

Bioconversion of Wastewater Sludge and Glycerol to Biodiesel

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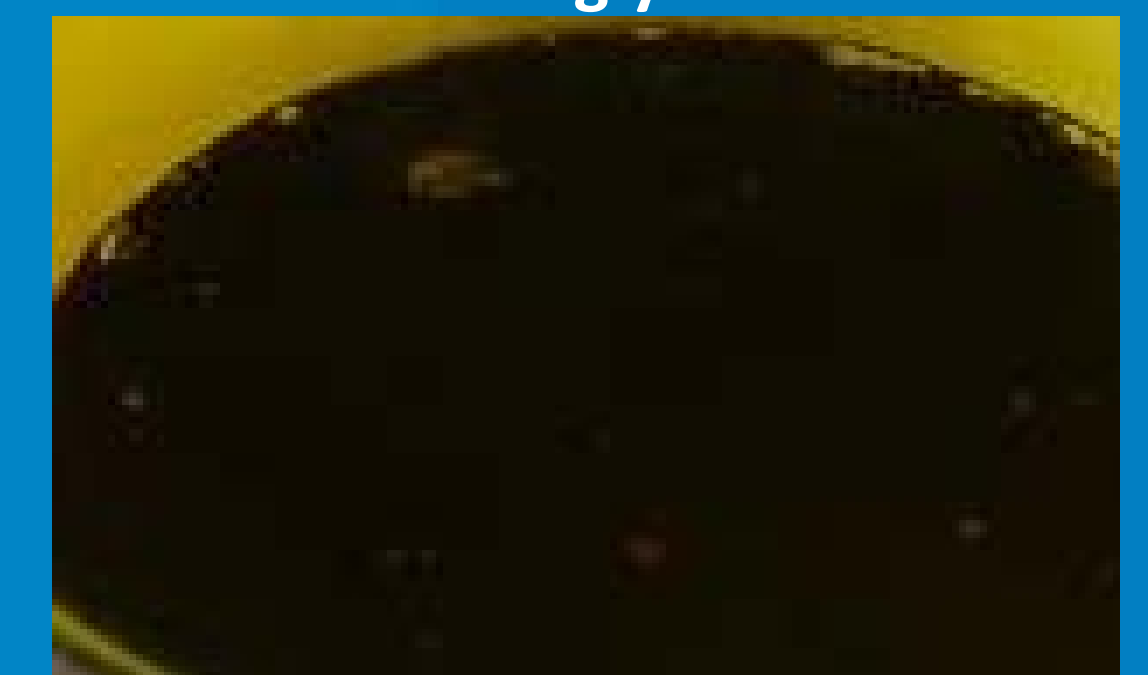
Introduction

Biodiesel, one of the promising alternative and renewable fuels, has been drawn attention. However, the cost of microbial oil (> 10 \$/gal) production is so high to be comparable with plant oils (< 4.5 \$/gal). The major cost (greater than 50% of total cost) is from the utilization of raw materials including carbon source and nutrients. Therefore, the biodiesel producers are looking for using cheaper raw materials like renewable resources such as wastewater sludge and/or crude glycerol.

sludge



crude glycerol



Oleaginous microbes-morphology

Process (crude glycerol to lipid)

Step 1: Fermentation (lipid accumulating)

Fermenter (28 °C, 48 h)

Process (crude glycerol to lipid)

Step 2: Cell disruptions (lipid releasing)

Homogenized cells

Process (crude glycerol to lipid)

Step 3: Phase separation (lipid separation)

Lipid, Water, Cell residues

Our Project

- First, highly active yeast and filamentous fungal strains were isolated from soil/wastewater sludge, then were used to develop a process for lipids production using crude glycerol and/or wastewater sludge as raw material (sterilized or non-sterilized).
- Experiments were performed in shake flasks, then scaled up to 15 L fermenter and will perform in 2000 L pilot plant.
- The implications of this highly original research are doubly significant. On one hand, residual biomass and/or by-products from industry (which are normally difficult and expensive to dispose of) can be converted into bio-energy, offers concrete solutions to environmental concerns and on the other hand, the production cost of bio-energy became economic.

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