

PROGRAM BOOK

# ICSEB

## INTERNATIONAL CONFERENCE ON SUSTAINABLE BIOMASS 2019

“Bioenergy for Rural Development”

OCTOBER 15<sup>th</sup> - 17<sup>th</sup>, 2019

EMERSIA HOTEL & RESORT, BANDAR LAMPUNG - INDONESIA



# **PROGRAM & ABSTRACT BOOK**

**1<sup>st</sup> ICSB 2019**

---

**THE 1<sup>st</sup> INTERNATIONAL CONFERENCE ON SUSTAINABLE  
BIOMASS (ICSB) 2019**

---

**EMERSIA HOTEL & RESORT  
BANDAR LAMPUNG, LAMPUNG, INDONESIA  
OCTOBER 15<sup>th</sup> -17<sup>th</sup>, 2019**

# **PROGRAM & ABSTRACT BOOK**

## **1<sup>st</sup> ICSB 2019**

**Editor:**

Darmansyah

Lathifa Indraningtyas

Wahyu Hidayat

Dewi Agustina Iryani

Ardian Ulvan

*The committees have been trying to check the typos and the contents of this program and abstract book before going to the book printing process. If there were still errors and omissions, then the committee will fix it in the digital version of this book which is stored on the website of the 1<sup>st</sup> ICSB 2019 event.*

*Doc. Version: 05 | Date : 10/10/2019*



## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

### Welcoming Remarks by Rector of Universitas Lampung



On behalf of Universitas Lampung, I am greatly honored and pleased to welcome you all to the first International Conference on Sustainable Biomass or 1<sup>st</sup> ICSB 2019 in Bandar Lampung. I am delighted to have been invited to give the welcoming remarks for ICSB 2019.

It has been well known that Indonesia is the agricultural nation. Lampung, in particular, is one province in Indonesia as the place of many variety of plantations and produce many agroindustry products. To be mentioned that Lampung is the number one producer of Cassava and its derivative products, number one producer of Pineapple, Bananas, and others, including Coffee, Cacao, Palm as well as Rice. It means, we here have plenty of biomass resources which are potential as a green and renewable energy resources.

In the last several years major discussions are taking place regarding the relationships among energy, economic growth and security, the environment, and national food security. A critically important part of these discussions is the intersection of food resilience, energy security, environmental quality, and economic health. Integrated production, management, harvesting, and conversion of woody and agroindustry biomass to efficiently produce energy and replace a significant portion of fossil fuels are fundamental to optimizing this balance. Our nation's forests, farms and plantations are a strategic asset in this arena. Obviously, the involvement of education and research in university and other research institutes, as well as the cooperation with the industries and other stakeholders are the key point for the balance.

This conference, which I believe, provides the opportunity for sharing the most recent findings related to the sustainable biomass, especially the bioenergy for rural development, which is become the main theme of this inaugural event. It will be highlight researches, all best practices, and lessons learnt in managing and processing the biomass, which might be adopted in the biomass processing policy and action.

The 1<sup>st</sup> ICSB 2019 is organized by Universitas Lampung (Unila), in cooperation with Universitas Gadjah Mada (UGM), and University of Borås, Sweden. Thanks to the all-conference committee. I would like to extend our gratitude to you all the speakers and attendants in this 1<sup>st</sup> ICSB 2019, as you are our distinguished guests. I would also like to extend our great gratitude, especially to all of our keynote speakers and invited speakers.

Welcome to the 1<sup>st</sup> ICSB 2019. Welcome to Bandar Lampung.

**Prof. Dr. Ir. Hasriadi Mat Akin, M.P.**  
Rector of Universitas Lampung



## **Message from the Head of Research and Development Center for Tropical Biomass of Universitas Lampung**



Welcome to all participants of International Conference on Sustainable Biomass 2019.

Research and Development Center for Tropical Biomass is one of center under Institute for Research and Community Services, University of Lampung. This center was developed to support some agroindustries and communities to increase their productivity and sustainability. Reduce, reuse, recycle, and recovery of several biomass waste from agroindustries and agricultural activities to produce bioenergy and biomaterials are our main target. It's important to increase the total productivity of natural resources utilization.

Biomass based industries development is important to support new job opportunities, economic growth in villages and remote area, and also to increase the total productivities of utilization of agricultural products resources. It is related with the commitment of Indonesia government to accelerate economic development in villages and remote area. Research and Development Center for Tropical Biomass University of Lampung was developed to give some solution on biomass waste treatment and utilization technologies and support biomass based industries and green agroindustries.

Hopefully, all you are enjoy in Lampung and we are very much welcome to make collaboration with other parties to develop sustainable biomass based refinery industries.

Bandar Lampung, October 14<sup>th</sup> 2019

**Research and Development Center for Tropical Biomass,  
University of Lampung  
Head,**

**Prof. Dr. Udin Hasanudin**



## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

### Chairman of Organizing Committee



It is a great pleasure to welcome you to the 1st International Conference on Sustainable Biomass (ICSB) 2019 at Emersia Hotel and Resort, Bandar Lampung, the capital city of Lampung Province, the land of Sai Bumi Ruwa Jurai.

Many encouragement and progress on the biomass processing, to increase the efficiency, productivity, and sustainability in both agroindustries and communities, however we are still facing a huge global problem today, on how balancing the energy security, food resilience, environmental quality, and economic health.

In this first event, there are more than 50 scientific papers will be presented in ICSB 2019 related to 5 scientific tracks: energy security and sustainability; bioenergy and biofuel; energy efficiency; energy conversion green power technology, and environment; advanced material for energy storage, generation, and transmission.

