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Safe and Sustainable Water Resources Research Program

A monthly webinar series focused on EPA water research

Systems View of Nutrient Management - Nutrient Recovery from Human Urine

Wednesday, December 14, 2016
2:00 to 3:00 pm EST

Register online: https://attendee.gotowebinar.com/register/3756322425949157890

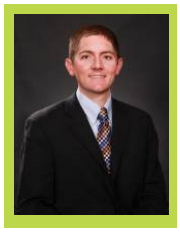
Urine is the primary source of phosphorus and nitrogen in municipal wastewater. Accordingly, it is important to consider for nutrient management. This webinar will cover new science on recovering nutrients from human urine, including issues of source separation in buildings, use at the farm, review of health issues, and factors influencing the environmental sustainability of nutrient management strategies. This webinar is an output of preliminary scientific research and demonstrations achieved from the Centers for Water Research on National Priorities Related to a Systems View of Nutrient Management, which were funded by EPA's Science to Achieve Results (STAR) grants.

Agenda and Presenters

1. Introduction: A brief introduction on the topic will be provided.

Presented by Dr. Colleen Naughton, University of South Florida, National Center for Reinventing Aging Infrastructure for Nutrient Management: Dr. Naughton is a postdoctoral research associate in Civil and Environmental Engineering at the University of South Florida where she also serves as the administrative assistant for the National Center for Reinventing Aging Infrastructure for Nutrient Management. Her research is focused around the food-water-energy nexus and coupling natural and human systems, integrating environmental sustainability and ethnographic analyses with local and global issues of sustainable development.

2. Building: Waterless urinals can benefit both water conservation and implementation of urine source separation systems. However, due to urine's composition and the presence of the urease enzyme that hydrolyzes urea, valuable nutrients readily precipitate in the urinal fixtures and pipes, hindering water conservation and nutrient recovery efforts due to maintenance problems. Dr. Treavor Boyer will review controlled laboratory experiments and a demonstration study that increases our understanding of the urea hydrolysis process in waterless urinals by mimicking and inhibiting urea hydrolysis so as to benefit water conservation and nutrient recovery.



Presented by Dr. Treavor Boyer, Arizona State University, National Center for Reinventing Aging Infrastructure for Nutrient Management: Dr. Boyer is an associate professor at the School of Sustainable Engineering and the Built Environment at Arizona State University (ASU). Before joining ASU, he was an Associate Professor in the Department of Environmental Engineering Sciences at the University of Florida. His research is broadly focused on water sustainability, and spans drinking water and wastewater treatment, and natural aquatic systems.

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Agenda and Presenters continued

3. Environmental Sustainability: Nutrients embedded in wastewater or stormwater can be managed via different technologies at different scales. The factors influencing environmental sustainability of nutrient management strategies, including end applications, design configurations, implementation locations, and scale of implementations will be discussed.

Presented by Dr. Qiong Zhang, University of South Florida, National Center for Reinventing Aging Infrastructure for Nutrient Management: Dr. Zhang is an associate professor of Civil and Environmental Engineering at the University of South Florida (USF). Prior to joining USF, she worked as the operations manager for the Sustainable Futures Institute at Michigan Tech. She has sponsored research projects in the areas of green engineering and sustainability, life cycle assessment, waste-based resource recovery, system modeling of environmental technology adoption and critical infrastructures resiliency, and carbon footprint accounting of water and wastewater technologies and strategies.

4. Health: Source separated urine typically contains pharmaceuticals and microorganisms. A review of the occurrence of pharmaceuticals and microorganisms in source separated urine as it is transformed into fertilizer products will be provided. The impact of storage, struvite precipitation, and pasteurization on the levels and types of contaminants in urine has been studied.

Presented by Dr. Krista Wigginton, University of Michigan, WE&RF's National Research Center for Resource Recovery and Nutrient Management: Dr. Wigginton is an assistant professor of Civil and Environmental Engineering at the University of Michigan (UM). Prior to joining the faculty at UM, she was an assistant professor at the University of Maryland, College Park. Her research focuses on applications of environmental biotechnology in drinking water and wastewater treatment. In particular, her research group develops new methods to detect and analyze the fate of emerging pollutants in the environment.

5. Farm: Source separated urine has been shown to work well as a crop fertilizer. Work on applying urine-derived fertilizer products to grow crops on a research farm in Vermont will be discussed. Urine was collected from public toilets (>1,000 users) and turned into fertilizer. Lettuce and carrots were grown over two seasons in test field plots amended with urine, urine spiked with additional pharmaceuticals, urine-derived struvite, and synthetic fertilizer.

Presented by Abraham Noe-Hays, Rich Earth Institute, WE&RF's National Research Center for Resource Recovery and Nutrient Management: Mr. Noe-Hays is a founder of the Rich Earth Institute and has been working with dry sanitation systems since 1990. He holds a BA in Human Ecology with concentrations in agroecology and compost science from the College of the Atlantic, where his interest in recycling human manure led to an internship at Woods End Research Laboratory and his thesis project, "An Experiment in Thermophilic Composting."

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