

# Produksi Biomassa, Produksi Lipid, Dan Karakterisasi Asam Lemak *Chlorella* Sp. Strain Asli Indonesia = Biomass Production, Lipid Production, and Fatty Acid Profiling of Indigenous Indonesian *Chlorella* sp. Strains

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## Abstrak

Penelitian bertujuan mengetahui fase pertumbuhan *Chlorella* sp.; identitas molekuler *Chlorella* sp.; mendeteksi lipid *Chlorella* sp. secara kualitatif; waktu panen *Chlorella* sp. dengan biomassa terbanyak; waktu panen *Chlorella* sp. dengan lipid terbaik; dan mengkarakterisasi asam lemak pada tiga fase pertumbuhan *Chlorella* sp. Sepuluh mikroalga diseleksi menjadi tiga melalui identifikasi molekuler, pendeteksian lipid kualitatif menggunakan Nile-red, dan pengamatan pertumbuhan dalam Erlenmeyer, selanjutnya karakterisasi pertumbuhan, pengamatan produksi biomassa dengan metode filtrasi, penghitungan kadar lipid dengan ekstraksi Bligh-Dyer, dan analisis profil asam lemak dengan karakterisasi FAME menggunakan GCMS. Hasil penelitian menunjukkan *Chlorella* sp. MA-84, *Chlorella* sp. MA-86, dan *Chlorella* sp. MA-90 diidentifikasi secara molekuler sebagai *Chlorella vulgaris* dan memiliki potensi lipid terbaik secara kualitatif tanpa hambatan pertumbuhan biomassa. Terdapat variasi fase-fase pertumbuhan pada ketiga strain. *Chlorella vulgaris* MA-84, *Chlorella vulgaris* MA-86, dan *Chlorella vulgaris* MA-90 menghasilkan biomassa tertinggi masing-masing  $1,242 \pm 0,08$  g/L (t12),  $3,217 \pm 0,17$  g/L (t14), dan  $0,604 \pm 0,04$  g/L (t16), kadar lipid tertinggi masing-masing  $13,853 \pm 7,09\%$  (t15),  $26,810 \pm 22,62\%$  (t16), dan  $10,161 \pm 3,74\%$  (t16). Ketiga strain mengandung asam palmitat, asam palmitoleat, asam heksadekadienoik, asam linoleat, asam stearat, dan asam arakidat.

.....The study aims to identify the growth phases of *Chlorella* sp., molecularly identify of *Chlorella* sp., qualitatively detect *Chlorella* sp. lipids, determine the best harvesting time for maximum biomass and maximum lipid content, also characterize the fatty acids on three growth phases of *Chlorella* sp. Ten microalgae were selected into three strains through molecular identification, qualitative lipid detection using Nile-red, and growth observation in Erlenmeyer, for analyze growth characterization, biomass production using filtration method, lipid content using Bligh-Dyer extraction, and fatty acid profiling through FAME characterization using GCMS. The research results showed that *Chlorella* sp. MA-84, *Chlorella* sp. MA-86, and *Chlorella* sp. MA-90 were molecularly identified as *Chlorella vulgaris* and demonstrated the best qualitative lipid potential with good growth. There were variations in growth phases among the three strains. *Chlorella vulgaris* MA-84, *Chlorella vulgaris* MA-86, and *Chlorella vulgaris* MA-90 produced the highest biomass of  $1.242 \pm 0.08$  g/L (t12),  $3.217 \pm 0.17$  g/L (t14), and  $0.604 \pm 0.04$  g/L (t16), respectively, and exhibited the highest lipid content of  $13.853 \pm 7.09\%$  (t15),  $26.810 \pm 22.62\%$  (t16), and  $10.161 \pm 3.74\%$  (t16), respectively. All three strains contained palmitic acid, palmitoleic acid, hexadecadienoic acid, linoleic acid, stearic acid, and arachidic acid.