

Worawit Whangchenchom 2014: Optimal Condition for Nutrient Removal and Microalgae Biomass Production in Wastewater from Instant Noodle Factory using Microalgae Cultivated in Photobioreactor. Master of Engineering (Advanced and Sustainable Environmental Engineering), Major Field: Advanced and Sustainable Environmental Engineering, Faculty of Engineering. Thesis Advisor: Associate Professor Wilai Chiemchaisri, D.Tech.Sc. 179 pages.

Cultivation of microalgae using wastewater exhibits several advantages such as nutrient removal and the production of high valuable products such as lipid and pigments. With this study, two types of wastewater from instant noodle factory; mixed liquor suspended solids (MLSS) and effluent after sedimentation tank were investigated for green microalga *Scenedesmus* sp. cultivation under laboratory condition. MLSS and effluent without dilution showed the highest specific growth in preliminary testing. There was no significant ( $p < 0.05$ ) difference on growth and biomass of wastewater from instant noodle factory and control (BG11) using Duran bottle as culture vessel under laboratory condition. Ammonia from ammonification and nitrate were nitrogen source for microalgae cultivated in MLSS and effluent, respectively. Phosphate addition could promote higher maximum algal biomass especially from MLSS. MLSS was therefore used as the culture medium for outdoor algal culture in 6 L vertical column photobioreactor. It was found that aeration with 2% CO<sub>2</sub> supplement during daytime provided the highest productivity of *Scenedesmus* under batch culture in outdoor condition. Outdoor continuous culture of *Scenedesmus* was also performed with MLSS. At steady stage (day 21 – 38) with  $0.46 \pm 0.03 \text{ day}^{-1}$  dilution rate, microalgal productivity was  $167.43 \pm 13.02 \text{ mg/L/day}$ . Moreover, cultivation of *Scenedesmus* could reduce total COD, soluble COD, total nitrogen and total phosphorus in wastewater from instant noodle factory.

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