

TITLE: COMPARATIVE STUDY OF CELL DISRUPTION/EXTRACTION METHODS TO OBTAIN MICROALGAE OIL FROM NATIONAL BIOPROSPECTING MICROALGAE.

Production of biodiesel from microalgae is promising as they have the potential to offer considerable amount of fuel from small crop areas and lower production costs. Microalgae oil extraction is an important step in the production chain, which efficiency is related to global efficiency of the process.

The theme of this article is the comparison in terms of extraction efficiency, costs, energy requirements and toxicity; of five methods for microalgae oil extraction with chemical solvents and cell disruption. It was used hydrolysis with HCl 0.5M as a cell wall disruption method for hexane and cyclohexane in-situ extraction methods, soxhlet and ethanol/hexane methods; and it was carried out the methanol/chloroform method from biomass that did not go under a stage of cell disruption as well. Three different microalgae genus were took under this methodologies. They were: *Guinardia* sp, *Amphiprora* sp an *Tetraedron* sp, which were chosen for its high biomass productivity, easily of isolation and scaling up.

Two studies were developed in order to determinate the best of this procedures. As a first step, a statistical analysis was done over efficiency results making a comparison of the methods that includes cell disruption and then, having the best of these, compares it with the efficiency achieved with methanol chloroform. It was found that there are no significative differences between efficiency oil extraction given for methanol chloroform and soxhlet methods for *Amphiprora* sp and *Tetraedron* sp. While for *Guinardia* sp, methanol chloroform method is highly efficient compare to soxhlet. For the second step, criteria as: oil yield, energy requirements, toxicity and global cost of each method were considering into a study of cases which make possible to estimate different scenarios for the methods from variations on these criteria´s selection adjustment. It was shown that soxhlet were the best method for *Guinardia* sp and *Tetraedron* sp and the same happened for *Amphiprora* sp when it was given a high adjustment to the toxicity criteria.

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