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BEHAVIOUR OF OZONATION BY-PRODUCTS DURING ADVANCED DRINKING WATER TREATMENT WITH PEARL RIVER WATER

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Abstract

Simulation experiments were conducted to investigate the behaviour of ozonation by-products and the removal of organic matter in the treatment of the Pearl River raw water. The treatment processes include pre-ozonation, conventional treatment processes (coagulation/sedimentation and sand filtration), post-ozonation and granular activated carbon (GAC) filtration. Treatment efficiency of each unit process was evaluated by using several parameters such as permanganate index (COD_{Mn}), ultraviolet absorbance at 254 nm (UV_{254}), bromate (BrO_3^-) and formaldehyde. The overall conversion rates of BrO_3^- in the six water samples were 0.43~5.54%. Treated water flowed through the pre-ozonation unit process in which COD_{Mn} and UV_{254} were greatly removed. The conventional treatment processes had poor ability to remove BrO_3^- , but were effective in the removal of formaldehyde. In the post-ozonation unit process, the concentrations of BrO_3^- and formaldehyde reached the highest value. GAC filtration enhanced the removal efficiency of BrO_3^- compared with the conventional treatment processes. Water samples from the Xijiang and Beijiang River of the Pearl River basin contained higher concentrations of BrO_3^- and lower values of COD_{Mn} , UV_{254} and formaldehyde in the final effluents than those from the Dongjiang River.

Key words: bromate, formaldehyde, granular activated carbon, ozone, Pearl River raw water

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