

Pengaruh pengaturan laju aerasi terhadap laju pertumbuhan *nannochloropsis* sp. dalam fotobioreaktor plat datar = Effect of aeration rate adjustment on growth rate of *nannochloropsis* sp. in flat plate fotobioreactor / Maryam Mardiyah Farizal

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Abstrak

[*Nannochloropsis* sp. merupakan salah satu organisme fotosintetik yang memiliki banyak potensi manfaat, yaitu sebagai bahan makanan bernutrisi tinggi, komponen bioaktif, media pengurang polusi, dan media pembuatan bahan bakar terbarukan. Melihat potensi pemanfaatan *Nannochloropsis* sp., penelitian ditujukan untuk mendapatkan profil pertumbuhan paling optimal produksi biomassa *Nannochloropsis* sp. dalam fotobioreaktor plat datar dengan memperhatikan pengaruh laju aerasinya. Variasi laju aerasi 1,2 L/ menit, 1,4 L/ menit, 1,6 L/ menit, dan 1,8 L/ menit dialirkan pada kultur *Nannochloropsis* sp. selama proses kultivasi 130 jam. Di sisi lain, perhitungan gas hold up dilakukan untuk mempelajari hidrodinamika cairan dalam fotobioreaktor sebagai akibat dari laju alir gas masuk. Hasil penelitian menunjukkan laju aerasi 1,4 L/ menit memberikan hasil berat kering biomassa terbaik (0,83 g/ L) dan profil laju pertumbuhan yang memuaskan dibandingkan dengan variasi lainnya. Hal ini disebabkan oleh perpindahan CO₂ dari udara yang dialirkan kepada sel dan terdedahnya semua bagian kultur, akibat proses pengadukan, terhadap nutrisi dalam medium dan pencahayaan yang diberikan. Lebih lanjut, variasi nilai laju alir yang diberikan ditemukan tidak banyak mempengaruhi nilai yield lipid hasil kultivasi, dimana terdapat didalamnya beberapa jenis asam lemak yang cocok untuk diubah menjadi biodiesel.]; *Nannochloropsis* sp. is one of photosynthetic organism that has many potential benefits such as nutritious food ingredient, bioactive component, pollution reducer, and renewable fuel. Seeing the potential benefits of *Nannochloropsis* sp., this research is conducted with the aim to obtain optimal growth profile of *Nannochloropsis* sp. in a flat plate photobioreactor with the attention to the influence of its aeration rate. Varied aeration rate of 1.2 L / min, 1.4 L/ min, 1.6 L/ min, and 1.8 L/ min was supplied to the culture of *Nannochloropsis* sp. in flat plate photobioreactor for 130 hours. On the other hand, the calculation of the hold up gas was conducted to study the hydrodynamics phenomenon in cultivation regarding its gas input rate. The results showed that the 1,4 L/ min aeration rate gave the best results of biomass dry weight (0,83 g/ L) whereas the growth rate profile are also satisfactory, compared with the other aeration rate value. This caused by the transfer process of CO₂ from the air that flowed to all parts of the cell. Moreover the culture is exposed well, due to the mixing process, to nutrition and lighting in a given medium. Furthermore the result shows aeration rate has no significant effect in the yield lipid produced, where the lipid contained various types of fatty acids that suitable to be converted into biodiesel, *Nannochloropsis* sp. is one of photosynthetic organism that has many potential benefits such as nutritious food ingredient, bioactive component, pollution reducer, and renewable fuel. Seeing the potential benefits of *Nannochloropsis* sp., this research is conducted with the aim to obtain optimal growth profile of *Nannochloropsis* sp. in a flat plate photobioreactor with the attention to the influence of its aeration rate. Varied aeration rate of 1.2 L / min, 1.4 L/ min, 1.6 L/ min, and 1.8 L/ min was supplied to the culture of *Nannochloropsis* sp. in flat plate photobioreactor for 130 hours. On the other hand, the calculation of the hold up gas was conducted to study the hydrodynamics phenomenon in cultivation regarding its gas input

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