Modeling and its applications of microalgae cultivation in open raceway pond

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In this research, a new model is proposed to predict microalgae cultivaiton in an open raceway pond (ORP). Based on the proposed model, optimal operating condition for maximizaing the operating profit is searched. 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 successful commercialization. ORP with its relatively low cultivation costs is considered as the most probable means for the mass production of microalgae. Despite this, there exist few published research works on the modeling of microaglae growth in an ORP as it growth. Futhermore, previously proposed ORP models, which are based on computational fluid dynamics research, a new ORP model is proposed. It is based on dynamics of microalgae growth, light penetration, sedimentation and heat transfer, which are improtant for microalgae cultivation in an ORP. Since the model is relatively simple, we can use it to optimize the operating condition. The optimization result shows that current operating practice leaves much room for improvement.