

Comparative Study of the Contaminant Removal Efficiencies from Municipal Wastewater by an Aerobic Biofilm System Using Natural Gravels and Recycling Materials as the Contact Media

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Abstract

This study aimed to evaluate the contaminant removal efficiencies from municipal wastewater by an aerobic biofilm system using different materials as the contact media. A pilot-scale biofilm system was constructed using natural gravels at the size between 5 and 10 cm as well as the recycling materials of (1) construction and demolition waste (C&D waste), and (2) oyster shells. The municipal wastewater used was collected from a drainage channel. The retention times for the experiments were 4, 6 and 8 hours. The use of C&D waste demonstrated a better capability of removing suspended solid (SS), biological oxygen demand (BOD) and ammonium-nitrogen (NH₃-N) in municipal wastewater. For SS, BOD and NH₃-N, the removal efficiencies using C&D waste as the contact media were calculated as 76.4%, 73.8% and 82.2.0% at the retention time of 8 hours and 12.2 L/min aeration rate, respectively. The increase in system retention time resulted in the improvement of BOD, SS, and NH₃-N removal. By considering the project life span of 20 years of this facility, using recycling materials as the contact media might reduce the unit treatment cost for municipal wastewater from 1.47 NTD/ton to 1.17-1.15 NTD/ton compared to that using gravel as the contact media.

Keyword : organic carbon, biofilm, recycling materials, wastewater treatment