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

Peng Wu1*, Kuanfeng Li1, Lezhong Xu1, Qi Peng2, Zhenxing Huang3, Jiachao Zhang4, Yaoliang Shen1,5,6

1School of Environmental Science and Engineering, Suzhou University of Science and Technology, Suzhou 215009, China
2School of Life Sciences, Shaoxing University, Shaoxing 312000, China
3School of Environmental and Civil Engineering, Jiangnan University, Wuxi 214122, China
4College of Resources and Environment, Hunan Agricultural University, Changsha 410128, China
5Key Lab of Environmental Science and Engineering of Jiangsu Province, Suzhou University of Science and Technology, Suzhou 215009, China
6Jiangsu Collaborative Innovation Center of Technology and Material of Water Treatment, Suzhou 215009, China

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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* Author to whom all correspondence should be addressed: e-mail: wupengniu@126.com; Phone/Fax: +86 512 68256233