

# **GREEN INDUSTRY RESEARCH SYMPOSIUM FOR SUSTAINABLE DEVELOPMENT**

Lignocellulases : from Isolation  
to Structure-Function Mechanism and  
Industrial Application

Surabaya, 11-12 September 2019

In collaboration with  
Biocatalysis and Agricultural Biotechnology  
(Schimago Q2, Indexed by Scopus)



Diagram illustrating the components of lignocellulose structure:

- Lignin
- Cellulose
- Hemicellulose

↓ PRETREATMENT

Organized by

Research Center for Bio-Molecule Engineering  
Universitas Airlangga



## RUNDOWN

### *GreenSymp 2019*

“Green Industry Research Symposium for Sustainable Development in collaboration  
with Biocatalysis and Agricultural Biotechnology, Journal of ELSEVIER”  
Institute Tropical Disease, 2<sup>nd</sup> Floor, Surabaya, 11 – 12 September 2019

Wednesday, 11 September 2019

Time	Activity
08.00 – 08.30	Registration
08.30 – 09.00	Opening Ceremony
09.00 – 09.15	Coffee Break
09.15 – 12.00	<b><u>Keynote Speaker Presentation</u></b> Moderator: <b>Prof. Osman Hassan</b> <b>Prof. Dr. Kazuo Sakka</b> (Mie University, Japan) Cellulosomal Modular Hemicellulases from <i>Ruminiclostridium josui</i> <b>Wong Wai Seng</b> (Novozymes Malaysia) <b>Prof. Rosli Md Illias, Ph.D</b> (Universiti Teknologi Malaysia) Designing Xylanases: from Protein Engineering to Immobilization <b>Prof. M. Mukram M</b> (Universiti Kebangsaan Malaysia) Exploration of Enzymes from Microbial Bioresource for Bio-Industry and Biorefinery <b>Dr. Ni'matuzahroh</b> (Research Center for Bio-Molecule Engineering, BIOME, Universitas Airlangga) Bioconversion of agricultural waste hydrolysate from lignocellulolytic mold into biosurfactant by <i>Achromobacter</i> BP(1)5
12.00 – 13.00	Lunch Time
13.00 – 14.30	<b><u>Invited Author Presentation</u></b> Moderator: <b>Ali Rohman, Ph.D.</b> <b>Prof. Dr. Jamaliah</b> (Universiti Kebangsaan Malaysia/ACABT) Harnessing the Potential of Bio-based Fine Chemicals Production from Sustainable Lignocellulosic Crops in Malaysia: Zero waste Concept within Palm oil processing mill <b>Asst. Prof. Dr. Chakrit Tachaapaikoon</b> (King Mongkut's University of Technology Thonburi) Biohydrogen Production from Cassava Pulp Using Selectively Enriched Community



	<b>Dr. Verawat Champreda</b> (Enzyme Technology Laboratory and Integrated Biorefinery Laboratory, BIOTEC-NSTDA, Thailand) Discovery, Design and Engineering of Lignocellulolytic Enzyme Systems for Bioindustry
	<b>Dr. Yopi</b> (Research Center and Human Resource Development, BSN) Production of Mannan endo-1,4- $\beta$ -mannosidase from <i>Kitasatospora</i> sp. under Submerged Fermentation: Purification, Characterization and Its Potential for Mannooligosaccharide Production
<b>14.00 – 14.30</b>	Discussion
<b>14.30 – 15.00</b>	Coffee Break
<b>15.00 – 17.00</b>	Review Manuscript by Guest Editor

