

## **Mass harvesting of marine microalgae using different techniques**

### **ABSTRACT**

The marine species microalgae are an attractive source of feedstock for biofuel production and other bio-products such as omega-3 fatty acids and aquaculture feeds. The prevailing main nutrients in seawater environment for their growth are believed to be more economical than freshwater in terms of their cultivation system which may lead to low cost for upstream processing. Hence, marine microalgae provide attractive potential to be further explored. However, harvesting process of microalgae is known to be too costly because of their dilute nature that accounts for 20–30% of the overall production costs rendering using microalgae as the raw material not economically feasible. Currently the various harvesting methods including centrifugation, flocculation, flotation, filtration and magnetic separation had been applied to harvest marine species. For instance, harvesting by electrolytic means that require less energy to harvest marine species compared to the freshwater species. This can potentially help to reduce the challenges related to the exploitation of microalgae biomass. However, different techniques have their own advantages and drawbacks, whereas their cost and energy requirement vary accordingly depending on the selection of marine microalgal strains, equipment used and/or the choice of harvesting aid (flocculants, surfactant). Thus far, no single technique may still be proposed. Therefore, this paper aims to provide further details of each method used focusing only for marine species of microalgae with their respective advantages and disadvantages.

**Keyword:** Microalgae; Harvesting; Marine species; Biofuel; Bio-products