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*The Fifth*

# GRUBER-SOEDIGDO LECTURE

**Bandung, 10 - 12 November 2015**

The Gruber-Soedigdo Lecture (GSL) is created to commemorate Prof. Max Gruber (University of Groningen) and Prof. Soedigdo (Institut Teknologi Bandung), as founding fathers of Biochemistry Division of Institut Teknologi Bandung.

The fifth GSL is designed in the form of **one-day seminar** and two days of **parallel workshops**. This event will present scientists, researchers, and practitioners from the Netherlands, Japan, South Korea, and Indonesia. Recent findings in the field of biocatalyst and its application will be shared and discussed. Results from other Indonesian scientific community will also be disseminated in **poster presentations**.

## November 10, 2015 One-day Seminar

Aula Barat ITB, Jl. Ganesha No. 10, Bandung

**“Biocatalyst for Food, Energy, and Medical Applications”**

### Invited speakers:

Prof. Akhmaloka, PhD (ITB, Indonesia)

Prof. P. J. M van Haastert\*  
(University of Groningen, Netherland)

Dr. Takashi Kumasaka (Japan Synchrotron Radiation  
Research Institute, Japan)

Prof. Dr. Titania Nugroho, M.Si  
(Universitas Riau, Indonesia)

\*) in confirmation

Abstract for poster presentation  
can be submitted by email  
to: [gsl@chem.itb.ac.id](mailto:gsl@chem.itb.ac.id)

### Important Dates

**14 October 2015**

Submission of abstract

**16 October 2015**

Notification of acceptance

### Secretariat

The Fifth Gruber-Soedigdo Lecture 2015

Biochemistry Research Division  
Faculty of Mathematics and Natural Sciences  
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## November 11-12, 2015 WORKSHOPS

**Topic 1:**  
Culturing technique of microalgae and  
isolation of its lipid for biofuel

Biochemistry Lab, ex. PAU



**Topic 2:**  
Laboratory practice: Real-time PCR

Basic Science Center A (BSC-A), ITB



**Topic 3:**  
Computational analysis for protein



Computer Room at ITB Library

### Registration Fee

The seminar and workshops are open for lecturers, researchers, scientists, practitioners, and the students interested in the scope of this seminar, especially in biocatalyst and its applications.

Participant	Before 17 Oct 2015 After 17 Oct 2015	
	Seminar	
Student	Rp. 150.000,-	Rp. 200.000,-
Non Student	Rp. 250.000,-	Rp. 400.000,-
Seminar and Workshop		
Participant	Rp. 2.000.000,-	Rp. 2.000.000,-

# KULTIVASI *Oedogonium* sp PADA MEDIA EFFLUENT DARI PENGOLAHAN LIMBAH DOMESTIK MELALUI KOMBINASI ANAEROBIC BAFFLED REACTOR (ABR) DAN CONSTRUCTED WETLANDS (CW) SEBAGAI BIOMASSA PENHASIL LIPID

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## ABSTRAK

Limbah cair domestik dari kompleks perumahan diolah pada bioreaktor berskala laboratorium, pengolahan dilakukan melalui kombinasi antara *anaerobic baffled reactor* (ABR) yang diberi enam sekat dan *constructed wetlands* (CW), selanjutnya effluent dari CW dialirkan ke penampungan untuk proses pengendapan. Air limbah domestik dialirkan secara kontinu dengan waktu retensi 24 jam. Effluent hasil pengolahan digunakan untuk menumbuhkan makroalga *Oedogonium* sp secara open pond, biomassa mencapai fase logaritmik setelah 20-24 hari. Biomassa hasil panen dikeringkan pada suhu 80°C selama 12 jam, dihaluskan dan diekstraksi lipidnya menggunakan hexane sebagai pelarut selama 6 jam. Lipid yang dihasilkan mencapai 5,8 hingga 6,4 % per gram berat kering makroalga. Hasil analisis GCMS, lipid yang dihasilkan tersusun oleh beberapa jenis asam lemak yang berpotensi untuk berbagai aplikasi bioteknologi, diantaranya adalah; asam palmitat (13,32 - 16,05 %), asam heksadekanoat (3,2 - 4,1 %), asam linolenik (19,19 %), asam stearat (1,29 %), asam oktadekanoat (1,82 %), asam adipat (14,97 %) dan asam oleat (12,61%).

**Keywords:** makroalga, biomasa, limbah cair domestik, *Anaerobic baffled reactor*, *Constructed wetland*, kadar lemak.

# MACROALAGAE *Oedogonium* sp CULTIVATION FOR LIPID PRODUCTION BY USING EFFLUENT FROM COMBINATION OF ANAEROBIC BAFFLED REACTOR (ABR) AND CONSTRUCTED WETLANDS (CW) FOR DOMESTIC WASTEWATER TREATMENT

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## ABSTRACT

Domestic wastewater from local housing in Palembang was treated in laboratory scale bioreactors adopted a combination of *anaerobic baffled reactor* (ABR) which consisted of six compartments and *constructed wetland* (CW), effluent from CW was flown into a settling basin prior to be used further for macroalgae *Oedogonium* sp biomass cultivation. The wastewater was fed into the bioreactors continuously and achieved a 24 h retention time. *Oedogonium* sp was cultivated as an open pond, macroalgal biomass achieved logarithmic phases after 20-24 days. Harvested biomass was dried in an oven at 80°C for 12 h, grounded and subjected to a lipid extraction processes by using hexane as solvent for 6 h. Fat content per gram biomass has been extracted was ranged between 5,8 to 6,4 %. GCMS analisis shows the lipid was composed of several fatty acids which potential for biotechnological applications such as palmytic acid (13,32 - 16,05 %), hexadodecanoic acid (3,2 - 4,1 %), linolenic acid (19,19 %), stearic acid (1,29 %), oktadekanoic acid (1,82 %), adipic acid (14,97 %) and oleic acid (12,61%).

**Keywords:** macroalgae, biomass, domestic wastewater, *Anaerobic baffled reactor*, *Constructed wetland*, fat content.