

Kinetic Evaluation of Biodegradability of Paint Shop Wastewater of a Bus Production Factory

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Abstract : This paper presents a biological treatability study of paint shop wastewater of a bus factory by an anoxic/aerobic sequencing batch reactor. A lab scale 14L SBR system was implemented to investigate carbon and nitrogen removal performance from paint shop waste streams combined with domestic and process wastewater of a bus production factory in Istanbul (Turkey). The wastewater collected from decanters of the paint boots and pre-treatment plant was used for the feeding of SBR. The reactor was operated with a total hydraulic retention time of 24 hrs, and a total sludge age of 18.7 days. Initially the efficiency and stability of the reactor were studied when fed with main wastewater stream to simulate the current wastewater treatment plant. Removal efficiency of 57% nitrogen and 90% COD were obtained. Once the paint shop wastewater was introduced to mainstream feeding with a ratio of 1:5, nitrification completely, carbon removal were partially inhibited. SBR system was successful to handle even at very high COD concentrations of paint shop wastewater after feeding of 2 months, with an average effluent COD of 100 mg/L. For the determination of kinetic parameters, respirometric analysis was also conducted with/without paint shop wastewater addition. Model simulation indicated lower maximum specific growth and hydrolysis rates when paint shop wastewater was mixed with the mainstream wastewater of the factory.

Keywords : biological treatability, nitrogen removal, paint shop wastewater, sequencing batch reactor

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