



# Environmental Conservation by Fermentation of Biomass in Asia



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## Background

Asia holds more than 60% of the world population and the wastes it produces are estimated massive. The environmental pollution of Asia will cause great havoc to the world environment. In order to realize sustainable growth on the Earth where the resources are limited, it is necessary to effectively use reclaimable resources. In this aspects, the usage of biomass is an important issue that we should tackle first. This project aims at developing appropriate technologies of methane and ethanol fermentation of the biomass including waste biomass produced in Asia.

Carbon dioxide produced by the biomass utilization is what the plants absorbed from the air, so the technologies will contribute to the control of the global warming as well as the waste management. Methane gas produced can be used as fuel and for power generation and ethanol produced, bioethanol, be additive of gasoline to reduce the oil consumption. This will make it possible to design a regional energy self-supply system in Asia.

## Objective

- 1) Methane Fermentation: To develop appropriate technologies for methane fermentation of biomass including waste biomass produced in Asia and energy recovery as methane and hydrogen gases for reduction of CO<sub>2</sub> emission.
- 2) Ethanol Fermentation: To develop appropriate technologies for ethanol fermentation of biomass including waste biomass produced in Asia and energy recovery as ethanol for reduction of CO<sub>2</sub> emission.

## Biomass

The biomass to be studied is, for example, molasses, livestock wastes, garbage and sewage sludge for methane fermentation and corn, palm and cassava starch and sugar cane for ethanol fermentation.

## Expected Outcomes

Since the fermentation technology is safe, low cost and easy to handle, it will surely come into wide use in Asian developing countries. Not just in Asia, but in many countries they tend to put emphasis on economic growth rather than on environmental conservation, but this project will be helpful in constructing a recycle based society in which economy and environment coexists by enhancing the circulation of biomass. Its social significance is great as it can contribute not only to the conservation of environment in Asia but also to the mutual understanding due to personnel interchange through the joint research.

Environmental problems of developing countries have background peculiar to the region and they cannot be solved by merely transferring technologies of the developed countries and financial aids. The project will be started with organizing a joint research team of cooperating institutions in Asia with Asian Center for Environmental Research (ACER) as the hub to develop technologies that suit the region.

## Cooperative Organizations

ACER has already established relation with the following institution

- Hanoi University of Technology in Vietnam
- Shanghai Jiao Tong University in China
- Asian Institute of Technology in Thailand
- Chiang Mai University in Thailand
- Hong Ik University in Korea
- Korea Advanced Institute of Science and Technology in Korea

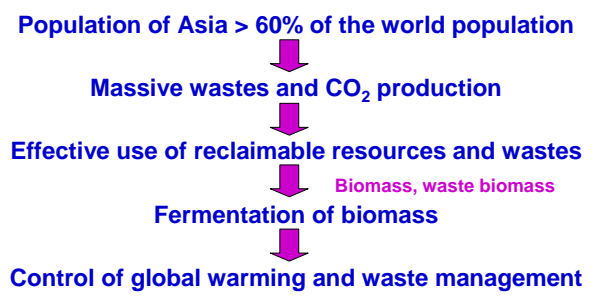


Figure 1. Overview of Research Background

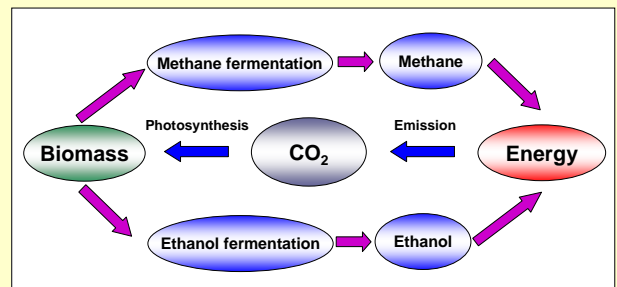


Figure 2. Carbon Neutral Technology by Fermentation of Biomass

## Research Framework

In fermentation technologies we will take into account of the regional characteristics and cost effectiveness and the following issues are particularly on the agenda:

- 1) Non-heating anaerobic digestion.
- 2) Pretreatment of the target biomass.
- 3) Kinetic analyses.
- 4) Optimum conditions of fermenter operation and so on.

## Contact Information



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