

PROJECT TITLE Concentration of green algae for biodiesel by flotation

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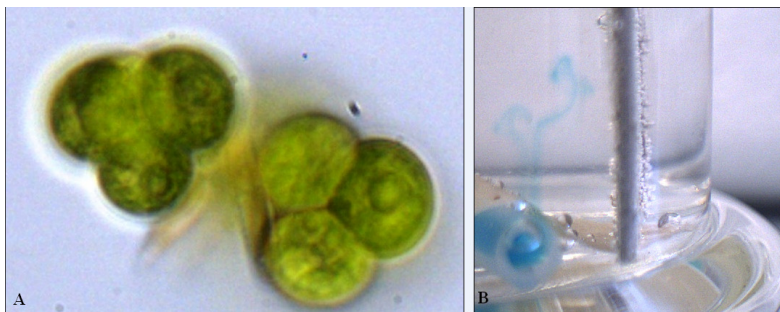
Any pre-requisite subjects: MEC2404 - Fluid mechanics I

The Problem

Marine algae are a second generation feedstock for the production of biodiesel, as it does not divert agricultural resources to the production of a transport fuel. This project is involved with concentration and purification of algae from the bioreactor at 1g/litre to around 20wt%, which is considered to be optimum for the separation of lipids from the algae cells. A number of different processes are being evaluated including flotation.

The Project

1. Analysis of bubble attachment to algae during electrolysis
Electrolysis experiments can be performed on algae. During these experiments, algae particles are carried to the surface by hydrogen bubbles created from the electrolysis reaction. This project involves analysing the attachment of hydrogen bubbles to algae; how many algal cells does one bubble attach to? Do the bubbles coalesce? Will varying the voltage applied affect the coalescence of bubbles and hence attachment to algae?
2. Dissolved air flotation for algae dewatering
The electrolysis experiments done so far on algae have shown that it is possible to obtain a concentrated layer of algae on the surface of the algae sample. In these experiments, the algae are carried to the surface of the sample by hydrogen gas formed at the electrodes. A dissolved air flotation unit is to be designed and constructed to determine the efficiency of this process and determine its specific energy requirements (J/kg of dried algae).



A) Algae seen under a microscope

B) Flow path of methylene blue dye in an electrolytic cell