Advanced effect of water treatment via changing the reaction steps in a sequencing batch reactor treating coal chemical industry wastewater

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As the complexity of coal chemical industry wastewater components, the direct discharge of wastewater will cause serious environmental pollution. The sequencing batch reactor (SBR) is perhaps the most promising and viable of proposed activated sludge modifications made for the removal of organic carbon and nutrients[1]. In this study, a modified sequencing batch reactor (SBR) operated at the aerobic–anoxic-anaerobic mode was developed to fully utilize the organics in coal chemical industry wastewater and improve the effect of water treatment, the wastewater and sludge were both taken from a coal chemical wastewater treatment plant in Shaanxi Yulin. In this experiment, the reaction steps are adjust to influent instant, aeration 7.5h, stir (anoxic) 1.5h, effluent instant, anerobic process 5h, as the plant's SBR reaction steps are influent 1h, aeration 8h, stir (anoxic) 2h, effluent 1h. By adding the anerobic process, the COD remove efficiency is up to 99%, and the NH_4^+-N remove efficiency is up to 98% at room temperature about 22°C , while the plant's COD and NH_4^+-N remove efficiency are 98% and 96% at a high temperature about 32°C. The results show that the COD and NH_4^+-N remove efficiency of SBR can achieve a higher level than actual project at lower temperature via changing the reaction steps. This method can save more energy and provide a reference for the actual project.

[1] Heloísa Fernandes, Mariele K. Jungles, Heike Hoffmann, et al. (2013)Full-scale sequencing batch reactor (SBR) for domestic wastewater:Performance and diversity of microbial communities. Bioresource Technology, 132: 262–268