

Biodiesel Production from Closed-Algae Growing Systems Using Waste Water of Ethanol plant in Vietnam

Project Objective

The objectives of this project are:

- To develop a technique for producing biodiesel from microalgae using wastewater and a photobioreactor;
- To assess the cost of biodiesel and the potential use of microalgae as an alternative source of vegetal oil for biodiesel.

Description

Using fossil fuel as a source of energy has been widely recognized as unsustainable. Fossil fuel supplies are depleting and carbon dioxide is accumulating in the environment. This necessitates the need to develop renewable source of energy (using microalgae) with minimal or zero impact on the environment.

This project will develop a low cost large scale tubular photobioreactor for growing microalgae for biodiesel production. A photobioreactor is used because of its high productivity, easy contamination control, and efficient light path optimization. The reactor will use wastewater with high nutrient and CO₂ will be produced from an ethanol plant to grow algae in order to reduce the cost of operation. The production cost will be further reduced by optimization of the downstream processing such as wet extraction. The project will study the improvement of algae growth, oil extraction and refining, cost, and environmental issues from microalgae biodiesel.

Project Highlights

Project ID	: 3-V-053
Country	: Vietnam
Lead Partner	: Nong Lam University (NLU)
Partners	: Dong Xanh Company: Green Field Company (GFC), Finnish Environment Institute (SYKE), Universite Libre de Bruxelles (ULB)
Total Project Cost	: € 180,000
EEP Financing (% to total project cost)	: € 117, 000 (65%)
Technical Focus	: Biofuels
Activity	: Pilot Project
Duration	: 15 months

Relevance to Country's Energy and Environment Policies

This project is relevant to the Vietnam's energy and environment policies as it will contribute positively to the biofuel program for the next 20 years and biodiesel from algae is a renewable, carbon neutral resource for environmental and economic sustainability.

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Innovation and Knowledge Transfer

This project is expected to generate new ideas as listed below:

1. New photobioreactor design which is easy to construct to reduce cost and new arrangement of tube to receive light and CO₂. This new idea relates to the field of engineering in tubular photobioreactor design.
2. A combination of stress treatments to enhance oil content in algae. This area is related to the discoveries in algal biology.
3. Growing of microalgae for biodiesel in waste water and CO₂ source produced from cassava ethanol plant to reduce cost. This area is related to the environment, algal biology and economic issues.

Dissemination activities will be carried out during the project time. However, the main dissemination and technology transfer may be implemented after the completion of this project. Another project may be developed for this mission.

For more information:

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Photos on background information of EEP-3-V-053 algae biodiesel project: photos were taken at laboratories of Chemical Engineering Department, Nong Lam University HCM city, Vietnam

Growing of microalgae



Growth of Microalgae in 500mL bottle



Growth of Microalgae in 5000mL bottle



Growth of Microalgae in 170L PBR, indoor condition



Growth of Microalgae in 170L PBR, outdoor condition

Harvesting



Centrifuge to get biomass



Dried algae



Algae powder