

Prathana Vichumane 2012: Utilization of Confectionery Wastewater for Production of Bioplastic Monomer by Waste Activated Sludge. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Science. Thesis Advisor: Mrs. Piyapawn Somsamak, Ph.D. 108 pages.

This research investigated the conditions stimulating polyhydroxybutyrate (PHB) accumulation in waste activated sludge by using the confectionery wastewater with COD:N 75 as raw materials and screened for PHB accumulating organisms. The conditions examined were aerated: non-aerated cycle, chemical oxygen demand: nitrogen (COD:N) ratios and source of carbon supplement. The results showed that waste activated sludge incubated under 15:9 h aerated: non-aerated cycles with the initial biomass concentration of 1000 mg/L demonstrating the highest PHB accumulation at 67.60 mg/g dry weight. When the accumulation of PHB at various COD:N ratios was examined, PHB accumulation increased with higher COD:N ratios under aerated cycle 24 h. Moreover, at COD:N ratio 75-120 the accumulation of PHB was not different statistically. It suggests that the confectionery wastewater contains suitable amount organic carbon and nitrogen which can stimulate unbalanced growth conditions and enhanced PHB accumulation. While being incubated under aerated: non-aerated cycles, COD:N less than 120 did not affect the PHB accumulation. At COD:N 120, however; the highest PHB accumulation of 64.47 mg/g dry weight was obtained. COD:N ratios greater than 120 demonstrated inhibitory effects to PHB accumulation. When several compounds were tested as source of carbon supplement, sucrose supplement yielded highest PHB accumulation. Waste activated sludge were enriched and screened for PHB accumulating organisms. Then 4 bacterial isolates were selected. Upon incubated under aerated: non-aerated 15:9 h using confectionery wastewater supplemented with sucrose (COD:N 120), Isolate 3 gave the PHB accumulation of 189.45 mg/g dry weight.

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