



Northeastern University

College of Engineering

CEE 7400: Graduate Seminar Series
Department Civil and Environmental Engineering

Processes for the Removal of Pharmaceuticals and Personal Care Products from Water: Preparing for Indirect and Direct Water Reuse

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3:00-4:00 PM*
105 Shillman Hall

Abstract

The presence of trace amounts of pharmaceutically active compounds (PhACs) in water supplies has been widely documented during the last decade. With the spread of indirect potable water reuse and the advent of direct potable water reuse, the concentration of PhACs in raw drinking water is expected to increase. The concern over PhACs centers on the effects that trace levels of pharmaceuticals may have on the environment and on human health. As a result, a substantial number of research studies have focused on the development of treatment processes aimed at the removal of pharmaceuticals from drinking water.

Two of the major challenges of these technologies are that process performance is often dependent on the composition of the background source water, and removal of pharmacological activity is not always concomitant with parent compound removal. For example, transformative processes such as advanced oxidation are dramatically impacted by: 1) the background organic water matrix (i.e. the relative amounts of terrestrially-, microbially-, and anthropogenically-derived organic matter); and, 2) pharmacological activity associated with intermediate products that may still remain even when the parent compound has been destroyed.

This talk will focus on the application of a framework for evaluating treatment process effectiveness that involves measuring parent compound concentration and residual antimicrobial activity. Our research group has applied this approach to several PhAc's in a range of background water matrices. Drawing on the results of this research, we shall explore the suitability of various metrics for assessing treatment process requirements and performance. In addition, we will discuss the potential consequences of water reuse on treatment process efficacy.



Dr. Lynn Katz is the Bettie Margaret Smith Professor of Engineering in the Department of Civil, Architectural and Environmental Engineering at the University of Texas at Austin. She has over twenty years of experience examining reaction phenomena at interfaces and evaluating the impact of these processes on the fate and transport of organic and inorganic contaminants in the environment. Her research has involved both fundamental and applied research in this field and has included the development of in-situ remediation and ex-situ treatment processes. Her expertise extends from fundamental spectroscopic studies of aquatic surface chemistry to pilot plant evaluation of technologies developed in her research. Her recent and on-going research has involved projects focused on modeling adsorption of metal ions to soils and sediments, in-situ remediation of mercury, development of synthetic membrane vesicles for estimating contaminant partition, production of biofuel from algae, removal of dissolved metals from stormwater, removal of pharmaceuticals and personal care products from drinking water and greywater, and produced water reuse.

** 30 minute reception to follow*