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# Removal characteristics of geosmin by advanced water treatment processes: a case study around the Han River, Republic of Korea

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**ABSTRACT**

Water treatment plants (WTPs) that intake raw water from the Paldang Dam of the Han River have generally adopted ozone + granular activated carbon (GAC) processes for the effective removal of taste and odor substances. In recent years, the concentration and duration of the substances causing taste and odor in Paldang Lake have gradually increased. Therefore, it is necessary to review the appropriateness of the advanced water treatment processes introduced in the WTPs located in the Han River. This study attempted to compare and review two processes for geosmin removal, one using a pre-ozone GAC filter-adsorber (pre-ozone + F/A) at the B WTP and the other using a post-ozone GAC adsorber (post-ozone + GAC) at the G WTP. The results of the investigation for geosmin and 2-MIB concentrations upstream of the Paldang Dam over the past 5 years showed that 2-MIB exceeded the standard concentration for less than 5 d per year and geosmin was the main cause of taste and odor. At the B WTP in the winter of 2011, the total geosmin concentration in the treated water exceeded 20 ng/L twice. Additionally, the average total geosmin concentration of the treated water after the application of the F/A was 7.81 ng/L. On the other hand, in the case of the G WTP, the total geosmin concentration after post-ozone and GAC treatment was 0.45 ng/L. In the summer of 2012, the fraction of particulate geosmin (66.9%–82.3%) was higher than that of dissolved geosmin (17.7%–33.1%) in the raw water of the two WTPs. During this period, the average removal rates of total geosmin in the final treated water of the G WTP were 0.7% higher than that of the B WTP. Therefore, ozone injection into filtered water after removing particulate geosmin and organic substances through the standard treatment process (coagulation, sedimentation, and filtration) is thought to be effective for removal to lower the concentration of dissolved organic matter and dissolved geosmin. In conclusion, the treatment efficiency was confirmed to vary according to the stage at which the process was used, even when the same ozone + activated carbon adsorption process was used. In addition, the 'post-ozone + GAC' method is considered advantageous when introducing advanced WTPs in the Han River.

*Keywords:* Advanced water treatment process; Granular activated carbon; Geosmin; Ozone treatment; Taste and odor

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