The conference is initiated by Research and Development Centre for Tropical Biomass of Unila, in cooperation with Universitas Gadjah Mada (UGM), and University of Borås, Sweden. It is also supported by the Swedish Research Council Sweden, BDPD Kelapa Sawit Indonesia, and Cenergi SEA, Malaysia. The conference will bring together leading researchers, scientists, engineers, policy makers, and other professionals in various disciplines of biomass, bioenergy, and environments around the world.

Besides the keynotes and parallel sessions, there is also the Memorandum of Understanding (MoU) signing between Unila and Cenergi SAE, and a special workshop on Green Technology Partnership Initiative which is involved Unila, Korean Institute of Energy Research (KIER), Green Technology Center Korea, Government of Lampung, and domestic agroindustries. The event will last with the field trip to Great Giant Food Company to visit their premises in production facilities, and biomass waste processing facility.

We do hope you still extend your stay by discovering Bandar Lampung and Lampung, the treasure of Sumatra.

We welcome you to an inspiring, valuable, and enjoyable program.

Bandar Lampung, October 14<sup>th</sup> 2019

**Committee Chairman**

**Dr.-ing. Ardian Ulvan**



## **Committee**

### **Advisory Board:**

**Prof. Dr. Ir. Hasriadi Mat Akin** – *Rector of Universitas Lampung*

**H.E. Marina Berg** – *Ambassador of Sweden to Indonesia*

**Prof. Ir. Panut Mulyono, M.Eng, D.Eng** – *Rector of Universitas Gadjah Mada*

### **Steering Committee:**

**Prof. Bujang Rahman** – *Vice Rector for Academic Affairs, Universitas Lampung, Indonesia*

**Dr. Warsono** – *Director of LPPM, University of Lampung, Indonesia*

**Prof. Mohammed Taherzadeh** – *The University of Borås, Sweden*

**Prof. Dr. Eng. Udin Hasanudin** – *Universitas Lampung, Indonesia*

**Dr. Ria Millati** – *Universitas Gadjah Mada, Indonesia*

### **Organizing Committee:**

**Dr.-ing. Ardian Ulvan** – *Chair*

**Dr. Eng. Dewi Agustina Iryani** – *Secretary*

**Dr.-ing. Melvi** – *Treasurer*

**Novri Tanti, S.T., M.T.** – *Logistics and Appurtenances*

**Dr. Amrul** – *Publication*

**Dr. Sugeng Triyono** – *Social Event and Excursion*

**Lathifa Indraningtyas, S.T.P., M.Sc.** – *Public Relation*

**Darmansyah, S.T., M.T.,** – *Administration and Circulation*

**Muhammad Haviz, S.T., M.T.** – *Administration and Circulation*

### **Technical Program Committee:**

**Dr. Wahyu Hidayat** – *Chair*

**Dr. Marelli Talambanua** – *Co-chair*

### **TPC Members:**

**Anna Brunerová** – *Czech University of Life Sciences, Czech Republic*

**Seung Hwan Lee** – *Kangwon National University, South Korea*

**Nam Hun Kim** – *Kangwon National University, South Korea*

**Agus Haryanto** – *Universitas Lampung, Indonesia*



## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

---

**Khomaini Hasan** – *Biosciences and Biotechnology Research Centre, ITB, Indonesia*

**Udin Hasanudin** – *Universitas Lampung, Indonesia*

**Patrick Rousset** – *King Mongkut's of Technology Thonburi, Thailand*

**Shabbir H. Gheewala** – *King Mongkut's of Technology Thonburi, Thailand*

**Oki Muraza** – *King Fahd University, Saudi Arabia*

**Yuki Kudoh** – *National Institute of Advanced Industrial Science and Technology, Japan*

**Heri Susanto** – *Institut Teknologi Bandung, Indonesia*

**Yazid Bindar** – *Institut Teknologi Bandung, Indonesia*

**Ronny Purwadi** – *Institut Teknologi Bandung, Indonesia*

**Mahidin** – *Universitas Syiah Kuala, Indonesia*

**Irvan** – *Universitas Sumatera Utara, Indonesia*

**Zuchra Helwani** – *Universitas Riau, Indonesia*

**Rohim** – *Universitas Gadjah Mada, Indonesia*

**Teguh Ariyanto** – *Universitas Gadjah Mada, Indonesia*

**Rohim Bakti Cahyono** – *Universitas Gadjah Mada, Indonesia*

**Rochma Wikandari** – *Universitas Gadjah Mada, Indonesia*

**Bambang Sudarmanta** – *Institut Teknologi Sepuluh November, Indonesia*

**Muhammad Abdul Kholiq** – *BPPT, Indonesia*

**Isroi** – *Indonesian Research Institute for Biotechnology and Bioindustry, Indonesia*

**Suharto** – *Indonesian Institute of Sciences, Indonesia*

**Novizar Nazir** – *Universitas Andalas, Indonesia*

**Suripto Dwi Yuwono** – *Universitas Lampung, Indonesia*

**M. Irsyad** – *Universitas Lampung, Indonesia*

**Suprihatin** – *Institut Pertanian Bogor, Bogor, Indonesia*

**Muhammad Yani** – *Institut Pertanian Bogor University, Bogor, Indonesia*

**Andes Ismayana** – *Institut Pertanian Bogor University, Bogor, Indonesia*





## Content

Chairman of Organizing Committee

Committee

Content

Conference Program

Abstract of Papers

A. Poster Presentation

B. Oral presentation

1. Energy Security and Sustainability
2. Bioenergy and Biofuel
3. Energy Efficiency
4. Energy Conversion, Green Power Technology and Environment
5. Advanced Material for Energy Storage, Generation, and  
Transmission

