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SIMULTANEOUS TREATMENT OF SULFATE WASTEWATER AND DOMESTIC SEWAGE WITH MICRO-AERATION

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Abstract

High sulfide inhibited the activities of sulfate-reducing bacteria (SRB) and methane-producing bacteria (MPB). In addition, a large number of domestic sewages should be treated in China. Thus, it is the first time that domestic sewage was collected to dilute high-sulfate wastewater in this study to achieve simultaneous treatment of sulfate wastewater and domestic sewage in the anaerobic baffled reactor (ABR). The results showed that there were obvious separation of sulfate reduction phase and methane production phase in the ABR, and large sulfate were reduced in the front compartments. Micro-aeration (oxygen demand of 0.4-0.6 mg/L) could significantly decrease sulfide concentration from 45 mg/L to 5 mg/L. Furthermore, micro-aeration between sulfate-reducing and methane-producing phases could significantly promote the synergistic removal of organics by SRB and MPB, while COD removal efficiency increased from 80% to 95%, and sulfate removal efficiency increased from 80% to 90%. And the highest elemental sulfur recovery rate was 0.27 kg/(m³·d). Finally, the ABR that operated with C/S of 2, HRT of 12 h and COD load of 4 kg/(m³·d), micro-aeration (DO of 0.4-0.6 mg/L) at the end of sulfate reduction phase (the compartment 5) has proved to be efficient in simultaneous sulfate wastewater and domestic sewage treatment and is suitable for elemental sulfur recovery.

Key words: anaerobic baffled reactor, dissolved oxygen, sulfate-reducing bacteria, methane-producing bacteria, synergy

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