

Fed-Batch Mixotrophic Cultivation of Microalgae *Scenedesmus* sp., Using Airlift Photobioreactor

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Abstract : This study investigates the feasibility of fed-batch mixotrophic cultivation of microalgae *Scenedesmus* sp. in a 3-litre airlift photobioreactor under standard operating conditions. The results of this study suggest the algae species may serve as an excellent feed for aquatic species using organic byproducts. Microalgae *Scenedesmus* sp., was cultured using a synthetic wastewater by stepwise addition of crude glycerol concentration ranging from 2-10g/l under fed-batch mixotrophic mode for a period of 15 days. The attempts were made with the stepwise addition of crude glycerol as a carbon source in the initial growth phase to evade the inhibitory nature of high glycerol concentration on the growth of *Scenedesmus* sp. Crude glycerol was chosen since it is readily accessible as byproduct from biodiesel production sectors. Highest biomass concentration was achieved to be 2.43 g/l at the crude glycerol concentration of 6g/l after 10 days which is 3 fold times the increase in the biomass concentration compared with the control medium without the addition of glycerol. Biomass growth data obtained for the microalgae *Scenedesmus* sp. was fitted well with the modified Logistic equation. Substrate utilization kinetics was also employed to model the biomass productivity with respect to the various crude glycerol concentration. The results indicated that the supplement of crude glycerol to the mixotrophic culture of *Scenedesmus* sp., enhances the biomass concentration, chlorophyll and lutein productivity. Thus the application of fed-batch mixotrophic cultivation with stepwise addition of crude glycerol to *Scenedesmus* sp., provides a subtle way to reduce the production cost and improvisation in the large-scale cultivation along with biochemical compound synthesis.

Keywords : airlift photobioreactor, crude glycerol, microalgae *Scenedesmus* sp., mixotrophic cultivation, lutein production

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