terminalia cattapa* Linn.) based on drying time of board**

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**Abstract.** The aim of this research to know the effect of drying time of board on the physical and mechanical properties of cement bonded particleboard from ketapang. The testing encompassed density, moisture content, thickness swelling, static bending strength (Moe and MoR). Completely randomized design and ten replications was used to analyze data and further testing with LSD test. In addition to supporting data, hydration temperature was also tested with Sandermann method. The drying time of board treatment were 14 days, 21 days and 28 days. Result of testing hydration temperature indicated that the treatment was in a good classification. Statistically, the drying time of board showed non significantly and very significantly difference to the physical and mechanical properties. In general, all of average value of properties of cement bonded particleboard had completed the standard (ISO 8335/1987, BS 5569/1989)

**Keywords:** Cement board, drying time of board, physical and mechanical properties, Ketapang





## ABSTRACTS

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**P-16**

### **An evaluation of a new function of a tropical plants species, *Vernonia amigdalina* as ethanol feed stock: a preliminary study**

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**Abstract.** Biomass such as straw, wood and waste is by far the largest source of renewable energy in many countries, including Indonesia. In term of this, many tropical trees and shrubs plant species were known as potential biomass for that purposes. However, only few information related with the fuction of shrub plant species such as *Vernonia amigdalina* asenergyand bioriefineryfeedstocks are available. Most of information were discover the functions of *V. amigdalina* as herbal medicine and cosmetic. Therefore, herein this paper potential saccharified sugar and ethanol production of *V. amigdalina* pretreated with various concentrations of alkaline were evaluated. The results showed that the pretreatment using 2% of NaOH for 30 minutes produced the highest potential reducing sugar to reach 31.76%. Even the theoritical ethanol yield still low but the results gave an alternative way to fully utilized of *V. amigdalina* to produced herbal medicine, cosmetic and also ethanol in the near future.

**Keywords:** Alkaline pretreatment, bioethanol, saccharification, *V. amigdalina*





## ABSTRACTS

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**P-17**

### **Alkaline pretreatment of tropical short rotation coppice species, *Bauhinia purpurea*: a preliminary study**

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**Abstract.** *Bauhinia purpurea* L. is a tropical *Short Rotation Coppice* (SRC) plant species which is known growth very fast with the repetitive growth cycle and high production of biomass. The high production of biomass is appropriate to be used for biorefinery production, including ethanol. Here in this paper, suitability of *B. purpurea* woody biomass to be used as biorefinery feedstock, particularly ethanol was evaluated using alkaline pretreatment process. Pretreatment was done using 1-3% of alkaline (NaOH) for 15-45 min in autoclave (121°C). The results showed that the highest reducing sugar and theoretical ethanol was obtained at concentration of 2% of NaOH for 30 min to reach 41.38% of saccharified sugar. In general, we found alkaline pretreatment was effective to increased delignification and saccharification of woody biomass to produced high yield of saccharified sugar.

**Keywords:** Alkaline, *Bauhinia purpurea*, ethanol, *Short rotation coppice* (SRC)





## ABSTRACTS

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P-18

### Comparasion of growth and antioxidant properties of wild and domesticated a tropical fungi, *Xylaria hypoxylon*

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**Abstract.** Recently, the need for new and useful compounds to provide assistance and relief in all aspects of the human condition is ever growing, including from fungi. In fungi, besides the composition rich in high in fiber, quality protein, vitamins and minerals, there are biologically active compounds such as: polysaccharides and phenolic compounds, which are involved in antitumor, antiviral, immunomodulatory, hypoglycemia, cholesterol lowering, antioxidant, anti-inflammatory and antimicrobial activities. Fungi of the genus *Xylaria* are known to be a rich source of secondary metabolites, among them are succinic acid derivatives, cytochalasins, and the more common melleins. Therefore, herein this paper, a tropical fungi *Xylaria hypoxylon* was studied to point out their growth ability and antioxidant properties. Enhanced growth and antioxidant properties of domesticated *X. hypoxylon* was also discussed.