C. Intensive Workshop



---

## INTERNATIONAL CONFERENCE ON SUSTAINABLE BIOMASS

### PARALLEL SESSION (October 15<sup>th</sup> – 17<sup>th</sup>, 2019)

Topic	Room	Amount of papers	Session Chair/ Assistant
Energy Security and Sustainability		9	Session Chair : Dr. Sugeng Triyono Assistant : Operator : Documentation :
Bioenergy and Biofuel		13	Session Chair : Dr. Eng. Dewi A. Iryani Assistant : Operator : Documentation :
Energy Efficiency		13	Session Chair : Dr. Muhammad Irsyad Assistant : Operator : Documentation :
Energy Conversion, Green Power Technology, and Environment		10	Session Chair : Dr. Agus Haryanto Assistant : Operator : Documentation :
Advanced Material for Energy Storage, Generation, and Transmission		6	Session Chair : Dr. Wahyu Hidayat Assistant : Operator : Documentation :
<b>Total amount of papers</b>		<b>51</b>	

### POSTER SESSION (October 15<sup>th</sup> – 17<sup>th</sup>, 2019)

Presenter	Title
Deodata Leela, Syukri M Nur, Galih Rai	Life Cycle Analysis and Sustainability of POME as Biodiesel Fuel
Angga Kusuma, Agung Firmansyah, Dewi A. Iryani, Simparmin Br. Ginting, Ni Luh ratna L, Udin Hasanudin	Biomethane Upgrading by Using Cellulose Acetate Modified with Lampung Natural Zeolite Membrane



## PRESENTATION SCHEDULE DAY-1 (Tuesday, October 15<sup>th</sup>)

### ROOM 1 (BALLROOM)

#### TOPIC : ENERGY SECURITY AND SUSTAINABILITY

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
13.30-13.45	843	Joko Nugroho, Wahyu Karyadi	lations for Methane Gas Production from Cow Dung in the Yogyakarta Region	Session Chair : Dr. Sugeng Triyono  Assistant :  Operator :  Documentation :
13.45-14.00	856	Muhammad Faisal, Asri Gani, Farid Mulana	Utilization of Liquid Smoke Produced from Oil Palm Empty Fruit Bunches to Preserve Tofu	
14.00-14.15	863	Anggun Rahmada, Fajar Marendra, Cahyo Wulandari, Ria Millati, Teguh Ariyanto, Rochim Bakti Cahyono	Zero Waste Concept in Fruit Waste Anaerobic Digester: Case Study of Biogas Plant Gamping, Yogyakarta	
14.15-14.30	869	Muhammad Sigit Cahyono	Methane Pyrolysis for Sustainable Hydrogen Production : A Review	
14.30-14.45	871	Siti Suharyatun, Agus Haryanto, Winda Rahmawati, Usi Zubaidah	Improving Fuel Quality of Rice Straw Through Washing by Using Tofu Mill Effluent	
14.45-15.00	876	Era R Finalis	Synthesis and Characterization of NPK/SRF Fertilizer for Red Onion by Using Empty Fruit Bunch (EFB) Char	
15.00-15.15	<b>Coffee Break</b>			



**TOPIC : ADVANCED MATERIALS FOR ENERGY STORAGE, GENERATION  
AND TRANSMISSION OTHER ISSUES**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
15.15-15.30	854	Hanifa Marisa	Stratification Of Arboretum Forest, Sriwijaya University Campus, Indralaya, South Sumatra; With Measurement Of Loss Of Weight After Drying Of Main Species	Session Chair : Dr. Wahyu Hidayat  Assistant :  Operator :  Documentation :
15.30-15.45	901	Sri Rachmawati Hidayah Siregar, AdiSurjosatyo	Influence of Die Temperature on the Characteristics and Quality of Municipal Solid Waste Pellets	
15.45-16.00	874	Kinanthi Mondylaksita	Edible Fungal ( <i>Rhizomucor</i> CCUG 61147) Production from Organosolv Pretreated OPEFB in Submerged Fermentation	

**ROOM 2 (CLASS ROOM 1)**

**TOPIC : BIOENERGY AND BIOFUEL**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
13.30-13.45	884	Anna Brunerová, Udin Hasanudin, Dewi Agustina Iryani, David Herák	Analysis of Tropical Fruit Waste Biomass Generation in Indonesia and Its Reuse Potential	Session Chair : Dr. Eng. Dewi A. Iryani  Assistant :  Operator :  Documentation :
13.45-14.00	848	Sanggono Adisasmito, Carolus Borromeus Rasrendra, William Einstein, Utomo Putera	Biogas Production from Anaerobic Digestion of Tofu Industry Wastewater	
14.00-14.15	851	Asyeni Miftahul Jannah	The Effect of H <sub>2</sub> SO <sub>4</sub> and NaOH in Delignification of Bioethanol Production from Coconut Husk Using Simultaneous saccharification Fermentation Method	
14.15-14.30	925	Angky Wahyu Putranto, Sakinah Hilya Abida, Khodijah Adrebi	Lignocellulosic Analysis of Corn cob Biomass by Using Non-Thermal Pulsed Electric Field-NaOH Pretreatment	



## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

14.30-14.45	920	Nyahu Rumbang, Karelius, Made Dirgantara, Komang Gde Suastika	Chemical Modifications of Torrefied Palm Kernel Shell by COMB Method
14.45-15.00	870	Agus Haryanto, Udin Hasanudin, Dewi Iriyani Agustina, Wahyu Hidayat, Mareli Telaumbanua, Amrul, Sugeng Triyono	Potential of Biomass Fuel from Oil Palm Empty Fruit Bunch Pellet
15.00-15.15	<b>Coffee Break</b>		
15.15-15.30	875	Atti Sholihah, Sri Djangkung Sumbogo, Asmi Rima Juwita, Fusia Mirda Yanti, Hens Saputra	Characterization of Mixed Biodiesel and Petrodiesel as Transportation Fuel
15.30-15.45	847	Ridwan Yahya, Yuwana, Budiyanto Budiyanto	Drying Effectiveness of Oil Palm Empty Bunches as a Renewable Energy Source Using "Teko Bersayap" Model Solar Dryer
15.45-16.00	913	Dwita Atyana Prameswari	Methane Production from Patchouli Oil Distillery Waste Using Dry Batch and Wet Semi-Continuous Anaerobic Digestion

### ROOM 3 (CLASS ROOM 2)

#### TOPIC : ENERGY EFFICIENCY

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
13.30-14.00		<b>Invited Speaker :</b> <b>Dr. Agus Haryanto</b> <b>(University of Lampung)</b>		Session Chair : Dr. Muhammad Irsyad
14.00-14.15	917	Tri Widjaja, Ali Altway, Siti Nurkhamidah, Toto Iswanto	Performance of Biogas Production from Coffee Pulp Waste with Cow Dung and Cattle Rumen Fluid As Inoculum in a Batch Reactor	Assistant :
14.15-14.30	861	Lydia Mawar Ningsih, Agus Haryanto, Udin Hasanudin, Sugeng Triyono	Leaching Alkali and Alkali Earth Metal From Oil Palm Empty Fruit Bunch Using Cassava Waste Water	Operator :  Documentation :



## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

14.30-14.45	900	Kiki Haetami, Junianto, Abun Abun	Pairing Coconut and Candlenut Oil as Feed Supplement in Low Protein Diet with Addition Se on Feed Efficiency of Red Nile Fish ( <i>Oreochromis Niloticus</i> )
14.45-15.00	911	Darmansyah, Simparmin Br. Ginting, Dewi Agustina Iryani, Ratna Puspita Sari, Didik Supriyadi	Characterization of Modified Natural Zeolite Lampung with Cetyltrimethylammonium Bromide (CTAB) for Adsorption Industrial Tapioca Wastewater
15.00-15.15	<b>Coffee Break</b>		
15.15-15.30	916	Tri Widjaja, Ali Altway, Siti Nurkhamidah, Ni Made Kartika Laksmi, Bayu Gusdyarto, Toto Iswanto	The Effect of Alkaline Pretreatment on Biogas Productivity and Kinetic from Cocoa Pod Husk Waste Using Batch Reactor
15.30-15.45	892	Zaki Saptari Saldi, Aditya Putranto, Fidelis Simanjuntak, Udin Hasanudin	Numerical Investigation Of Sludge Mixing Under Varying Total Solids In A Lab-Scale Anaerobic Digester
15.45-16.00	899	Sri Ismiyati Damayanti, Sarto sarto, Chandra Wahyu Purnomo, Wiratni Budhijanto	Microaeration Technique to Enhance The Performance of Anaerobic Digestion of Palm Oil Mill Effluent (POME)
16.00-16.15		Nugroho Adi Sasongko	Techno-economic analysis of <i>Botryococcus braunii</i> cultivation in biofilm



**ROOM 4 (CLASS ROOM 3)**

**TOPIC: ENERGY CONVERSION, GREEN POWER TECHNOLOGY,  
AND ENVIRONMENT**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
13.30-14.00		<b>Invited Speaker :</b> <b>Dr. Sarto</b> (Universitas Gadjah Mada)		
14.00-14.15		M. Mahidin, Erdiwansyah, Yanna Syamsuddin, Hamdani, Hisbullah	Numerical Analysis with Simulations for Biomass Gasification	
14.15-14.30	909	Tyas Puspita Rini, SD Sumbogo Murti	Hybrid Catalyst Cu- ZnO/Al <sub>2</sub> O <sub>3</sub> -HZSM-5 for Direct Synthesis Dimethyl Ether from CO and H <sub>2</sub> (Syngas)	
14.30-14.45	873	Erlan Rosyadi	Cold Model Performance Test Of 50 Kwe Dual Fluidized Bed Gasification Technology	
14.45-15.00	877	Wahyu Hidayat, Udin Hasanudin, Dewi Agustina Iryani, Agus Haryanto, Amrul Amrul, Jiho Yoo, Sangdo Kim, Sihyun Lee	Effect of Torrefaction using Counter Flow Multi-Baffle (COMB) Reactor on the Properties of Wood Pellets	Session Chair : Dr. Agus Haryanto
15.00-15.15	<b>Coffee Break</b>			Assistant :
15.15-15.30	905	Herri Susanto, Dicka Ar Rahim, Mi Yan, Rahmad Dennie Agustin Pohan, Dwi Hantoko	Upgrading of Palm Oil Empty Fruit Bunches To Solid Fuel Using Torrefaction and Hydrothermal Treatment	Operator :
15.30-15.45	907	Dhias Cahya Hakika	Enhancement of Biogas Production From Sugarcane Vinasse Using Fenton Reaction: Effect of pH	Documentation :
15.45-16.00		Elida Purba, Christine Natalia Y, Puput Dwi Ratna Sari	Biogas Purification by CO <sub>2</sub> Reduction in Bubble Column using Ca(OH) <sub>2</sub> and NaOH	
16.00-16.15		Soni Sisbudi Harsono	Coffee Husk Utilization as Biobricket and Biopellet Based on Zero Waste Approach	



