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Study on full-scale H_2O_2/O_3–UBAC process for removing organic matters in drinking water treatment

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ABSTRACT

Ozone–biological activated carbon process (O_3–BAC) is an advanced drinking water treatment technology that has been widely used. The combined process of O_3/H_2O_2-upflow BAC filter (UBAC)—sand filter has been adopted by a drinking water treatment plant. The paper summarizes the effect of advanced oxidation process (O_3 and O_3/H_2O_2) on the overall combined process in two seasons. The influence of different O_3/H_2O_2dosages on the effluent water quality is investigated and the effectiveness of the combined process is analyzed. The results indicate that O_3 can effectively decompose organic matters in water and increase the biodegradability of dissolved organic carbon. The organic matters removal rate of combined process increases as ozone dosage increases. Biodegradable dissolved organic carbon (BDOC) after ozonation increases by 30, 93, and 101% with increasing ozone dosages from 1.0, 1.5 to 2.0 mg/L. The removal rates of BDOC by the combined process reached 39, 45, and 73%, respectively. H_2O_2/O_3 does not give better effect than O_3 alone. Turbidity removal rate by sand filtration remains stable, which is above 87%. Higher temperature is favorable to microbial degradation by UBAC and sand filter.

Keywords: Drinking water treatment; Ozonation; O_3/H_2O_2; Advanced oxidation process; Biological activated carbon

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