

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME IV

Editors:

Ma'an Alkhatib
Abdullah Al Mamun
Faridah Yusof



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(VOLUME IV)

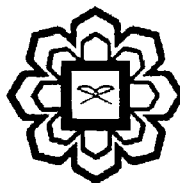
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CHAPTER 25

FEASIBILITY STUDY ON THE PRODUCTION OF BIODIESEL FROM MICROALGAE

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ABSTRACT

This study investigates the feasibility of producing biodiesel from fresh water *Botryococcus sudeticus* microalgae. It is believed that this microalgae has a lipid content of about 20% and that can be increased under various conditions such as nutrient concentrations and other growth conditions. Under optimized condition, the biomass yield was observed at various concentrations of nitrogen in the media, agitation speed and the pH of the medium. Furthermore, oil content of the biomass yield was extracted with n-hexane solvent using Soxhlet extraction. The maximum growth was achieved at high nitrogen concentration, low agitation speed and neutral pH, on the other hand the highest volume of oil was obtained when the nitrogen concentration was the lowest

Keywords: *botryococcus sudeticus*, biodiesel, biomass, microalgae

INTRODUCTION

The growing concern about the environmental impacts of fossil energy has drawn significant attention to renewable biofuels as alternative to petroleum-based fuels (Krohn, et al., 2010). Biomass has been sourced as renewable source of energy and large-scale introduction of biomass energy could contribute to sustainable development, environmentally, socially and economically (Aishah, et al., 2008). However important liquid biofuel that have attracted greater interest is biodiesel, a long chain alkyl esters, which is a renewable, biodegradable, and non-toxic biofuel that shows great promise to the environment (Lu, et al., 2009). Biodiesel is commonly derived from the transesterification of mono-, di- and triacylglycerides (TAGs) and the esterification of free fatty acids (FFAs) that occur naturally in biological lipids, such as animal fats and plant oils. As a result, biodiesel has the potential to be a carbon neutral fuel (Krohn, et al., 2010). Furthermore, in comparison to petroleum diesel which is a major source of greenhouse gas (GHG) (Aishah, et al., 2008), biodiesel emits lower levels of environmental pollutants including volatile organic compounds, particulate matter, and sulphur-compounds during combustion (Krohn, et al., 2010). In this perspective, considerable attention has been given towards the production of biodiesel as a diesel substitute.

Biodiesel fuel as a potential source of energy can be obtained from food crops, such as soybean, rapeseed, palm, or sunflower oils; however, there are significant concerns with its