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Cosmetic wastewater treatment by a combined anaerobic/aerobic (ABR+UBAF) biological system

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ABSTRACT

The cosmetics industry has been growing steadily for the past several tens of years in China, yet very few researches exist on cosmetic wastewater treatment system. This study gave new insight to develop a combined anaerobic baffled reactor (ABR) and upflow biological aerated filter (UBAF) system for the treatment of cosmetic wastewater. The chemical oxygen demand (COD) removal efficiency in the cosmetic wastewater was mainly investigated in the front two compartments of ABR reactor, while it was treated by the same reactor with six compartments. When the influent COD load was set at 1.5 g COD/L.d, the COD removal efficiency reached a maximum in the No. 1 compartment. The highest COD removal efficiency achieved 2.0 g COD/L.d for the complete ABR reactor. The optimal hydraulic retention time (HRT) of the ABR was 48 h. A UBAF reactor was applied to advanced treatment for ABR effluent. The coke powder with the diameter of 0.5–1.0 mm and the gas-water ratio of 7:1 were chosen the optimal experimental conditions. Under the above-optimal experimental conditions, the COD removal efficiency of UBAF was 69.5–82.6%. After the combined treatment by ABR and UBAF, the cosmetic wastewater effluent can effectively supply the discharge standard in China.

Keywords: Cosmetic wastewater; Biological treatment; Anaerobic baffled reactor (ABR); Upflow biological aerated filter (UBAF)

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