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Characteristics of disinfection by-products reduction in the processes of drinking water treatment system using Nakdong river water

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ABSTRACT

In this study, batch and continuous experiments were conducted to investigate the influential factors on the distribution and formation of aldehydes, bromate and bromide in Nakdong river water and to investigate the behaviour of disinfection by-products (DBPs) in the processes of drinking water treatment system. The mean influent concentrations were 3.1 mg/L (2.4–3.9 mg/L) for dissolved organic carbon (DOC), 57.6 ug/L (42.0–85.7 ug/L) for total aldehydes (TA) and 55.7 ug/L (17.4–89.3 ug/L) for bromide. As a result, TA and bromide levels in the Nakdong river water increased with the decreasing water flow rate and decreasing water temperature. In pre- and post-ozonation, the DBPs concentration increased with increasing bromide level, ozone dosage and pH value. In particular, the concentration of DBPs formation in both pre-ozonation and winter was relatively higher than that in both post-ozonation and summer. In coagulation and sedimentation, polyaluminium sulphate organic magnesium coagulation resulted in slightly less DBPs removal than polyaluminium silicate chloride coagulation. TA was significantly reduced at the top of sand and biological activated carbon (BAC) filters, whereas bromate was effectively reduced in a three-month-old BAC filter.

Keywords: Disinfection by-products; Aldehydes; Bromate; Ozonation; Drinking water treatment processes

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