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SIMULTANEOUS NITRIFICATION AND DENITRIFICATION AND MICROBIAL COMMUNITY STRUCTURE UNDER THE DUAL STRESSES OF SALT AND PHENOL

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Abstract

Saline phenol is a type of wastewater for which biological treatment is challenging. In this study, a sequencing batch biofilm reactor (SBBR) was used to treat saline phenol wastewater. The effects of phenol and salinity acclimation after 65 operation cycles on the simultaneous nitrification and denitrification (SND) rate and removal effect were studied. The inoculum was first adapted to phenol and then to NaCl. At a phenol concentration of 500 mg/L and a salinity of 12 g/L, the removal rates of chemical oxygen demand (COD), NH_4^+-N, and total nitrogen (TN) could reach 89%, 87%, and 72%, respectively. High-throughput sequencing was used to explore the diversity of microbial communities and species changes in the reactor. The reasons for the changes in the treatment effect of the reactor were analyzed. *Pseudomonas* and *Azoarcus* were more adaptable to growing in saline phenol wastewater and provided the primary denitrification and phenol removal capabilities.

Key words: high-throughput sequencing; saline phenol wastewater; sequencing batch biofilm reactor; simultaneous nitrification and denitrification;

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