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## BEHAVIOURS 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 behaviours 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 ( $\text{COD}_{\text{Mn}}$ ), ultraviolet absorbance at 254 nm ( $\text{UV}_{254}$ ), bromate ( $\text{BrO}_3^-$ ) and formaldehyde. The overall conversion rates of  $\text{BrO}_3^-$  in the six water samples were 0.43–5.54 %. Treated water flowed through the pre-ozonation unit process in which  $\text{COD}_{\text{Mn}}$  and  $\text{UV}_{254}$  were greatly removed. The conventional treatment processes had poor ability to remove  $\text{BrO}_3^-$ , but were effective in the removal of formaldehyde. In the post-ozonation unit process, the concentrations of  $\text{BrO}_3^-$  and formaldehyde reached the highest value. GAC filtration enhanced the removal efficiency of  $\text{BrO}_3^-$  compared with the conventional treatment processes. Water samples from the Xijiang and Beijiang River of the Pearl River basin contained higher concentrations of  $\text{BrO}_3^-$  and lower values of  $\text{COD}_{\text{Mn}}$ ,  $\text{UV}_{254}$  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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