**Keywords:** Antioxidant, domesticated, fungi, growth, *Xylaria hypoxylon*





## ABSTRACTS

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**P-19**

### **Implementation of Kirinyu (*Chromolaena odorata* L.) leaf extract and Lemongrass (*Andropogon citratus*) stem extract to the intensity of pest insect on mustard Pakcoy (*Brassica rapa* L.) as practice materials for entomology course**

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**Abstract.** Indonesia is a country has various potentials in developing natural resources. In its development, one sector that is being developed is in agriculture. One of the plants being developed is mustard pakcoy. But there are still many problems that are experienced in cultivators, one of which is pests. To overcome these pests, various methods are used, one of which is using pesticides. But new problems arise from the use of pesticides. The pesticides used are synthetic pesticides which produce various side effects that are dangerous. The impact felt by environment and humans. Kirinyuh leaves and lemongrass stems contain elements that can reduce the intensity of pest insects so they can be used as natural pesticides. This study aims to determine the chemical content and produce kirinyu leaf extract (*Chromolaena odorata*) and lemongrass stems (*Andropogon citratus*) with laboratory-standard quality to see their effects on the intensity of pest insects on mustard pakcoy (*Brassica rapa* L.) and the results of the research are used as a practice materials in Entomology course chapter on pests and plant diseases. The research sample was taken in Samarinda and Kutai Kartanegara. Where this material is tested by phytochemical tests and compressed contents are alkaloids, saponins, flavonoids, tannins, steroids, and essential oils. This research method uses an experimental approach with 5 treatments and 5 repetitions. Data analysis technique used Analysis of Variance (ANOVA) one track with a significance level of 5% to determine the effect of treatment and if there is a difference then proceed with the LSD test of 5%. The results of the analysis can be obtained that the treatment of T4 (60 ml extract + 40 ml water + 5 grams of detergent) has a significant effect and gives the highest effect in suppressing the intensity of pest insect with a value of 16.91. These results will be used as materials for the preparation of practice courses Entomology chapter Pests and Plant Diseases

**Keywords:** Kirinyu leaves, Lemongrass stems, natural pesticides, practicum guides





## ABSTRACTS

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**P-20**

### **Effect of simultaneous saccharification and fermentation (SSF) time on ethanol production from spent medium of Oyster mushroom (*Pleurotus ostreatus*)**

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**Abstract.** Bioethanol is considered as the most promising prospective renewable energy source. One of the most potential lignocellulose material for bioethanol feedstock is spent media (SM) of edible mushroom. *Pleurotus ostreatus* is more selective to degrade lignin than holocellulose component, therefore the SM is very compatible as a bioethanol feedstock. This study was observed the influence of variation of cultivation time of oyster mushroom (*P. ostreatus*) into the SM chemical content and its ethanol production yield by using simultaneous saccharification and fermentation method. The results showed that the difference of cultivation time did not show the significant result on SM chemical content, except the hot water soluble extractive content. The highest hot water soluble extractive content was found in SM with 110 days of cultivation time (27.68%). The highest hydrolysis rate was found at 90 days of cultivation time (15.65%) and 48 and 72 hours saccharification time (14.77% and 14.78%). The highest reducing sugar content was found at 110 days of cultivation time (4.89 g/L). The highest ethanol content was found in SM with a combination of 90 days cultivation time and 48 hours saccharification time (1.696 g/L). The 90 days cultivation time was enough to produce SM that can be used as raw material for bio-ethanol production.

**Keywords:** Bioethanol, *Pleurotus ostretus*, hydrolysis rate, reducing sugar, spent media





## ABSTRACTS

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**P-21**

### **Morphological, physical, chemical and mineralogical characteristics of dystrostepts soil with natural and plantation forests**

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**Abstract.** In general, forest land has a low fertility potential. The conversion of natural forest into plantation forest using fast growing species with similar age and composition will accelerate the decline of its soil fertility. Tree species are one of the factors influencing the amount of nutrient accumulation in forest stand biomass as well as its stand age. Nutrients immobilized in vegetation tend to increase along with the stands maturity and therefore the development of plantations might reduce the soil quality. The study aims to evaluate and compare soil characteristics between plantation forest with fast growing species and natural forest. The study was carried out in Borisallo Forest Block, Gowa, South Sulawesi on forest stand plantation of mangium, sengon, and leda of 17 years of age and on natural forest at Dystrustepts soil. The collected data were analysed descriptively. The study indicates that soil structure and consistency under natural stands are better than those of plantation forest. However, bulk density of natural forest is high and similar between those two types of forest. Chemical characteristics of soil on leda stand is better than that of the natural forest and the best of all other stands. Only the N content which is higher in the natural stand than in any other stands in the plantation forest. The nutrient content of P, Ca, and Mg are higher in leda, whereas mangium has the highest content of K. Sengon has the least content of all observed nutrients. Orthoclase, Sanidin, Muscovite and Biotit that sources of K mineral whereas Hiperstein, Augit, Hornblende, Biotit that sources of Ca and Mg mineral. Besides that, Labradorit was also found as a source of Mg. The exception of Sanidin, the concentration of these minerals is so low that it is difficult to believe that it is a supplier of nutrients. Almost all nutrients for both types of forest are sourced from organic matter.

