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Comparison of *Synechocystis* sp. PCC6803 and *Nannochloropsis salina* for lipid production using artificial seawater and nutrients from anaerobic digestion effluent

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Abstract

The potential use of *Synechocystis* sp. PCC6803 (*Synechocystis* sp.) for lipid production using artificial seawater (ASW) medium supplemented with anaerobic digestion effluent (ADE) was investigated and compared to marine microalgae, *Nannochloropsis salina* (*N. salina*). *Synechocystis* sp. showed growth rates 83% and 20% higher than *N. salina* at 3% and 6% ADE loading ratios, respectively, achieving the highest biomass productivity of 212 mg L^{-1} d^{-1} in semi-cultivation. The rapid growth of *Synechocystis* sp. was offset by its low lipid content, resulting in lipid productivities 7–28% lower than *N. salina*. The lipid productivity of *Synechocystis* sp. may be further improved by decreasing the harvesting interval during semi-continuous cultivation. Fatty acid analysis showed that lipids extracted from *Synechocystis* sp. contained higher palmitic acid (60.3±2.0%) and linoleic acid (20.0±1.6%), and had a higher cetane number and oxidative stability than those from *N. salina*.

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