

Bioenergy: Biodiesel from Freshwater Green Microalgae and a Cyanobacterium Occurring in Ghana

Doamekpor, L. K.¹, Onwona-Agyeman, R² and Ameka, G. K³

¹Department of Chemistry, School of Physical and Mathematical Sciences, University of Ghana, P. O. Box LG 56, Legon, Accra, Ghana.

²Institute of Environment and Sanitation Studies, College of Basic and Applied Sciences, University of Ghana, P. O. Box LG 209 Legon, Accra, Ghana.

³Department of Plant and Environmental Biology, School of Biological Sciences, University of Ghana, P. O. Box LG 55, Legon, Accra, Ghana.

*Corresponding Author: gameka@ug.edu.gh

Abstract

Biodiesel from freshwater green microalgae, and cyanobacteria holds promise as an alternative to replace petroleum diesel to meet the energy demands for transportation, industry and domestic use. In this study, three green freshwater microalgae (*Closterium acerosum* Ehrenberg ex Ralfs, *Oedogonium ciliatum* Pringsheim ex Hirn, and *Spirogyra africana* (F.E.Fritsch) Czurda), and a freshwater cyanobacterium (*Chroococcus turgidus* (Kützing) Nägeli) occurring in Ghana, were assessed to verify their suitability for biodiesel production. Samples of the species were collected from the Weija Lake; and the green freshwater microalgae were cultured in Bold's Basal Medium while the cyanobacterium was cultured in BG-11 (Blue-Green Medium) medium, in photo-bioreactors for 14 days. Algal lipids were extracted from dry biomass of the species with hexane and diethyl ether, and biodiesel produced from the lipids by base-catalysed transesterification. The amount of lipid extracted from the species varied from 20.3 in *Spirogyra* to 38.2% dry wt. in *Oedogonium*. Biodiesel produced also varied from 6.7 in *Spirogyra* to 22.3% dry wt. in *Closterium*, and the values fell well within the range reported for such organisms around the world. We suggest that many more microalgae occurring in Ghana should be sampled for their lipid content in future work on biodiesel production and development in the country.