SEMINAR

ADVANCED CHARACTERIZATION OF DRINKING WATER DISINFECTION BYPRODUCTS

Speaker

Professor Xing-Fang LI

Fellow of the Royal Society of Canada, Academy of Science
Professor, University of Alberta, Canada

Abstract

Appropriate disinfection of drinking water is effective to prevent waterborne disease. An unintended consequence of the chemical disinfection process is the formation of disinfection byproducts (DBPs), resulting from reactions of disinfectants with organic matter in source water. Epidemiological studies have indicated potential association of chronic DBP exposure with adverse health effects (e.g. increased risk of bladder cancer). Although a few easily detectable DBPs are regulated, they may not be responsible for the adverse health effects. To date, majority of DBPs remain unidentified. To meet growing water demands while controlling regulated DBP formation, water utilities are applying new disinfectant combinations. In light of these changes in disinfection practice, we must characterize DBPs that are important to human health effects. Nontargeted analysis using chromatography and high resolution mass spectrometry can detect more than 10,000 chemical features in a water sample. However, data processing and annotation is challenging. This presentation will describe our current research on targeted and nontargeted approaches combined with machine learning techniques to enhance analysis of chemical features and identification of new DPBs. Our goal is to achieve comprehensive identification of precursors and new DBPs of toxicological importance.

Biography

Dr. Xing-Fang Li is Professor in the Department of Laboratory Medicine and Pathology, Faculty of Medicine and Dentistry at the University of Alberta. She is Canada Research Chair (Tier 1) in Analytical and Environmental Toxicology and an elected Fellow of the Royal Society of Canada, Academy of Science. Dr. Li's research group develops innovative analytical and molecular techniques that enable ultrasensitive detection of environmental contaminants, microbial pathogens, and biomolecular interactions. Dr. Li is the recipient of the 2020 Ricardo Aroca Award for "a distinguished contribution to the field of analytical chemistry", the 2017 Environment Research & Development Dima Award for "distinguished contributions to research and/or development in the fields of environmental chemistry", and the 2010 W.A.E. McBryde Medal for "a significant achievement in pure or applied analytical chemistry", from the Canadian Society for Chemistry and the Chemical Institute of Canada. Dr. Li has also received the Excellence in Mentoring Award (2014) and Killam Annual Professorship (2013) from the University of Alberta. Dr. Li received B.Sc. (1983) in Chemistry from Hangzhou University, M.Sc. (1986) in Environmental Chemistry from the Research Centre for Eco-Environmental Sciences, Chinese Academy of Sciences, M.Sc. (1990) in Analytical Chemistry from Brock University (Canada), and Ph.D. (1995) in Environmental/Analytical Chemistry from the University of British Columbia, Canada.

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Enquiry:

Ms. Rebecca Yau
cerebeca@ust.hk