The effects of operation conditions of carbon/nitrogen ratio and pH on nitrogen removal in intermittently aerated membrane bioreactor (IAMBR)

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ABSTRACT

In this study, the effect of chemical oxygen demand/nitrogen (COD/N) and pH on nitrification-denitrification was investigated by operating a sequencing batch reactor with the use of aeration duration control, coupled with a membrane bioreactor (MBR) system to improve the efficiency of nutrient removal. Among the COD/N ratios of 2, 4 and 6, the removal efficiencies of NH$_4^+$, NO$_3^-$ and NO$_2^-$ in permeate, were the highest at 92.31, 80.69 and 93.63% respectively, at the COD/N ratio of 6. This ratio is an important factor to be considered for successful nitrogen removal. For pH values of 5.5, 7.6 and 9 there was a great difference in the removal of NH$_4^+$, NO$_3^-$ and NO$_2^-$ with pH 7.6 were the highest at 92.31, 84.51 and 93.63%, respectively. This implies that a pH above 7.6 should be maintained for a nutrient removal efficiency of approximately 90%.

Keywords: Nitrification; Denitrification; COD/N ratio; Membrane bioreactor; Nitrogen; Waste-water

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