



This research is to address the health concerns of elevated dissolved organic carbon (DOC) in drinking source water by developing a novel, cost-effective treatment technology that could reduce DOC and forming potential of carcinogenic disinfection by-products and safeguard human health for rural residents.

Improving drinking water quality for small rural communities

Who cares and why?

The concentration of dissolved organic carbon (DOC) of surface water in agriculture watersheds have recently been doubled as a result of increased agricultural activities. Elevated DOC level in surface water is of great environmental and health concerns, which could potentially lead to impaired water quality and the potential of eutrophication in aquatic ecosystem. In addition, high DOC in drinking source water can serve as precursors for the formation of carcinogenic, disinfection by-products (DBPs), consequently threatening public health. USEPA is currently regulating several DBP compounds in drinking water. It has been a great challenge for small water system to treat elevated-DOC drinking source water due to lacks of treatment technology and resources. Thus developing a cost-effective treatment technology for small water system is urgently needed to protect public health resulting from DOC-elevated source water.

Overall goal of this project aims to improve drinking water quality and safeguard human health for small rural communities. This research would help small water systems identify water quality issues facing rural residents and develop cost-effective treatment technologies to reduce the disinfection-by-product (DBP) formation.

What has the project done so far?

Several treatment approaches have been investigated for the DOC removal efficacy, which include the change of types of activated carbon used and management practices, carbon baffle walls, and advanced chemical oxidation using hydrogen peroxide and ferrous iron. Several operation conditions including pH, H_2O_2 and Fe^{2+} concentration, reaction time were evaluated, in order to achieve the maximum efficiency. Preliminary results of this study indicated that the removal of DBP precursor by the tested treatment technology was fast and effective for DOC removal and reduction of DBP forming potential.



Impact Statement

This research could lead to cost-effective treatment technologies for small water systems to treat DOC-elevated drinking source water and reduce DBP forming potential in drinking water.

- Developed a cost-effective water treatment technology to reduce DOC and THM forming potential in drinking water for small water systems
- Best drinking water management practices in compliance with EPA current drinking water DBP regulation.
- Safeguard human health from THM-associated risks for rural residents
- Improve water quality/safety and quality of life for rural communities

What research is needed?

Pilot-scale studies will be conducted in selected small water systems to validate laboratory results for the DOC removal efficiency and reduction of THM forming potential. The optimal operation parameters will be evaluated for the best result. The assessment of water quality upon the new technology implementation in the small water systems or pilot scale treatment will be conducted and the technology transfer and operator trainings initiated.



Want to know more?

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Additional link can be found at <http://www.umes.edu/ard/Default.aspx?id=46285>