## PRESENTATION SCHEDULE DAY-2 (Wednesday, October 16<sup>th</sup>)

### ROOM 1 (CLASS ROOM 1)

#### TOPIC : ENERGY SECURITY AND SUSTAINABILITY

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
10.45-11.00	919	Dwi Putri Rahmadani	Biogas Purification using Chitosan-Impregnated Porous Carbon	Session Chair : Assistant : Operator : Documentation :
11.00-11.15	898	Asesanti Suci Nur Pratami, Nugroho Adi Sasongko, Kega Amalania Salsabiil, Wara Dyah Pita Rengga	Techno-Economic Analysis of Integrated Process Design of Palm Oil Mill Effluent (Pome) Treatment Coupled With Algae Biomass Production System	
11.15-11.30		Usi Nur Pamiliani, Elida Purba	Purification of Biogas by CO <sub>2</sub> Reduction in Biogas Using Potassium Hydroxide Solution (KOH) in a Packed Tower	

#### TOPIC :ADVANCED MATERIALS FOR ENERGY STORAGE, GENERATION AND TRANSMISSION OTHER ISSUES

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
11.30-11.45	839	Wahyu Hidayat, Fauzi Febrianto, Byantara Darsan Purusatama, Nam Hun Kim	Effect of Oil Heat Treatment on the Properties of Fast Growing Wood Species	Session Chair : Assistant : Operator : Documentation :
11.45-12.00	857	Via Siti Maslulah, Aisyah Ardy, and Herri Susanto	Comparison of Performance of Three Types of Catalysts of Methanol Dehydration to DME	
12.00-12.15		Julfi Restu Amelia, Udin Hasanudin, Oktarina M	Decreasing of Pollution Tract Loads Through Utilization of Effluent Reactor of Tapioca Industrial Biogass for Production of Organic Vegetables	





**ROOM 2 (CLASS ROOM 2)**

**TOPIC : BIOENERGY AND BIOFUEL**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
10.45-11.00	904	Lia Limeri, YuliDarni, Meiliza Anggraini, Agus Sudarno	Characterization of Cassava Stems as Potential Biomass for Bio-Oil Production	Session Chair : Assistant : Operator : Documentation :
11.00-11.15	895	Kega Amalania Salsabiil, Asesanti Suci Nur Pratami, Nugroho Adi Sasongko, Wara Dyah Pita Rengga	Integrated Process Design of Palm Oil Mill Effluent (POME) Treatment Coupled with Algae Biomass Production System	
11.15-11.30	903	Ansar ansar	Production of Bioethanol from Palm Sap ( <i>Arengapinnata Merr</i> ) Using Fermentation and Distillation Technology	
11.30-11.45		Soni Sisbudi Harsono	Life Cycle Analysis of Civet Coffee in Ijen Plateau Area of <i>Bondowoso</i> , East Java – Indonesia	

**TOPIC: ENERGY CONVERSION, GREEN POWER TECHNOLOGY, AND  
ENVIRONMENT**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
11.45-12.00	922	Yuli Darni, Herti Utami, Muhammad Hanif, Nurul Izzati Hanifah	Microfibril Cellulose Filler Contributes to Thermal Stability and Morphology of Bioplastics Characteristics of Sorghum-Based	Session Chair : Assistant : Operator : Documentation :
12.00-12.15	923	Ibnu Maulana Hidayatullah	Modeling of Temperature Effect on Separated Saccharification and Fermentation for Oil Palm Empty Fruit Bunches-Based Xylitol Production	



**ROOM 3 (CLASS ROOM 3)**

**TOPIC : ENERGY EFFICIENCY**

Time	ID	Presenter	Manuscript Title	PIC/ Moderator/ Operator
10.45-11.00		Khairudin, Amirudin, Lukmanul Hakim, Heri Gusmadi, Udin Hasanudin, Agus Haryanto	Emulating Excitation System of Biomass-based Micro Steam Turbine Generator	Session Chair :  Assistant :  Operator :  Documentation :
11.00-11.15	910	Lathifa Indraningtyas, Udin Hasanudin, Darmansyah	Performance Test of Compost Biofilter in Reducing H <sub>2</sub> S Content on Biogas From Waste Water Tapioca Industry	
11.15-11.30	883	Indra Mamad Gandidi	Two Stage Pyrolysis with Long Catalyzer Reactor to Produce of Gasoline Range From Mixed MSW	
11.30-11.45		Arief Prasetyo, Dewi Agustina Iryani, Udin Hasanudin, Simparmin Br. Ginting	Effect of Annealing and Ananealing Of Cellulose Acetate (CA) Membrane Modified with Lampung Netural Zeolite (LNZ) to Improve Performace in Separation of CO <sub>2</sub> /CH <sub>4</sub>	
11.45-12.00		Heri Satria, Yandri, Nurhasanah, Aspita Laila, Suropto Dwi Yuwono	Utilization of Native Extracellular Cellulase from Cultivated Indigenous Actinomyces Act-4 on Ionic Liquid Pretreated Bagasse in Simultaneous Saccharification and Fermentation (SSF) Ethanol	
12.00-12.15		Nida Nurlivi Fauziah, Eko Prasetyo, Nugroho Adi Sasongko	Study of Green Gasoline Life Cycle Assessment (LCA) with Crude Palm Oil (CPO) as Raw Materials	



