

Enhanced lipid productivity from microalgae: a mathematical model based optimization and evaluation

유경환, 이재형[†]
카이스트

(jayhlee@kaist.ac.kr[†])

Increasing lipid production rate stands as one of the challenges to bring microalgae-based bio-refinery to the economic feasibility. Various bioreactor operation methods have been considered for cultivating microalgae, including batch, continuous, fed-batch, and two-stage operations, with the aim of improving their overall economics. However, since previous studies used different reactor designs and criteria for evaluating the various bioreactor operation methods, it is hard to say something conclusive about their relative economic performances. Hence, this study compares the performances of the different operation methods after optimizing the operating condition for each operation. The optimal conditions are determined by performing a model based optimization to maximize the lipid productivity, which is a major determining factor of the overall economics. Various cost factors affecting the economics of microalgae cultivation, such as those of required nutrients, electricity and equipment, are analyzed.