

Seminar Series 2017 - 2018

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

Oxidative Stress: a Merged Toxic Pathway for Environmental Matrices

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Oxidative stress has been suggested to be the primary toxic pathway of air particulate matter (PM) to cause cardiovascular disease and other adverse effects. In this talk, oxidative stress was demonstrated as the primary toxic pathway for both disinfection by-products (DBPs) in drinking water, and oil sands-processed water (OSPW). To this end, a hybrid platform was established in our group to identify toxic components and their modes of action (MOA) from these critical environmental matrices. High-throughput and reproducible *in vitro* cell reporter system was used to determine the Nrf2-mediated oxidative stress response from environmental mixtures. Then, Effect-Directed Analysis (EDA) and chemical probe, combined with untargeted chemical analysis, were used accordingly to identify toxic components. Specifically, more than 600 DBPs were identified in the drinking water after disinfection and direct reaction with cysteine was elucidated as the primary pathway for DBPs to cause oxidative stress. Accordingly, a biotin/cysteine chemical probe was synthesized to identify toxic DBPs. For OSPW whose oxidative stress may primarily be caused by indirect pathways, EDA combined with untargeted chemical analysis was used to identify hydroxylated aldehydes as the primary toxic components. Studies regarding PM samples are still ongoing, and preliminary data shown that chemical probe is an efficient approach to identify toxic components (i.e. quinone) in PM samples. Thus, our hybrid platform may provide a versatile and accessible approach in elucidating the oxidative stress promoting components in a variety of environmental matrices.

Wednesday, Nov 1, 2017 3:00 – 4:00 PM

Wallberg Building, 200 College Street, Room 407



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