

## **Lecture III**

### **Biofuels by Biocatalysts**

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#### **Abstract**

At present, the world is confronting with the problem of oil depletion resulting in higher oil prices. One of the main reasons is the increasing rate of diesel engine production. Consequently, the promotions of surveys and research have been implemented in order to search for alternative sources of energy. Today, many scientists are trying to search for new technology of natural biomass production. Such alternatives should be decided based on the impact on the environment and human health compared to the application of fossil fuels. The ability to continuously manipulate the undepleted production has to be included for consideration.

Biodiesel is the fatty acid alkyl ester obtained from the chemical reaction called transesterification. In the process of biodiesel production from plant oil and animal fats with alcohol such as methanol or ethanol, it is necessary to add catalysts for the activation of the reaction rate. In the past, chemical catalysts such as sodium hydroxide or potassium hydroxide were more popularly used. The purity of the obtained glycerol, one of the useful by-products, is affected by these fatty acids. The difficulty from this chemical process is an attempt to separate the biodiesel from glycerol. The other disadvantage is the greater consumption of energy from high temperature required for the chemical process to complete the reaction with the fastest possible rate. Recently, many research groups have focused on enzymatic process by lipases catalysis which, in reality, exhibit better qualities than chemical catalysts in various aspects.

However, the majority of fuel ethanol in the world is made from corn cassava starch and sugarcane juice, a biopolymer of glucose and glucofuranose that is readily broken down to fermentable simple sugars like glucose. New technologies are being developed to produce ethanol from lignocellulosic biomass, such as agricultural wastes, forest residues and non food energy crops. Production of biofuels by biocatalysts is unquestionably more interesting. It is environmental friendly and can be conducted under the ambient temperature in which the energy consumption is certainly low.

### **Short Biography**

Dr. Warawut Chulalaksananukul was a student in Bachelor and Master Degrees at Chulalongkorn University between 1977-1983. After graduation, he became one of the staff members of Department of Botany, Faculty of Science, Chulalongkorn University. After 3 years work, he got the fellowship from the French government to further his study in the fields of Microbiology and Biotechnology in France. He got another master diploma in 1989 and was awarded his first honor Ph.D level from INSA, Toulouse, France in 1993. Currently, he is the head of Biofuels by Biocatalysts Research Unit Deputy and Director for Administration of Aquatic Resources Research Institute of Chulalongkorn University, Board of Genetics Society of Thailand and of The Science Society of Thailand under the Patronage of his Majesty the King.

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