



A comparative study on the control of disinfection by-products (DBPs) and toxicity in drinking water

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ABSTRACT

In this work, ozone oxidation combined with ferric chloride and aluminum sulfate (Alum) coagulations was employed to investigate the optimum conditions for the control of the toxicity to *Daphnia magna* and *Pseudokirchneriella subcapitata* and disinfection by-products (DBPs) formation potential of Buyukcekmece (BC) lake water in Istanbul, Turkey. The efficiency of the treatment was determined by means of UV absorption at 254 nm (UV_{254}) and dissolved organic carbon (DOC) parameters. Four species of trihalomethanes (THMs) and eight species of haloacetic acids (HAAs) were identified and quantified for the evaluation of treatment methods on the formation of DBPs. It was observed that pre-ozonation enhanced DOC removal efficiency of alum and ferric chloride coagulations. 40 mg/l optimal alum and ferric chloride doses respectively exhibited 51% and 56% DOC reduction after 5 min pre-ozonation. As a result, THMs formation potential (THMFP) decreased approximately 43% after ozone enhanced alum and ferric chloride coagulations. Haloacetic acids formation potential (HAAFP) of water was reduced by 61% using pre-ozonation alone but a fluctuating increase and also decrease were reported after coagulations. Chlorinated raw and treated samples displayed acute toxicity in different pattern.

Keywords: Pre-ozonation; Enhanced coagulation; Haloacetic acids (HAAs); Trihalomethanes (THMs); Toxicity; Natural organic matter (NOM)

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