

### Enhancement of Growth Yield of Microalgae Cultivation in an Open Raceway Pond by Generating Vertical Flow.

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Against global warming due to CO<sub>2</sub> emission, techniques that reduce CO<sub>2</sub> emission have attracted attention. Among others, microalgae-extracted oil has been studied as a solution, which needs large scale microalgae cultivation. Open raceway pond (ORP) is most widely used for mass production of microalgae. As conventional ORP has low light intensity at the bottom of pond, the depth of pond and the productivity of microalgae cultivation per unit area are limited. By generating vertical flow and improving mixing performance, microalgae in the pond has more chance to receive light leading to higher productivity of microalgae cultivation. To enhance vertical flow, internal structures were installed in lab scale ORP. By performing numerical simulation, the effect of internal structure to generate vertical flow was confirmed. To verify the effect of vertical flow on the productivity of microalgae, two existing lab scale ORPs with and without structures were compared for microalgae cultivation. From the CFD simulation and experimental results, internal structure was shown to be effective to increase the productivity of microalgae cultivation by generating vertical flow.