

# EFEKTIVITAS BIOFLOKULASI DAN KANDUNGAN KARBOHIDRAT, LIPID, PROTEIN, SERTA PIGMEN PADA KULTUR *Euglena* sp. DENGAN BIOFLOKULAN *Ettlia texensis*

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## INTISARI

Kebutuhan energi dunia semakin meningkat, tetapi tidak diiringi dengan ketersediaan sumber energi. Produksi energi alternatif berbahan alam ramah lingkungan perlu dikembangkan, salah satunya dengan memanfaatkan mikroalga *Euglena* sp. yang mampu mengakumulasi biomassa, karbohidrat, lipid, protein, dan pigmen. Namun, teknik pemanenan memakan biaya hingga 30% dari total biaya produksi sehingga dibutuhkan alternatif teknik pemanenan yang lebih efisien, yaitu bioflokulasi. Penelitian ini bertujuan untuk mengetahui efektivitas pemanenan dengan bioflokulasi dan kandungan karbohidrat, lipid, protein, dan pigmen mikroalga *Euglena* sp. dengan bioflokulan *E. texensis*. Penekanan penelitian ini adalah pada penerapan teknik bioflokulasi pada proses pemanenan kultur mikroalga *Euglena* sp. Pada penelitian ini dilakukan kultivasi skala 50 L menggunakan medium Cramer Myers dan medium AF6. Uji bioflokulasi dan uji pigmen dilakukan dengan metode spektrofotometri, uji karbohidrat dengan metode asam fenol-sulfat, uji lipid dengan metode Bligh & Dyer, serta dilakukan karakterisasi mikroskopis. Rasio optimal dengan persentase pengendapan tertinggi dicapai pada rasio *Euglena* sp. dan *Ettlia texensis* 1:2, sedangkan metabolit tertinggi dicapai pada rasio 1:0,25. Hasil persentase pengendapan, biomassa yang dihasilkan, dan kandungan karbohidrat, lipid, dan pigmen berbeda signifikan antarperlakuan. Penggunaan mikroalga *Ettlia texensis* sebagai agen bioflokulan mampu meningkatkan efektivitas pemanenan kultur *Euglena* sp.

**Kata kunci:** Analisis metabolit, bioflokulasi, model kinetik pertumbuhan, dan persentase pengendapan.

# BIOFLOCCULATION EFFECTIVENESS AND CARBOHYDRATE, LIPID, PROTEIN, AND PIGMENT CONTENT OF *Euglena* sp. CULTURE WITH *Ettlia texensis* BIOFLOCCULANT

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## ABSTRACT

The world's energy needs are increasing, but not accompanied by the availability of energy sources. Alternative energy production made from environmentally friendly natural materials needs to be developed by utilizing microalgae *Euglena* sp. which can accumulate biomass, carbohydrates, lipids, proteins, and pigments. However, the harvesting technique costs up to 30% of the total production cost, so an alternative harvesting technique that is more efficient, namely bioflocculation, is needed. This study aims to determine the effectiveness of harvesting with bioflocculation and the content of carbohydrates, lipids, proteins, and pigments of microalgae *Euglena* sp. with bioflocculant *Ettlia texensis*. This research emphasizes the application of bioflocculation techniques in the harvesting process of *Euglena* sp. microalgae semimass culture. In this study, 50 L scale cultivation was carried out using Cramer Myers medium and AF6 medium. Bioflocculation and pigment tests were carried out by spectrophotometric, carbohydrate by phenol-sulfuric acid method, lipid test by Bligh & Dyer method, and microscopic characterization. The optimal ratio with the highest percentage of precipitation was achieved at a ratio of *Euglena* sp. and *Ettlia texensis* 1:2, while the highest metabolites were achieved at a ratio of 1:0.25. The results of the percentage of precipitation, biomass produced, and the content of carbohydrates, lipids, and pigments were significantly different between treatments. The use of microalgae *Ettlia texensis* as a bioflocculant agent was able to increase the effectiveness of *Euglena* sp. culture harvesting.

**Keywords:** Bioflocculation, growth kinetic models, metabolite analysis, and recovery efficiency.