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The adsorption of chlorite and chlorate by calcium carbonate in a drinking water pipe network

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ABSTRACT

Chlorite and chlorate are potential health-threatening by-products in drinking water disinfected by chlorine dioxide. Both can be adsorbed and thus removed by calcium carbonate. However, little is known on the adsorption dynamics of calcium carbonate to those by-products. In this study, adsorption efficiency of calcium carbonate to chlorite and chlorate was tested under different factors such as reaction time, chlorate and chlorite concentration, pH, and temperature. The results showed that 16.7–28.7% of chlorate and 23.8–41.3% of chlorite in water was adsorbed within 3 h. In addition, the adsorption of chlorate and chlorite decreased as pH and temperature increasing. In contrast, the adsorption increased as total organic carbon increasing. Furthermore, the effect of residual chlorine dioxide and iron oxide on adsorption was not evident. Taken together, our data provided a detailed characterization of adsorption behavior of calcium carbonate to chlorate and chlorite, which is helpful for making health water by chlorine dioxide.

Keywords: Chlorite; Chlorate; Calcium carbonate; Adsorption; Drinking water

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