**Keywords:** Soil characteristics, dystrostepts, natural forests, plantation forests.





## ABSTRACTS

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P-22

### Premium charcoal production using Shorea and non-Shorea woody waste biomass: a preliminary study

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**Abstract.** Currently, the large volume of waste produced by the wood processing and agricultural industries remains a problem that exists in almost all of region of Indonesia including in East Kalimantan. The huge amounts of waste are available from the timber industry, and the processing of wood to produce plywood, furniture, and other products. On the other hands, the increasing use of premium charcoal and activated carbon in diverse applications is one of the major trends influencing the growth of the global charcoal market. Here in this paper, Shorea and non-Shorea woody waste biomass were studied to point out their suitability to be used as premium (high quality) charcoal feedstock. The initial stage of the research is to make charcoal from woody waste biomass using pyrolysis system. The physico-chemical properties and elemental composition of premium charcoal produced were determined according to the method of American Standart for Testing and Material (ASTM). The results showed that the water content, ash and volatile matter of the premium charcoal sample had a low value and fit with premium quality of charcoal. In addition, the density, fixed carbon and calorific value had a higher value compared to ordinary charcoal. All parameters tested from both Shorea and non-Shorea woody waste biomass meet to the premium charcoal quality standards. Shorea laevis was achieved the highest calorific value of 7658 Kcal kg<sup>-1</sup>, followed by *S. gibbosa* 7428 Kcal kg<sup>-1</sup>, *S. leprosula* 7151 Kcal kg<sup>-1</sup>, respectively. In addition, non-Shorea woody biomass, *Vitex pinnata* reached 7097 Kcal kg<sup>-1</sup>. The quality of premium charcoal produced by Shorea and non-Shorea woody waste biomass showed that all parameters have a high value so that it has the potential to be used as premium charcoal.

**Keyword:** Calorific value, premium charcoal, shorea, woody waste biomass





## ABSTRACTS

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**P-23**

### **Observation of Sumatran Orangutan (*Pongo abelii*) nesting preferences in the Ketambe research station with the Leuser Conservation Forum (FKL), Southeast Aceh**

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**Abstract.** Gunung Leuser National Park has a research area of 450 ha that is known as the Ketambe Research Station, where the research area is managed by the Leuser Conservation Forum (FKL) and the Gunung Leuser National Park Center (BBTNGL). Ketambe Research Station has a potential habitat for rare and endangered animals and plants. Orangutans are endemic to the islands of Sumatra and Kalimantan. Orangutan populations are declining and in the brink of extinction due to habitat destruction such as disturbance to forested areas through land conversion intended for the development of cultivated plants (oil palm, etc), illegal logging, and poaching. International Union for Conservation of Nature (IUCN) includes Sumatran Orangutan as a critically endangered species category. The purpose of this observation is 1) To know the type of tree that is used as a nesting place; 2) To know the characteristics of nest tree. The method used in this observation is a direct field survey and analysis of field data. Tree species that has the most orangutan nests is the Entap tree (*Parashorea lucida*) and most found nests at an altitude of 15 m with the position of the most nest are the position III, which is located in the top of a tree with class or type B (with leaves that have changed color or withered).

**Keywords:** Sumatran Orangutan, entap, tree nest, nest characteristic



## ABSTRACTS

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**P-24**

### **Characteristic of Bintangur (*Calophyllum pulcherrimum*) treatment as alternative for made “Jalur” for sustainability pacu jalur culture with infuse method**

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**Abstract.** The Pacu Jalur is culture of Kuantan Singingi District tradition in Riau Province. Jalur is made from a tree with minimal diameter 100 cm and minimal height 20 m without nail connection. People are using a species wood from family Dipterocarpaceae until today. Specification of wood is rare, so need to find a alternative wood for made a Jalur, Bintangur is the one. The Bintangur wood's had durability class, 2-5 years life time, then it needs preserved. The preserved wood application is never do before with a life tree. The Infuse technic is one ways preserving life trees with 100 m up diameter and length. The research is proving that the preserved woods can application for life tree. The Durability of Bintangurs are using infuse method with 20% concentrate Borax ( $\text{Na}_2\text{B}_4\text{O}_7$ ) and Borix ( $\text{H}_3\text{BO}_3$ ) with 3 : 2 comparative. The result of study is proving that the preservative can mobile to the first branch of tree. Bintangur is absorbing 32 liter the preserved, 0,533 liter a day. The result of research are 6,15 mg/Kg Boron in tree base, 2,20 mg/Kg middle tree, 0,80 mg/Kg post tree. The conclusion of research is infuse method useable as alternative preserved.

**Keywords:** Jalur, bintangur, preserved, infuse



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