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Protozoa: US EPA Method 1623 and Beyond

Eric N. Villegas*

US EPA

* villegas.eric@epa.gov

Abstract:

Waterborne cryptosporidiosis and giardiasis remain a significant public health concern in countries around the world. Many species and genotypes of *Cryptosporidium* and *Giardia* contaminate drinking water sources, but *C. parvum*, *C. hominis*, and *G. intestinalis* remain the predominant species known to cause waterborne disease outbreaks in humans. To improve human health and reduce risks posed by these pathogens, the US EPA promulgated the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule). This rule requires drinking water utilities to monitor for *Cryptosporidium* oocysts in their source waters using US EPA Method 1622 and 1623. These methods are designed to enumerate oocysts and cysts by microscopy and although very useful in determining concentration levels of *Giardia* cysts and/or *Cryptosporidium* oocysts in various drinking water sources throughout US, the methods are time consuming, labor intensive and cannot distinguish animal from human specific species or determine if the oocysts or cysts are infectious to humans. Because many *Cryptosporidium* spp. oocysts and *Giardia* cysts are morphologically similar and can contaminate drinking water supplies, the development of more specific detection and typing approaches for this parasite are essential to better understand the impact of these parasites in source waters. The data generated by these methods will provide additional information that will be useful for future source water management strategies and for human health risk assessments related to waterborne *Cryptosporidium* oocyst and *Giardia* cyst contamination. Current research activities focused on developing new and more rapid molecular-based approaches (e.g., quantitative real-time PCR, microarrays, etc.) that can detect and determine the infectious potential of oocysts and cysts will be described. Advantages and inherent limitations of these approaches and their potential application(s) as alternative methods to current protozoan surveillance systems will be discussed.

Impact Statement:

This research is focused on the state-of-the-science for detecting waterborne *Cryptosporidium* oocysts and *Giardia* cysts in water. It will also provide the audience additional information that will be critical for current and future source water management strategies and human health risk assessments related to waterborne *Cryptosporidium* oocyst and *Giardia* cyst contamination

Category: Invited Speakers

Type of Presentation: Oral Presentation