

DBP REMOVAL BY AERATION

Trihalomethanes (THMs) are a group of disinfection byproducts (DBPs) regulated in drinking water because of potential health risks. Many consecutive systems are experiencing high levels of THMs due to longer reaction time between chlorine and natural organic matter in their distribution systems. Many technologies, including enhanced coagulation and alternative disinfectants, are effective in controlling THMs in parent systems. However, most of the consecutive systems can not use these technologies because these systems receive treated water from parent systems and do not employ additional treatment processes except adding chlorine. Aeration, or air stripping, has been shown to be effective in removing volatile organic compounds. This study will explore the use of aeration in water storage tanks for THM removal in consecutive systems.

A pilot study was conducted using an aeration column in Environmental Engineering Laboratories at Penn State Harrisburg. The initial concentrations, 200 μ g/L for each THM, 150 μ g/L and 100 μ g/L for chloroform (CF), were used. THM samples were collected at 2, 5, 10, 20, 60, 120, 180, and 240 minutes. Pilot study results indicated a removal of up to 88% of CF, 89% bromodichloromethane (BDCM), 70% dibromochloromethane (DBCM), and 40% bromoform (BF) in 60 minutes, and up to 94% CF, 99% BDCM, 96% DBCM, and 82% BF in 240 minutes or 4 hours.

A larger scale study has been conducted in a swimming pool. We are in the process to analyze the data. A full scale study will also be conducted in a storage tank in a consecutive system.

The results indicated aeration could be a potential technology for THM removal in consecutive systems. This technology could also be used in other water systems to control THMs in hot spots in their distribution systems.