



## Characteristics of residual metals from phosphorus removal in sewage treatment plants around Paldang lake, Korea

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### ABSTRACT

The abundant use of chemicals to remove phosphorus in water could pose a problem to the safety of drinking water. In this study, we investigated the amount of residual aluminum and iron remaining in river. Paldang lake consists of two major tributaries (North Han River and South Han River) and one minor tributary (Gyung-an Stream). As a result of a total inspection on 45 phosphorus removal treatment plants in Paldang watershed of Han River, it was found that 39 treatment plants used aluminum-related coagulants while six treatment plants used iron salts. We investigated aluminum and iron concentrations in influent and effluent from six representative phosphorus removal treatment plants (A–F) in three tributaries and found that iron concentrations in A and C and aluminum concentrations in B and D exceeded drinking water standards. The background concentrations of aluminum and iron not affected by treatment plants nearby were 0.04–0.20 and 0.09–0.11 mg/L, respectively. In sediments, the background concentrations of aluminum and iron were 70.9–86.3 and 37.2–51.3 g/kg, respectively. Aluminum and iron concentrations in six representative treatment plants in the three tributaries were 16.9–64.9 and 17.1–75.3 g/kg, respectively. Since the pH range in sediment was 6.8–7.8, the possibility to leach aluminum and iron was low. Among other water quality parameters, turbidity was significantly correlated to the concentration of aluminum and iron. Finally, the concentrations of aluminum and iron of this study in Korea are higher than those of Japan and Taiwan.

*Keywords:* Phosphorus removal; Alum; PAC; Iron salt; Coagulant; Sediment; Sewage treatment plants; Paldang lake

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