## **Green Technology Partnership Initiative Workshop**

**University of Lampung, Korea Institute of Energy Research,  
Green Technology Center, Government**

Wednesday, October 16 at Ballroom Emersia Hotel

<b>Time</b>	<b>Presenter</b>	<b>Title</b>	<b>PIC</b>
13.00-13.15	<b>Prof. Udin Hasanudin</b> Universitas Lampung	Biomass for Energy	<b>Session Chair:</b> Dr. Wahyu Hidayat
13.15-13.30	<b>Dr. Jiho Yoo</b> Korea Institute of Energy Research	Conversion of Biomass into Biochar based on COMBPY Technology	
13.30-13.45	<b>I GST NY Suryana</b> Head of Research and Development Office of Central Lampung Regency	Biomass Potential in Central Lampung Regency	
13.45-14.00	<b>Wilson Gultom</b> PT. Anaktuha Sawit Mandiri	Best Practice Management on the Utilization of Oil Palm Biomass	
14.15-14.30	<b>Mr. Jun-hyung Lee</b> Envelops	Utilization of Biomass Project in Indonesia and Best Practice	
14.30-14.45	<b>Mr. Kwan-young Kim</b> Green Technology Partnership Initiative	Capacity-Building of Biofuel Appropriate Technology Development and Business Model Generation using STI and Knowledge Management	
14.45-15.00	<b>Dr. Hyun-goo Kim</b> Korea Institute of Energy Research	Renewable Energy Resource Mapping of Korea Using Earth Observations	
15.00-15.30	Discussion		



## Poster Session

### Life Cycle Analysis and Sustainability of POME as Biodiesel Fuel

Deodata Leela, Syukri M Nur, Galih Rai ..... 1

### Biomethane Upgrading by Using Celulose Acetate Modified with Lampung Natural Zeolite Membrane

Angga Kusuma J,Dewi. Agustina. I, Agung F, Simparmin B. Ginting , N. L. G. Ratna, Udin Hasanudin ..... 2

## Parallel Session

### Theme 1: Energy Security and Sustainability

#### Improving Fuel Quality of Rice Straw Through Washing by Using Effluent From Tofu Industry

Siti Suharyatun, Agus Haryanto, Winda Rahmawati, Usi Zubaidah ..... I - 1

#### Methane Pyrolysis for Sustainable Hydrogen Production: A Review

Muhammad Sigit Cahyono ..... I - 2

#### Synthesis and Characterization Of NPK SRF Fertilizer for Red Onion by Using Empty Fruit Bunch (EFB) Char

Era R Finalis ..... I - 3

#### Utilization of Liquid Smoke Produced from Oil Palm Empty Fruit Bunches to Preserve Tofu

Muhammad Faisal, Asri Gani, Farid Mulana ..... I - 4

#### Zero Waste Concept in Fruit Waste Anaerobic Digester Case Study of Biogas Plant Gamping, Yogyakarta

Anggun Rahmada, Fajar Marendra, Cahyo Wulandari, Ria Millati, Rochim Bakti Cahyono, Teguh Ariyanto ..... I - 5

#### Biogas Purification Using Chitosan-impregnated Porous Carbon

D P Rahmadani, A Rahmada, F Marendra, H J Rimbawan, R B Cahyono, Suherman, and T Ariyanto ..... I - 6

#### Purification of Biogas by CO<sub>2</sub> Reduction in Biogas Using Potassium Hydroxide Solution (KOH) in a Packed Tower

Usi Nur Pamiliani, Elida Purba ..... I - 7

#### Techno-economic Analysis of Integrated Process Design of Palm Oil Mill Effluent (POME) Treatment Coupled with Algae Biomass Production System

Asesanti Suci Nur Pratami, Nugroho Adi Sasongko, Kega Amalania Salsabiiil, Wara Dyah Pita Rengga ..... I - 8



---

**lations for Methane Gas Production from Cow Dung in the Yogyakarta Region**

Joko Nugroho, Wahyu Karyadi ..... I - 9

**Theme 2 : Bioenergy and Biofuel**

**Analysis of Tropical Fruit Waste Biomass Generation in Indonesian Its Reuse Potential**

Anna Brunerová, Udin Hasanudin, Dewi Agustina Iryani, David Herák ..... II - 1

**Biogas Production from Anaerobic Digestion of Tofu Industry Wastewater**

Sanggono Adisasmito, Carolus Borromeus Rasrendra, William Einstein,  
Utomo Putera ..... II - 2

**Characterization of Mixed Biodiesel and Petrodiesel as Transportation Fuel**

Atti Sholihah, Sri Djangkung Sumbogo, Asmi Rima Juwita, Fusia Mirda Yanti,  
Hens Saputra ..... II - 3

**Chemical Modifications of Torrefied Palm Kernel Shell by COMB Method**

Nyahu Rumbang, Karelius, Made Dirgantara, Komang Gde Suastika ..... II - 4

**Drying Effectiveness of Oil Palm Empty Bunches as a Renewable Energy Source Using “Teko Bersayap” Model Solar Dryer**

Ridwan Yahya, Yuwana Yuwana, Budiyanto Budiyanto ..... II - 5

**Lignocellulosic Analysis of Corncob Biomass by Using Non-Thermal Pulsed Electric Field-NaOH Pretreatment**

A. W. Putranto, S. H. Abida, and K. Adrebi ..... II - 6

**Methane Production from Patchouli Oil Distillery Waste Using Dry Batch and Wet Semi-continuous Anaerobic Digestion**

D. A. Prameswari, A. N. Rahmah, R. Millati, R. Wikandari, M. N. Cahyanto, Lukitawesa, C. Niklasson, M. Taherzadeh ..... II - 7

**Potential of Biomass Fuel from Oil Palm Empty Fruit Bunch Pellet**

Agus Haryanto, Udin Hasanudin, Dewi Iriyani Agustina, Wahyu Hidayat, Mareli Telaumbanua, Amrul Amrul, Sugeng Triyono ..... II - 8

**The Effect of H<sub>2</sub>SO<sub>4</sub> and NaOH in Delignification of Bioethanol Production from Coconut Husk Using Simultaneous *Saccharification* Fermentation Method**

