

# Pengaruh Pencahayaan LED Merah Terhadap Laju Pertumbuhan dan Fiksasi CO<sub>2</sub> Mikroalga *Spirulina platensis* = The Influence of Red LED Lighting on the Growth Rate and CO<sub>2</sub> Fixation of the Microalga *Spirulina platensis*

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## Abstrak

Penelitian mengenai pengaruh pencahayaan LED merah terhadap laju pertumbuhan dan fiksasi CO<sub>2</sub> mikroalga *Spirulina platensis* masih terus dikembangkan hingga saat ini, dimana mikroalga telah banyak dikenal sebagai organisme yang sangat efisien dalam menyerap karbon dioksida secara biologis dan mikroalga telah digunakan untuk memperbaiki kualitas udara dengan mengurangi kadar karbon dioksida dan meningkatkan jumlah oksigen. Pada penelitian ini, mikroalga *Spirulina platensis* dikultivasi menggunakan lampu LED merah dengan variasi intensitas cahaya (1000 lux, 3000 lux, dan 5000 lux) dan inokulum sel awal (OD 0,2, OD 0,3, dan OD 0,5) untuk mengetahui pengaruhnya terhadap jumlah biomassa kering, laju pertumbuhan, kemampuan fiksasi CO<sub>2</sub>, kandungan fikosianin, dan kandungan klorofil. Analisis menunjukkan bahwa berat kering biomassa tertinggi dan laju pertumbuhan tertinggi didapatkan pada OD 0,5 dengan intensitas 5000 lux menggunakan lampu LED merah sebesar 0,069 mg/ml dan 0,0374 mg/hari. Lalu, fiksasi CO<sub>2</sub> tertinggi didapatkan sebesar 0,00110 mg/mg alga menggunakan lampu LED merah pada intensitas 5000 lux. Kandungan fikosianin tertinggi didapatkan menggunakan lampu LED putih pada intensitas 3000 lux sebesar 0,033 mg/mg alga dan kandungan klorofil tertinggi didapatkan menggunakan lampu LED merah pada intensitas 3000 lux sebesar 0,883 mg/mg alga.

.....Research on the effect of red LED lighting on the growth rate and CO<sub>2</sub> fixation of *Spirulina platensis* microalgae is still ongoing. Microalgae are well-known organisms that are highly efficient in biologically absorbing carbon dioxide. They have been used to improve air quality by reducing carbon dioxide levels and increasing oxygen levels. In this study, *Spirulina platensis* microalgae were cultivated using red and white LED lights with variations in light intensity (1000 lux, 3000 lux, and 5000 lux) and initial cell density (OD 0.2, OD 0.3, and OD 0.5) to determine their effect on dry biomass, growth rate, CO<sub>2</sub> fixation ability, phycocyanin content, and chlorophyll content. The analysis showed that the highest dry biomass weight and growth rate were obtained at OD 0.5 with an intensity of 5000 lux using red LED lights, which were 0.069 mg/ml and 0.0374 mg/day, respectively. The highest CO<sub>2</sub> fixation was obtained at 0.00110 mg/mg algae using red LED lights at an intensity of 5000 lux. The highest phycocyanin content was obtained using white LED lights at an intensity of 3000 lux, which was 0.033 mg/mg algae. The highest chlorophyll content was obtained using red LED lights at an intensity of 3000 lux, which was 0.883 mg/mg algae.