# Artificial Intelligence-Assisted Routine Water Monitoring and Comprehensive Disinfection Byproducts Study

The disinfection of drinking water to prevent waterborne disease is essential for public health. However, the reaction of disinfectants with naturally occurring organics in source water results in disinfection byproducts (DBPs). The state-of-the-art analytical techniques used for the comprehensive analysis of DBPs and their precursors in water produce large and complex data that are difficult to process, which has hampered their use by the water industry. This project will develop artificial intelligence (AI)-based data processing combined with advanced analytical techniques to enable rapid and in-depth assessment of drinking water quality, which will contribute to the capacity for safe and sustainable drinking water.

Source & Drinking Water Quality

High-resolution mass spectrometry + Artificial intelligence

FUNDING DETAILS
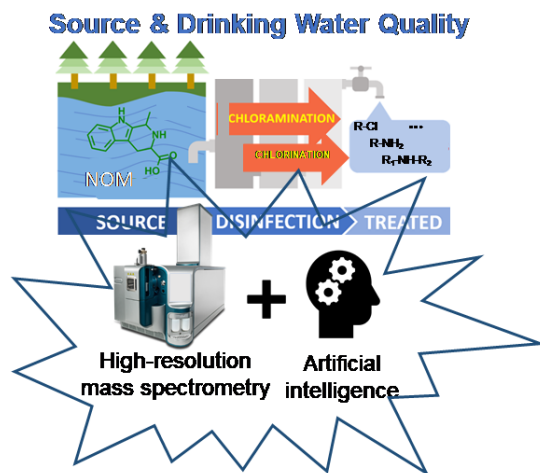
RECIPIENT:

University of Alberta – Professor Xing-Fang Li

PARTNERS:

EPCOR, Sciex, University of British Columbia

TOTAL BUDGET:

$1,200,000

AI FUNDING:

$600,000

PROJECT DATES:

JAN 2024 – DEC 2026

APPLICATION

The analytical and AI-based software tools will advance the state of the research on water disinfection byproducts and will be useful for water utilities to enhance monitoring of the quality of both source and treated water as well as optimization of the water treatment processes.

PROJECT GOALS

The proposed research will develop a suite of AI-based bioinformatic solutions to address the fundamental challenges in processing large and complex water analysis data, including:

- AI-based algorithm for rapid classification of water samples to recognize changes in water quality;
- Advanced analytical techniques for comprehensive analysis of source water and treated water;
- AI-assisted automated data processing for determination of currently known DBPs and their precursors and identification of new DBPs and new potential DBP precursors; and
- Open access platforms for automated processing of large and complex data for extended applications.

BENEFITS TO ALBERTA

- The project will train and help retain high quality professionals with multidisciplinary skills and knowledge, needed in multiple sectors, including academia, the water and energy industries, and Alberta government agencies.
- This research will produce advanced methodologies, computer programs, databases, and new knowledge of disinfection byproducts in treated water and their precursors in source water. Rapid assessment of source water quality will be useful for water utilities to optimize treatment conditions to reduce or eliminate taste and odor problems in drinking water.
- The outcomes of the project will contribute to safe and sustainable drinking water supplies and the protection of public health.

6 Publications

10 Students Trained

1 Patent

2 New Products/Services

1-2 Project Jobs

CURRENT STATUS

JAN 2024
Project began in January 2024.