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DRINKING WATER RESEARCH GROUP

*Working together for innovation in drinking water quality, treatment, and distribution*

# Coagulation Optimization to Remove DBP Precursors


**Principal Investigators:**
Dr. Robert C. Andrews, University of Toronto

**Collaborators:**
Peterborough Utilities Commission
NSERC Industrial Research Chair Partners



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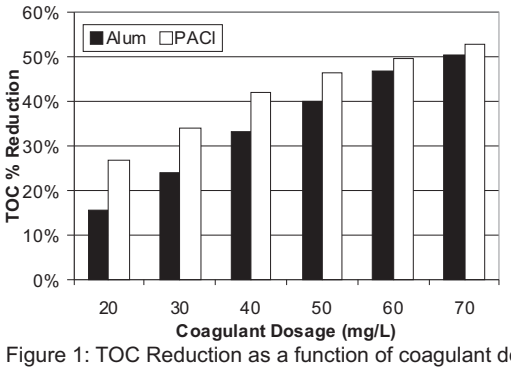


Figure 1: TOC Reduction as a function of coagulant dose

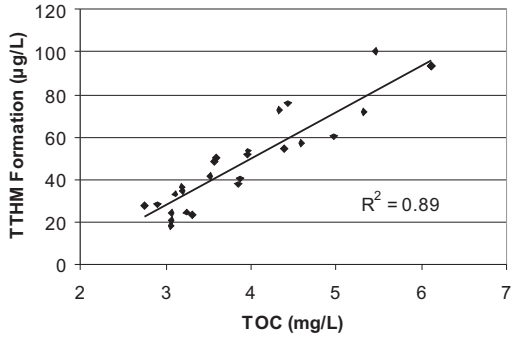


Figure 2: Relationship of THM formation to TOC

The water treatment industry is continually faced with the challenge of staying in compliance with current and future regulations regarding trihalomethanes (THMs) and haloacetic acids (HAAs) while meeting CT requirements for disinfection. Since natural organic matter (NOM) serves as precursor material for disinfection by-products (DBPs) such as THMs and HAAs, it may be desirable for utilities to maximize the removal of NOM by implementing enhanced coagulation practices. This can include changing coagulant type, changing coagulant dosage and/or using pH depression.

Bench-scale jar tests are being used to evaluate the potential of enhanced coagulation to remove NOM and reduce DBP formation. The use of alum for coagulation is compared with polyaluminum chloride (PACl) coagulants and alum with acid for pH depression over a range of coagulant dosages. Total organic carbon and ultraviolet absorbance are used as surrogates for NOM removal and are evaluated as predictive measures of DBP formation. The impacts of enhanced coagulation practices on pH, sludge formation, and DBP formation are also measured and taken into consideration. In addition, advanced analytical techniques (fluorescence excitation-emission and liquid chromatography with organic carbon detection) enable us to separate NOM into specific identifiable components such as humic substances. Results of these types of experiments are used to subsequently provide specific recommendations for testing alternative coagulants at pilot and full-scale.

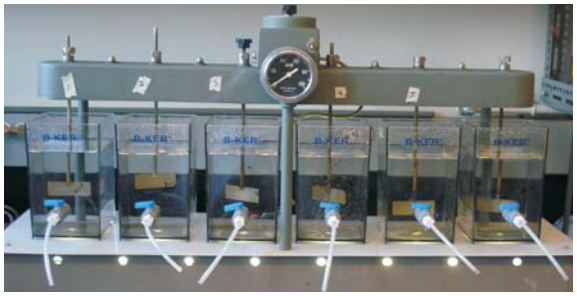

Figure 3: Jar Test System (6 compartment)


University of Toronto Department of Civil Engineering, 35 St. George Street, Toronto, ON, Canada M5S 1A4


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*For more information on the Drinking Water Research Group contact:*

Dr. Robert Andrews
andrews@civ.utoronto.ca
416-978-5399

Dr. Susan Andrews
sandrews@civ.utoronto.ca
416-946-0908

Dr. Ron Hofmann
ron.hofmann@utoronto.ca
416-946-7508

Jennifer Lee
jenwy.lee@utoronto.ca
416-946-0302