

Model predictive control for microalgal photobioreactor systems

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Microalgae have been suggested as a promising feedstock for producing biofuel because of their potential for lipid production. In this study, a first principles ODE model for microalgae growth and neutral lipid synthesis related with photo effect is investigated for the purpose of maximizing the growth rate and the amount of neutral lipid. The model follows the assumption of Droop model which explains the growth as a two-step phenomenon; the uptake of nutrients is first occurred in the cell, and then use of intracellular nutrient to support cell's growth. In this study, model predictive control based on successive linearization is implemented to maximize the amount of neutral lipid contents.