

Optimization of Direct-transesterification for Biodiesel Production from Microalgal Biomass of *Dunaliella tertiolecta* and *Tetraselmis* sp

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As the prices of conventional fossil fuels continue to escalate, so-called alternative fuels will become more attractive. Marine microalgae can synthesize lipids that can be converted into biodiesel. For a successful biodiesel production process, various unit operation steps, such as such as drying, lipid extraction, transesterification and biodiesel refining, are required. Direct-transesterification combine lipid extraction and transesterification into a single step to simplify the biodiesel production process. Process conditions for biodiesel production using two green microalgae, *Dunaliella tertiolecta* and *Tetraselmis* sp. KCTC12236BP, were investigated to optimize direct-transesterification process. The reaction conditions analyzed were reaction time, sulfuric acid concentration (catalyst), and volume of methanol. Maximum fatty acid methyl esters (FAMES) contents were obtained at 64°C and 3% sulfuric acid concentration. Optimal methanol volume and reaction time of direct-transesterification were 10 vol. (v/w) methanol and 3 h, respectively, for *D. tertiolecta*, and 7.5 vol. (v/w) and 5 h, respectively, for *Tetraselmis* sp. These results will help design a large-scale process for production from microalgae.