Asyeni Miftahul Jannah, Novia, Elda Melwita, Titi Lahanda Susanti, Nuraini Dewi Pratiwi ..... II - 9

**Characterization and Analysis of Cassava Stems as Potential Biomass for Bio-Oil Production Via Electromagnetic-Assisted Catalytic Liquefaction**

L Limeri, M Anggraini, A Sudarno and Y Darni ..... II - 10

**Integrated Process Design of Palm Oil Mill Effluent (POME) Treatment Coupled with Algae Biomass Production System**



---

Kega Amalania Salsabil, Nugroho Adi Sasongko, Asesanti Suci Nur Pratami, Wara Dyah Pita Rengga ..... II - 11

**Production of Bioethanol from Palm sap (*Arengapinnata MERR*) Using Fermentation and Distillation Technology**

Ansar and Nazaruddin ..... II - 12

**Life Cycle Analysis of Civet Coffee in Ijen Plateau Area of Bondowoso, East Java – Indonesia**

Soni Sisbudi Harsono ..... II - 13

**Theme 3: Energy Efficiency**

**Performance of Biogas Production from Coffee Pulp Waste with Cow Dung and Cattle Rumen Fluid as Inoculum in a Batch Reactor**

T. Widjaja, A. Altway, S. Nurkhamidah, T. Iswanto, E. Grady ..... III - 1

**Characterization of Modified Lampung Natural Zeolite with Cetyltrimethylammonium bromide (CTAB) for Adsorption Industrial Tapioca Wastewater**

Darmansyah, Simparmin Br. Ginting, Dewi Agustina Iryani, Ratna Puspita Sari, Didik Supriyadi ..... III - 2

**Leaching Alkali and Alkali Earth Metal from Oil Palm Empty Fruit Bunch Using Cassava Wastewater**

Lydia Mawar Ningsih, Agus Haryanto, Udin Hasanudin, Sugeng Triyono ..... III - 3

**Microaeration Technique to Enhance The Performance of Anaerobic Digestion of Palm Oil Mill Effluent (POME)**

Sri Ismiyati Damayanti, Sarto Sarto, Chandra Wahyu Purnomo, Wiratni Budhijanto ..... III - 4

**Pairing Coconut and Candlenut Oil as Feed Supplement in Low Protein Diet with Addition Se on Feed Efficiency of Red Nile Fish (*Oreochromis Niloticus*)**

Kiki Haetami, Junianto, and Abun ..... III - 5

**The Effect of Alkaline Pretreatment on Biogas Productivity and Kinetic from Cocoa Pod Husk Waste Using Batch Reactor**

T Widjaja, S Nurkhamidah, A Altway, KLaksmi, B Gusdyarto, T Iswanto ..... III - 6

**Effect of Annealing and Ananealing Of Cellulose Acetate (CA) Membrane Modified with Lampung Natural Zeolite (LNZ) to Improve Performance in Separation of CO<sub>2</sub>/CH<sub>4</sub> Biogas**

Arief Prasetyo, Dewi Agustina Iryani, Udin Hasanudin, S.Br. Ginting ..... III - 7



---

**Emulating Excitation System of a Biomass-based Micro Steam Turbine Generator**

Khairudin, Amirudin, Lukmanul Hakim, Herri Gusmedi, Udin Hasanudin, Agus Haryanto ..... III - 8

**Performance Test of Compost Biofilter in Reducing H<sub>2</sub>S Content on Biogas from Waste Water Tapioca Industry**

Lathifa Indraningtyas, Udin Hasanudin, Darmansyah..... III - 9

**Study of Green Gasoline Life Cycle Assessment (LCA) with Crude Palm Oil (CPO) as Raw Materials**

Nida Nurlivi Fauziah, Eko Prasetyo, Nugroho Adi Sasongko ..... III - 10

**Two Stage Pyrolysis with Long Catalyzer Reactor to Produce of Gasoline Range from Mixed MSW**

Indra Mamad Gandidi, Apri Wiyono, Rakensa Satria Ardipamungkas, Amrul..... III - 11

**Utilization of Native Extracellular Cellulase from Cultivated Indigenous Actinomycetes Act-4 on Ionic Liquid Pretreated Bagasse in Simultaneous Saccharification and Fermentation (SSF) Ethanol**

Heri Satria, Yandri, Nurhasanah, Aspita Laila, Sriptio Dwi Yuwono ..... III - 12

**Techno-economic Analysis of *Botryococcus braunii* Cultivation in Biofilm**

Nugroho Adi Sasongko ..... III - 13

**Theme 4: Energy Conversion, Green Power Technology and Environment**

**Nuerical Analysis with Simulations for Biomass Gasification**

Mahidin, Erdiwansyah, Yanna Syamsuddin, Hamdani, Hisbullah ..... IV - 1

**Biogas Purification by CO<sub>2</sub> Reduction in Bubble Column Using Ca(OH)<sub>2</sub> and NaOH**

Elida Purba, Christine Natalia Y, Puput Dwi Ratna Sari ..... IV - 2

**Cold Model Performance Test Of 50 Kwe Dual Fluidized Bed Gasification Technology**

Erlan Rosyadi ..... IV - 3

**Effect of Torrefaction Using Counter Flow Multi-Baffle (COMB) Reactor on the Properties of Wood Pellets**

Wahyu Hidayat, Udin Hasanudin, Dewi Agustina Iryani, Agus Haryanto, Amrul, Jiho Yoo, Sangdo Kim, Sihyun Lee ..... IV - 4

