

Series Cultivation Process for Simultaneous Induction of Biomass and Lipid Accumulation

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Microalgae are known for a promising source of clean renewable energy. When algal cells are exposed to stress conditions, they synthesize lipid as a protective mechanism. This accumulated lipid is able to be utilized as a source of biodiesel. Stress conditions, however, require cease of cell division, which indicating increase of biomass, thus inhibits overall productivity. Several approaches tried to solve this dilemma such as genetic engineering. Among them, one impressive trial is known as two-step cultivation. Until now, however, two-step cultivation process requires additional cost in the step of delivering fresh cells into stress conditions. In this research, the cost is reduced by automatic induction of nitrogen starvation. Four flat-panel photobioreactors are connected in series, operated with continuous supply of fresh media into first reactor. Microalgae *Nannochloropsis gaditana* cells actively grow in first and second reactor, then accumulate lipid in latter reactors due to lack of nitrogen source. Finally, the overall harvested cells show high concentration of both biomass and lipid.