An integrated raceway pond model for microalgal cultivation and its application

유경환, 김보은, 오승환, 이재형[†]

카이스트

(jayhlee@kaist.ac.kr[†])

In this research, a new model is proposed for microalgal cultivation in raceway pond (RWP). Recently, many researchers have studied microalgae as potential raw material for biofuels and chemicals. However, the high cost of cultivation stands as the main obstacle to the successful commercialization. RWP with its relatively low cultivation cost is considered as most probable means for the mass production of microalgae. Despite this, there are only few published research works on the modeling of microalgae growth in a RWP since it encompasses many complicated phenomena including mass hydrodynamics, light penetration, and microalgal growth. This is in contrast to photo-bioreactors, which provide much more controlled conditions for the microalgae growth. In this research, a new RWP model, which considers microalgal growth, light gradient, and sedimentation (hydrodynamics), is proposed. Based on the model, operating conditions are optimized using the genetic algorithm.