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Foodborne pathogen detection and bacterial community profiling of surface and nontraditional irrigation water sources in the Mid-Atlantic: A CONSERVE study

Concerns about availability and quality of agricultural water have strengthened US national interest in water reuse and the exploration of non-traditional irrigation water sources. Ensuring the safety of these water sources for agricultural use is a major priority. CONSERVE, a Center of Excellence at the Nexus of Sustainable Water Reuse, Food and Health, is midway through a 2-year sampling effort to characterize the quality of a variety of surface (river, pond) and nontraditional (reclaimed wastewater, produce wash water, return flows) water sources in the Mid-Atlantic and Southwestern US. In this talk, we compare the efficacy of microbiological and molecular methods (16S rRNA gene sequencing, shotgun metagenomics, and culture-based detection) in identifying foodborne pathogens from potential irrigation water sources in the Mid-Atlantic. Culture-based detection methods remain the most effective for identifying human enteric pathogens, such as *Salmonella enterica* and *Listeria monocytogenes*, from water samples. However, sequencing-based methods can be used to address the ecological context of pathogens in irrigation water sources and may be useful for the detection of viable but non-culturable organisms. Therefore, a combination of approaches will likely lead to the most robust characterization of human pathogen occurrence in the environment.

Biography

Dr. Sarah Allard is a postdoctoral fellow for CONSERVE, a Center of Excellence at the Nexus of Sustainable Water Reuse, Food, and Health. After receiving her B.A. in Biology from Haverford College, she completed an ORISE fellowship in the Division of Microbiology at the FDA's Center for Food Safety and Applied Nutrition. For her dissertation research, she studied the tomato microbiome, using 16S rRNA gene sequencing to investigate the influence of various agricultural practices and field conditions on the structure and diversity of tomato fruit-, blossom-, and root-dwelling bacterial communities. She received her PhD from the University of Maryland in 2016. Now, as part of the CONSERVE team based in the UMD School of Public Health, she is primarily working to characterize the microbiomes of nontraditional irrigation water sources including surface water and reclaimed wastewater. She is passionate about working towards the adoption of agricultural practices that are microbiologically safe, environmentally sustainable, and economically viable.

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