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THE EFFECTS OF NUTRITION ON LIPID PRODUCTION OF *HAEMATOCOCCUS PLUVIALIS* AND BIODIESEL POTENTIAL

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Abstract

Biofuels are important energy source alternatives because of their low input and high output properties. *Haematococcus pluvialis* is a freshwater green microalga that is considered as third-generation biofuel feedstock. Production medium conditions and nutritional factors affect the productivity of process and quality of produced biofuel. In this present study the effects of carbon source's type (crude or technical glycerol) and concentration (1, 2.5 and 10 mM), nitrogen (0, 1.5 and 2.9 mM) and phosphorus (0, 2.5 and 5.6 mM) concentrations on production of *H. pluvialis* biomass, chlorophyll, and total lipid were investigated. Additionally, the fatty acid profile was detected by gas chromatography and the biodiesel potential was examined. The highest lipid production (11.49±0.57 mg/ g wet cell) was detected with 2.5 mM crude glycerol, 2.9 mM nitrogen and 5.6 mM phosphorus on 5th day of incubation. FAME composition of produced lipid was determined and saturated, polyunsaturated and monounsaturated fatty acid contents were detected as 65.20±2.89%, 8.90±0.31% and 19.90±1.11%, respectively. All these results indicate that *H. pluvialis* has the capability to utilize crude glycerol for lipid production with high phosphorus and sufficient nitrogen and organic carbon concentrations. Additionally, produced lipid might be used as a potential feedstock for a quality biodiesel production due to its fuel characteristics (IV, 34.01±1.66 and CN, 262.44±12.48) according to European Standard.

Keywords: biodiesel, glycerol, *Haematococcus pluvialis*, nitrogen, phosphorus

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