

High rate algal pond cultivation of indigenous microalgae for biomass using municipal wastewater

강시은, 김병혁¹, 리쉬람 라마난¹, 양지원[†], 김희식¹

한국과학기술원; ¹한국생명공학연구원

(jwyang@kaist.ac.kr[†])

This study evaluates the growth and nutrient removal ability of indigenous algal consortium on municipal wastewater in a high rate algal pond (HRAP). Primary treatment wastewater was used as a nutrient source of indigenously grown microalgae in high rate algal pond which were under different conditions of hydraulic retention time (HRT: 2, 4, 6, and 8days). The average removal efficiencies of chemical oxygen demand, total nitrogen and phosphate of real municipal wastewater were maintained at $85.44 \pm 5.10 \%$, $92.74 \pm 5.82\%$ and $82.85 \pm 8.63\%$, respectively in 2 day HRT. Biomass and lipid productivity was $0.500 \pm 0.03 \text{ g/L/d}$ and $0.103 \pm 0.0083 \text{ g/L/d}$ (2 day HRT), respectively. Fatty acid methyl ester analysis revealed a predominance of palmitate (C16:0), palmitoleate (C16:1), linoleate (C18:2), and linolenate (C18:3). Microalgal diversity analyses determined the presence of *Chlorella*, *Scenedesmus* and *Stigeoclonium* as the dominant microalgae. From these results, indigenous algal consortium provides significant value not only in terms of nutrient removal but also bioenergy potential.