**Enhancement of Biogas Production from Sugarcane Vinasse Using Fenton Reaction: Effect of pH**

Dhias Cahya Hakika ..... IV - 5



---

**Hybrid Catalyst Cu-ZnO/Al<sub>2</sub>O<sub>3</sub>-HZSM-5 for Direct Synthesis Dimethyl Ether from CO and H<sub>2</sub> (Syngas)**

Tyas Puspita Rini, Sri Djangkung Sumbogo Murti, Nanda Sari Dewi..... IV - 6

**Upgrading of Palm Oil Empty Fruit Bunches to Solid Fuel Using Torrefaction and Hydrothermal Treatment**

Herri Susanto, Dicka Ar Rahim, Mi Yan, Rahmad Dennie Agustin Pohan, Dwi Hantoko..... IV - 7

**Microfibril Cellulose Filler Contributes to Thermal Stability and Morphology of Bioplastics Characteristics of Sorghum Based**

Y. Darni, H. Utami, L. Lismeri, M. Hanif, N.I. Hanifah..... IV - 8

**Modeling of Temperature Effect on Separated Saccharification and Fermentation for Oil Palm Empty Fruit Bunches-Based Xylitol Production**

Ibnu Maulana Hidayatullah ..... IV - 9

**Coffee Husk Utilization as Biobricket and Biopellet Based on Zero Waste Approach**

Soni Sisbudi Harsono ..... IV - 10

**Theme 5: Advanced Material for Energy Storage, Generation, and Transmission**

**Edible Fungal (*Rhizomucor* CCUG 61147) Production from Organosolv Pretreated OPEFB in Submerged Fermentation**

MB Devi Marhendraswari, Kinanthi Mondylaksita, Jorge Ferreira, Ria Millati, Mohammad J. Taherzadeh, Claes Niklasson..... V - 1

**Effect of Oil Heat Treatment on the Properties of Fast Growing Wood Species**

Wahyu Hidayat, Byantara Darsan Purusatama, Fauzi Febrianto, and Nam Hun Kim ..... V - 2

**Influence of Die Temperature on Unit Density and Calorific Value of Municipal Solid Waste Pellets**

Sri R. H. Siregar, Daragantina Nursani, and Adi Surjosatyo ..... V - 3

**Comparison of Performance of Three Types of Catalysts of Methanol Dehydration to DME**

Via Siti Maslulah, Aisyah Ardy, and Herri Susanto..... V - 4

**Decreasing of Pollution Tract Loads Through Utilization of Effluent Reactor of Tapioca Industrial Biogas for Production of Organic Vegetables**

Julfi Restu Amelia, Udin Hasanudin, Oktarina Maulidia ..... V - 5





## International Conference on Sustainable Biomass 2019

October 15<sup>th</sup> – 17<sup>th</sup>, 2019

EMERSIA Hotel & Resort, Bandar Lampung, Indonesia

“ Bioenergy for Rural Development “

---

### Stratification of Arboretum Forest, Sriwijaya University Campus, Indralaya, South Sumatra with Measurement of Loss of Weight after Drying of Main Species

Hanifa Marisa .....

V - 6



ENERGY EFFICIENCY

2019



---

## Utilization of Native Extracellular Cellulase from Cultivated Indigenous Actinomycetes Act-4 on Ionic Liquid Pretreated Bagasse in Simultaneous Saccharification and Fermentation (SSF) Ethanol

Heri Satria<sup>1\*</sup>, Yandri<sup>1</sup>, Nurhasanah<sup>1</sup>, Aspita Laila<sup>1</sup>, Suripto Dwi Yuwono<sup>1</sup>

<sup>1</sup>Department of Chemistry Faculty of Mathematics and Natural Sciences University of Lampung, Jl. Soemantri Brojonegoro No.1 Bandar Lampung 35145, Indonesia

\*correspondence author email: heri.satria@fmipa.unila.ac.id

### Abstract

Simultaneous saccharification and fermentation (SSF) technology require an understanding of suitable substrates and the role of the enzyme for high yield and productivity. Although SSF has been investigated extensively, the detail conditions for SSF of pretreated ionic liquid bagasse have yet not been in-depth determined. In this study, ionic liquid-pretreated bagasse was used as the substrate for the production of ethanol by SSF. Native cellulase enzymes of selected actinomycetes (Act-4) was utilized in combination with the yeast *Saccharomyces cerevisiae*. The effects of the loading mass of pretreated bagasse (5% to 20% w/w) and of inoculum size were investigated. Initially, the concentration of produced reduction sugar was evaluated before conducting an ethanol fermentation. The ethanol yield increased with increasing fermented available sugar on the medium that influenced by Act-4 inoculum size. The highest ethanol yield, 52% of the theoretical based on the glucose present in the bagasse, was obtained at 10% substrate concentration. A higher loading mass detected inefficient hydrolysis process because of insufficient suspension formed, whereas a lower substrate concentration, 5%, resulted in a low yield. This SSF process was an open opportunity to develop a one-pot process of lignocellulosic biomass using the identified effective component to increase productivity.

**Keywords:** Extracellular Cellulase, Actinomycetes, Ionic Liquid, Simultaneous Saccharification and Fermentation (SSF)

# ICSB

2019

Organizing Committee of International Conference  
on Sustainable Biomass 2019  
Research and Development Center for Tropical Biomass  
University of Lampung





# ICSB 2019



## CERTIFICATE

This is to certify that

**Heri Satria**

has participated in

**International Conference on Sustainable Biomass 2019**

as

**Presenter**

Bandarlampung, Indonesia. 15<sup>th</sup> - 17<sup>th</sup> October 2019

ICSB 2019 Conference Chair  
  
Dr. Ing. Ardian Ulvan, S.T., M.Sc.

