



Effect of recycle ratio on performance of pre-denitrification moving bed biofilm reactors in treating coal gasification wastewater

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ABSTRACT

A lab-scale sequential anoxic moving bed biofilm reactor (ANMBBR) and aerobic moving bed biofilm reactor (AEMBBR) for pre-denitrification system were used to treat real coal gasification wastewater. Removal efficiencies of COD, phenols, thiocyanate (SCN^-), ammonium (NH_4^+-N), and total nitrogen (TN) were investigated at different recycle ratios, and then NaHCO_3 was added into the inlet of the AEMBBR to promote nitrification. Maximal removal efficiencies of COD, phenols, and SCN^- were 84.2, 88, and 99.9% at a recycle ratio of 3.0, respectively. NH_4^+-N and TN removal efficiencies could achieve 97.4 and 78.2% with the addition of NaHCO_3 (3 g NaHCO_3 per day). Concentrations of NO_2^--N and NO_3^--N were always below 0.2 mg/L in the effluent of the ANMBBR. NO_2^--N accumulation could be observed in the effluent of the AEMBBR after adding NaHCO_3 .

Keywords: Coal gasification wastewater; Pre-denitrification system; Moving bed biofilm reactor; Recycle ratio; Nitrification

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