DWRG
DRINKING WATER RESEARCH GROUP

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

Monitoring Disinfection By-Product (DBP) Genotoxicity with the Ames Fluctuation Test

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Collaborators:
NSERC Industrial Research Chair Partners

Funding Source:
Environmental Bio-Detection Products Inc.
Natural Sciences and Engineering Research Council of Canada

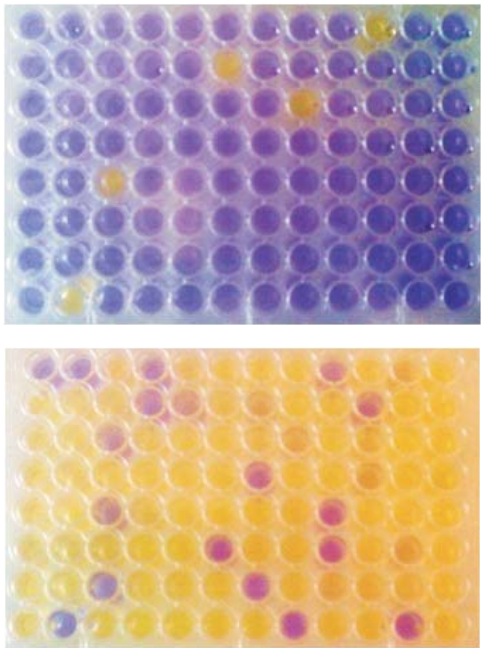

Figure 1: MUTA-ChromoPlate™ Tests completed for two different source waters (yellow wells indicate mutagenicity, blue wells show no mutation effect)

Disinfection by-products (DBPs) produced during drinking water treatment can be associated with mutagenic, genotoxic and/or toxic effects. The accurate measurement of these effects can pose a significant challenge, given the small DBP concentrations (µg/L) present. Unfortunately, while some of the by-products are known and regulated, many others have yet to be identified. Bioassays can be used to detect mutagenicity resulting from all compounds present in a given water, whether known of unknown.

This research examines the ability of two bioassays, the MUTA-ChromoPlate™ test and the Ames II test, to detect mutagenicity in chlorinated raw waters. A solid-phase extraction process is used to concentrate samples, and bacteria are therefore exposed to all of the compounds present. The number of mutations which the bacteria develop as a result of being exposed to the samples is a quantitative measure of genotoxicity.

The overall goal of this research is to establish a test which can be used to quantitatively evaluate treatment factors based on their removal or production of mutagenicity. One potential application could be the analysis of optimal coagulant dosages for the removal of potential mutagenic precursors.

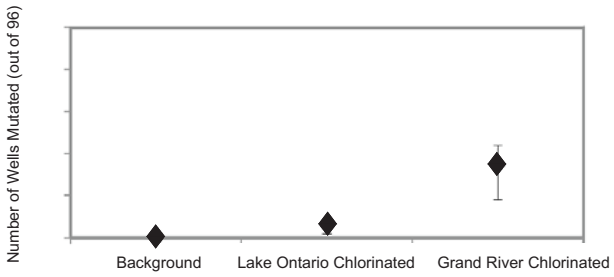

Figure 2: Number of wells mutated in 96 well MUTAChromoPlate™ Test

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