

PENGARUH PENAMBAHAN SILIKA TERHADAP PRODUKSI LIPID dan KARBOHIDRAT KULTUR CAMPURAN

Phaeodactylum sp. dan *Chlorella* sp.

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INTISARI

Mikroalga merupakan salah satu organisme yang dapat dijadikan sebagai bahan baku produksi biofuel. Pertumbuhan dan komposisi sel mikroalga dipengaruhi oleh strain dan kondisi lingkungan, termasuk suhu dan nutrisi. Nutrisi yang digunakan untuk pertumbuhan salah satunya silika, selain itu silika digunakan untuk membentuk *frustule* pada diatom. Penelitian ini bertujuan untuk mengetahui pengaruh pemberian silika terhadap pertumbuhan, berat kering, kandungan lipid dan karbohidrat yang dihasilkan dari kultur campuran *Phaeodactylum* sp. dan *Chlorella* sp. Kultivasi dilakukan selama 21 hari pada skala laboratorium menggunakan medium F/2. Pertumbuhan kultur diukur dengan menghitung densitas sel. Berat kering dihitung setiap 7 hari sekali untuk memperoleh produktivitas biomassa. Kadar karbohidrat diukur dengan metode fenol-sulfat. Kadar lipid netral diukur dengan metode analisis gambar digital hasil pewarnaan *Nile Red* menggunakan *free Software CellProfiler 2.0*, sampel diambil pada hari ke- 0, 7, 14 dan 21. Densitas sel dan berat kering tertinggi didapatkan pada kultur campuran *Phaeodactylum* sp. dan *Chlorella* sp. pada perlakuan Si 30 ppm yaitu sebesar 861.6667×10^5 sel/ml dan 1,47mg/ml. Kandungan lipid dan karbohidrat tertinggi pada kultur campuran *Phaeodactylum* sp. dan *Chlorella* sp. dengan perlakuan Si 30 ppm yaitu sebesar 391,02 mg/L dan 289,93 mg/L.

Kata Kunci: Kultur campuran, *Phaeodactylum* sp., *Chlorella* sp., karbohidrat, lipid, biofuel.

**EFFECT OF SILICA ADDITION ON LIPID AND CARBOHYDRATE
PRODUCTION MIXED CULTURES *Phaeodactylum* sp. and *Chlorella* sp.**

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ABSTRACT

Microalgae is one organism used as raw material for biofuel production. Growth and composition of microalgae cells are affected by strain and environmental conditions, including temperature and nutrients. One of nutrients used for the growth is silica, to form frustule on diatoms. This study was aimed to determine the effect of silica on growth, dry weight, lipids and carbohydrates produced from mixed cultures *Phaeodactylum* sp. and *Chlorella* sp. Cultivation was carried out for 21 days on a laboratory scale using a medium F/2. Culture growth was measured by counting cell density. The dry weight was calculated every 7 days to obtain a biomass productivity. Carbohydrate content was measured by the phenol-sulfuric method. Neutral lipid levels were measured by digital image analysis methods Nile Red staining results using a free Software CellProfiler 2.0, samples were taken on day 0, 7, 14 and 21. The highest cell density and the dry weight was found in mixed *Phaeodactylum* sp. and *Chlorella* sp. The treatment was obtained at 30 ppm is accounted for 861.6667×10^5 cells / ml and 1,47mg / ml. Respectively, the highest content of lipids and carbohydrates in mixed cultures were *Phaeodactylum* sp. and *Chlorella* sp. At 30 ppm, accounted to 391.02 mg / L and 289.93 mg / L.

Keywords: Mixed Culture, *Phaeodactylum* sp., *Chlorella* sp., carbohydrate, lipids, biofuels.