THE FIRST

THAI-JAPAN

Bioplastics and Biobased Materials Symposium

(AIST - NIA Joint Symposium)

2 September 2009

Pullman Bangkok King Power Hotel, Bangkok, Thailand

Programme and Abstracts

TOPICS:

- Biobased polymers and biodegradable polymers
- Production of biomass-containing materials; adhesive, composite, and resin
- Conversion of biomass-related materials to monomers and polymers
- Biosyntheses of polymers; in vitro and in vivo
- Polymerization of biobased monomers
- Functional biobased polymers
- High performance bioplastics
- Processing of biobased polymers; blend, molding, and spinning
- Biodegradation evaluation
- Application

Organized by

National Institute of Advanced Industrial Science and Technology (AIST, Japan)
National Innovation Agency (NIA, Thailand)

Supported by

[JENESYS Program 2009]
JSPS Exchange Program for East Asian Young Researchers (Japan)
National Institute of Advanced Industrial Science and Technology (AIST, Japan)
National Innovation Agency (NIA, Thailand)

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JENESYS Programme

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Scope

To create a sustainable society, biobased plastics produced from renewable resources (biomass) and biodegradable plastics should be the critical materials in 21st century. The purpose of this symposium is to overview the current research activities and global tends on bioplastics (biobased and biodegradable plastics) and biobased materials and to promote these activities in both countries. In addition researcher exchange between Thailand and Japan will be expected.

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Symposium Programme

Wednesday, 2 September 2009

9:30-9:45	**Roadmap Bioplastics in Japan** *Dr. Seiichi Aiba,* *National Institute of Advanced Industrial Science and Technology*
9:45-10:00	**Roadmap Bioplastics in Thailand** *Dr. Supachai Lorlowhakarn, National Innovation Agency*
10:00-10:20	Refreshment
10:20-10:50	**Global warming and bio-based plastics** *Prof. Hitomi Ohara, Kyoto Institute of Technology*
10:50-11:20	**Research on production of bioplastic with alkalophile bacteria** *Dr. Yoshikazu Kawata,* *National Institute of Advanced Industrial Science and Technology*
11:20-11:50	**PHBV production from palm oil mill effluent by Comamonas EB 172** *Dr. Lai Yee Phang, University Putra Malaysia*
11:50-12:20	**Thailand of the Hub of Raw Materials for Bioplastics** *Assoc.Prof. Dr. Klanarong Sriroth, Kasetsart University*
12:20-14:00	Lunch break/Poster Session
14:00-14:30	**R & D of biobased polyamides** *Dr. Seiichi Aiba,* *National Institute of Advanced Industrial Science and Technology*
14:30-15:00	**Biomedical application of chitin and chitosan** *Prof. Hiroshi Tamura, Kansai University*
15:00-15:30	**Microbial degradation of PET (polyethylene terephthalate)** *Emeritus Prof. Kohei Oda, Kyoto Institute of Technology*
15:30-15:50	Refreshment
15:50-16:20	**International standards related to bioplastics -biodegradable and biobased** *Dr. Masao Kunioka,* *National Institute of Advanced Industrial Science and Technology*
16:20-16:50	**Panel Discussion by Japanese Experts** • Poster review and comment • Poster award ceremony • Thai-Japanese future collaboration on bioplastics and biobased materials.
16:50-17:00	**Closing Remarks** *Dr. Wantanee Chongkum, National Innovation Agency*

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Quantitative extraction and purification of poly-3-hydroxyalkanoate produced from *Alcaligenes latus* ATCC 29714

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To enhance PHA production, kinetic growth profile of various fermentation conditions is initially studied. However, cell growth determined by OD_{660nm} using spectrophotometry or CDW determined by gravimetric analysis does not truely correspond to exact PHA accumulation in *Alcaligenes latus* ATCC 29714 at various growth phases. Isolation and purification of PHA were then investigated in order to obtain quantitative extraction yield with excellent quality of poly-3-hydroxyalkanoate (PHA) from *Alcaligenes latus*. Not only extraction methods used for the isolation, but also cell lytic pretreatment prior to extraction step is an importance key to excellent yield. In the pretreatment step, the oven-dried biomass needs to be broken or ruptured with short chain alcohols such as methanol or ethanol which can only disrupt cell wall and dissolve impurities but not the PHA, avoiding loss of yield. Furthermore, agitations (such as stirring, shaking and sonicating) significantly accelerate pretreatment step and reduce chance of polymer degradation, hence increasing isolated yield and conserving polymer properties. A continuous Soxhlet extraction showed significantly higher yield than direct solvent extraction. Quantitative extraction yield can be achieved by choice of extracting solvents. Low boiling point chlorinated "partial solvents" such as dichloromethane and chloroform were found to give high PHA quality and high extraction yield without decomposition of polymer over long period of extraction. Finally, in the purification step, short chain alcohols or hexanes gave optimal results in aggregating polymers. Most isolated polymers characterization by Infrared Spectroscopy and Nuclear Magnetic Resonance spectroscopy corresponds to the structure of poly-3-hydroxybutyrate. Their purities and properties were determined by ^{1}H NMR spectroscopy, Differential Scanning Calorimetry and Diluted Solution Viscometry.