Effects of aeration on/off times and hydraulic retention times in an intermittently aerated membrane bioreactor

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\textbf{ABSTRACT}

Intermittently aerated membrane bioreactor is a process that combines an intermittently aerated bioreactor with a membrane. A membrane bioreactor can achieve complete separation between solids and liquids, and improve nitrogen removal because the reactor contains bacteria relevant to nitrifying and denitrifying. This paper is an investigation into removal efficiencies on two operation factors (aeration on/off times and hydraulic retention times (HRTs)). Permeate concentrations of T-N and T-P in 60 min-on/60 min-off were 19.6 and 4.41 mg/L, respectively, and permeate concentrations of T-N and T-P in 30 min-on/30 min-off were 22.7 and 4.56 mg/L, respectively. Accordingly, we found that 60 min-on/60 min-off was superior to 30 min-on/30 min-off. This was due to the high mixed liquid suspended solid concentration and the sufficient aerobic/anoxic time for the reaction. In the experiments with HRTs of 6, 9, and 12 h, the removal efficiency of organic matter was above 90% under all conditions. However, the HRT of 6 h was the best condition for removal efficiencies of T-N and T-P, due to high chemical oxygen demand loading rates per unit time of the influent. 

\textit{Keywords:} Intermittently aerated membrane bioreactor; Membrane bioreactor; Nutrient removal; Aeration on/off time; Hydraulic retention time

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