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Raman Chemical Imaging Spectroscopy for Evaluation of Biological Agents in Water

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Abstract

The objective of this project is to evaluate the suitability of Raman chemical imaging spectroscopy as a tool for rapid identification of naturally-occurring and maliciously-introduced waterborne pathogens in complex aquatic environments.

Monitoring water quality has always been a labor-intensive process, requiring human sampling followed by off-site laboratory analysis. More recently, some automation has become available for simple chemical analyses and flow monitoring; however, most critical water-quality parameters related to biological threats require sampling and *ex situ* analysis that can take days to complete. Field-deployable methods for rapid assessment of the biological integrity of drinking water supplies are urgently needed. While water utilities expand their monitoring and protection of treated water supplies, the extensive distribution system remains an area of high vulnerability. The ability to rapidly assess the presence of biological agents in drinking water throughout the distribution system would significantly reduce the risk to human health from intentional or accidental introduction of pathogens in the system.