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±0,08 g/L (t12), 3,217±0,17 g/L (t14), dan 0.604±0.04 g/L (t16), kadar lipid tertinggi masing-masing 13,853±7,09% (t15), 26,810±22,62% (t16), dan 10,161±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±0.08 g/L (t12), 3.217±0.17 g/L (t14), and 0.604±0.04 g/L (t16), respectively, and exhibited the highest lipid content of 13.853±7.09% (t15), 26.810±22.62% (t16), and 10.161±3.74% (t16), respectively. All three strains contained palmitic acid, palmitoleic acid, hexadecadienoic acid, linoleic acid, stearic acid, and arachidic acid.