Public Abstract

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Title:Reduction of DBP Formation Potential in Drinking Water through Forced Alkaline Conditions and Aeration

As the United States Environmental Protection Agency (USEPA) moves to the more stringent Disinfection By Product (DBP) Stage 2 rule, small communities are challenged to meet the regulations. According to compliance data available from the state agency's Drinking Water Watch, most of the utilities that are not in compliance are due to high concentrations of trihalomethanes (THMs) in the finish water. THMs are formed when Nature Organic Matter (NOM) react with disinfectants such as free chlorine. To address this concern researchers at the University of Missouri (MU) are focusing on methods to reduce the formation and/or concentration of THMs to help small facilities stay in compliance.

Jar tests using different coagulants, namely ferric chloride, lime and alum, at different doses were done to optimize the dosage in terms of NOM reduction for the specific type of raw water used by a facility. The percentage NOM reductions measured as either UV254 absorbance or dissolved organic carbon (DOC) ranged from 30% to 70% for UV254 and 30% to 54% for DOC depending on the coagulant/raw water combination.

Some of the high THM concentrations these small communities are predominately chloroform. Since chloroform is a volatile compound, aeration is considered a good technology for THM removal. Aeration on a beach scale set up, in which a 3 L water chamber was used, when airflow was set at 1L/min, achieved a THMs reduction of at least 44% after 10 minutes aeration. When the aeration time was set at 10 minutes, the aeration could achieve a 66% reduction in THMs at an airflow of 3 L/min.

Reported here are the criteria for optimized coagulant addition and aeration which should be considered as feasible options for smaller communities trying to comply with Disinfection By Product Stage 2 rule.