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EXPERIMENTAL STUDIES ON THE EFFECTS OF DIFFERENT CARBON SOURCES ON PHOSPHORUS REMOVAL DURING DENITRIFYING PROCESS IN THE PARALLEL A^2O-MBR SYSTEM

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Abstract

A novel parallel A^2O-MBR system was developed in this study based on the theory of denitrification with phosphorus removal. By utilizing the denitrifying phosphorus accumulating bacteria (DPB), the carbon source in the influent could meet the needs of both the denitrification and dephosphorization processes. Therefore, the carbon source restriction in conventional A^2O processes was resolved. The proposed system was inoculated with the sludge collected from the secondary settling tank in a municipal sewage treatment plant. When the sludge reflux ratios of the anaerobic and aerobic tanks were 100% and 200% respectively, over 98% COD, NH_3-N, and phosphate were removed from the influent, which initially contained 240~350 $mg \cdot L^{-1}$ COD, 25~40 $mg \cdot L^{-1}$ NH_3-N, 50~60 $mg \cdot L^{-1}$ total nitrogen, and 4.3~6.7 $mg \cdot L^{-1}$ total phosphorus. The type of carbon source was an important factor for the denitrification and dephosphorization process regulation. Compared with sodium propionate, sodium acetate could markedly enhance the phosphorus release in anaerobic step. Therefore, the activity of DPB was promoted for the phosphorus uptake in the anoxic condition, and the simultaneous denitrification was also improved indirectly. The total nitrogen removal was increased by more than 15% due to the change of the carbon source from sodium propionate to sodium acetate.

Key words: A^2O, carbon source, denitrifying phosphorus removal, MBR, simultaneous nitrogen and phosphorus removal

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1. Introduction

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