

Simultaneous Nitrification and Denitrification in Suspended Activated Sludge Process Augmented with Immobilized Biomass: A Pilot Study

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Abstract : Simultaneous nitrification and denitrification (SND) are a natural phenomenon in the soil environment that can be applied in wastewater treatment. At a domestic wastewater treatment plant, we performed a pilot test of installing bioplates with entrapped biomass into a conventional aeration basin for SND, and investigated the effects of bioplate packing ratio, hydraulic retention time, dissolved oxygen level, on/off aeration mode, and supplemental carbon and alkalinity on nitrogen removal. With the pilot aeration basin of 1.3 m³ loaded with mixed liquor suspended solids of 1500-2500 mg/L and bioplates at PR of 3.2% (3.2% basin volume) operated at HRT of 6 h and DO of 4-6 mg/L without supplemental carbon or alkalinity, nitrogen in the wastewater was removed to an effluent total nitrogen (TN) of 7.3 mg/L from an influent TN of 28 mg/L. The bioplate robust cellulose triacetate structure carrying the biomass shows promise in retrofitting conventional aeration basins for enhanced nutrient removal.

Keywords : immobilization, nitrification/denitrification, nutrient removal, total nitrogen

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