Microalgal biodiesel production from C*hlorella vulgaris*

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Chlorella sp. which is one of the most investigated microalgae species in algal experiments has shown a great promise as a feedstock for biodiesel production due to its easy and rapid cultivation. In this study, effect of different growth parameters such as culture media additives and light intensity on lipid content and fatty acid structures of *C. vulgaris* were investigated. Microalgal oil was characterized with gas chromatography equipment and then transesterification of microalgal oil was carried out via ultrasonic and microwave methods by using methanol and potassium hydroxide as a catalyst. In the experiments, microalgal cultures were cultivated in different types of photobioreactors at various scales with culture medium and specific ratio of culture media additives at the temperature of 25±2°C in a shaking incubator. As a stress condition, illumination cycle was also altered in certain times to increase lipid content of microalgal cultures. In the chromatograms of microalgal oil, palmitoleic (16:1), oleic (18:1), linoleic (18:2) and linolenic acids and also low amount of stearic acids were found. Analyses showed that *C. vulgaris* has a high amount of unsaturated fatty acids and a high potential for biodiesel production. Stress conditions performed, changes in illumination cycle, culture media additives which are utilized from different industries, provided heterotrophic cultivation and also increased lipid content of *C. vulgaris.* In conclusion, high yield of fatty acid methyl esters was obtained from *C. vulgaris* microalgae.

Keywords: Microalgal oil, fatty acids, *Chlorella vulgaris,* biodiesel