**Thursday, 12 September 2019**

<b>Time</b>	<b>Activity</b>
<b>08.30 – 10.00</b>	<b><u>Invited Author Presentation</u></b> Moderator: <b>Dr Ni'matuzahroh</b> <b>Assoc. Prof. Dr. A Munir Abdul Murad</b> (Universiti Kebangsaan Malaysia) Microbial Expression System for Lignocellulase Production: Challenges and Way Forward <b>Dr. Eng Nanik Rahmani, M.Si</b> (Research Centre for Biotechnology, LIPI) Discovery and Development of Enzymes from Indonesia Bioresources for Food Industry <b>Prof. Dr. Mirni Lamid</b> (Faculty of Veterinary Medical Science, Universitas Airlangga) Substitution Of Rice Bran with Phytase Enzymes and Supplementation Turmeric Flour in Commercial Feed to Improve Quality Of Triglyceride (TG), Cholesterol, Density Lipoprotein (LDL) and High Density Lipoprotein (HDL) Broiler <b>Dr. A A Istri Ratnadewi</b> (Universitas Negeri Jember) In-Vitro Fermentation of Xylooligosaccharides (XOS) Enzymatic Hydrolysis products of Coffee Skin by <i>Latrobacillus casei</i> <b>Dr. Hermansyah</b> (Universitas Sriwijaya, Palembang) Delignification of Lignocellulosic Biomass Sugarcane Bagasse by Using Ozone as Initial Step to Produce Bioethanol
<b>09.45 – 10.00</b>	Discussion
<b>10.00 – 10.15</b>	Coffee Break
<b>10.15 – 12.00</b>	<b><u>Invited Author Presentation</u></b> Moderator: <b>Dr. Hery Suwito, M.Si.</b> <b>Assoc. Prof. Dr. Ario Bimo Tejo</b> (UCSI University, Malaysia) Rational Design of Short Antifreeze Peptides Derived from Rhagium inquisitor Antifreeze Protein



	<b>Almando Geraldi, S.Si., Ph.D.</b> (Research Center for Bio-Molecule Engineering, BIOME) Enzymatic Biotransformation of Ginsenoside Rb1 by Recombinant $\beta$ -glucosidase of Bacterial Isolates from Indonesia
	<b>Dian Fairuza</b> (Universitas Indonesia) Transformation and Expression Of Gen Beta Glucosidase from <i>Thermotoga neapolitana</i> to <i>Pichia pastoris</i>
	<b>Nur Umriani</b> (Universitas Hasanudin, Institut Teknologi Bandung) Box-Wilson design for optimization in vitro levan production catalyzed by heterologous expressed levansucrase and the application of the produced levan as antioxidant and antibacterial agents
	<b>Dr. Eng Heri Satria, M.Si</b> (Universitas Lampung) Extracellular Hydrolysis Enzyme Activity of Some Indigenous Actinomycetes on Pretreated Bagasse using Choline Acetate Ionic Liquid
<b>11.30 – 12.00</b>	Discussion
<b>12.00 – 13.00</b>	Lunch
<b>13.00 – 15.00</b>	Review Manuscript by Guest Editor
<b>15.00 – 15.15</b>	Coffee Break
<b>15.15 – 17.00</b>	Review Manuscript by Guest Editor
<b>17.00</b>	Closing Ceremony

## **Extracellular Hydrolysis Enzyme Activity of Some Indigenous Actinomycetes on Pretreated Bagasse using Choline Acetate Ionic Liquid**

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### **Abstract**

Ionic liquids (ILs) pretreatment is currently becoming attractive approach for improving the efficiency of enzymatic hydrolysis on lignocellulose. Cholinium acetate ILs that contain cholinium cation combined with carboxylic acid-based anion is not only marked as biocompatible ILs but also known as a useful catalyst to pretreat biomass which could enhance enzymatic saccharification of lignocellulosic biomass. In this study hydrolysis activities of cellulase and xylanase which produce extra-cellularly by isolated actinomycetes under the presence of ILs were investigated. ILs/biomass ratio (g/g) were set up between 0.0-3.0 for pretreatment follow by hydrolysis using cellulase and xylanase that excreted when actinomycetes were grown up in biomass bagasse successively. The IL/biomass ratio were as found to be 1.0 and 1.5, which achieved cellulose and hemicellulose saccharification percentages of between 65-86% and 78-90%, respectively. Since the cellulase activities were decreased to under 60% when IL/biomass ratio were increased to 2.0, 2.5 and 3.0, in contrast, xylanase activities remain stable at the range 82-98%. This experiment demonstrates the promising bio-hydrolysis of biomass in green technology to increase the yield of the biomass saccharification process.

*Key words: ionic liquid, choline acetate, actinomycetes, cellulase, xylanase, bagasse*





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Research Center for Bio-Molecule Engineering (BIOME), Universitas Airlangga  
present this certificate to

**Dr. Eng Heri Satria, M.Si**

As

Invited Author

for satisfactorily completing the

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Institute of Tropical Disease Building, Universitas Airlangga  
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