Nitrogen removal performance and microorganism community of an A/O-MBBR system under extreme hydraulic retention time

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\textbf{A B S T R A C T}

A lab-scale anoxic-oxic moving bed biofilm reactor (A/O-MBBR) was used to treat simulated nitrogenous wastewater. Transition of nitrogenous compounds and total nitrogen (TN) removal performance were studied under extreme hydraulic retention time of 8 h. The optimal \(\text{NH}_4^+\)–N and TN removal performance was achieved with dissolved oxygen (DO) concentration of 5.4 mg/L in the oxic reactor, which was 72\% and 34\% with influent \(\text{NH}_4^+\)–N and urea of around 30 and 50 mg/L. Polysaccharide concentration, protein concentration and PS/PN fluctuated significantly with the variation of DO concentration in the oxic zone, which achieved around 31.8 mg/g VSS, 7.1 mg/g VSS and 40, respectively. The fluorescence excitation emission matrix showed different distinct peaks under different DO concentration in the oxic zone. \textit{Terrimicrobium}, a kind of strictly anaerobic bacteria, became the main genera when DO concentration was controlled at around 1.9 mg/L in the oxic zone according to the results of high-throughput sequencing.

\textit{Keywords:} Anoxic/oxic; Moving bed biofilm reactor; Nitrogen removal; Hydraulic retention time

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