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Effects of Season, Nutrient Status, and Effects of Season, Nutrient Status, and Pollution Concentration on Survival of Fecally-Derived Bacterial Indicator Organisms and the Protozoan Pathogen, Cryptosporidium

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Regulatory practice has historically utilized Escherichia coli to indicate the presence of fecal contamination in water. E.coli has proven to be an effective surrogate for many pathogenic bacterial fecal contaminants. However, public health officials now must address the presence of chlorine resistant protozoan pathogens in public water supplies in an economically feasible manner. The proposed Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) calls for the monitoring of E.coli in some smaller water systems to determine the risk for contamination with the pathogenic protozoan, Cryptosporidium. However, the suitability of using E.coli as a surrogate for Cryptosporidium has yet to be demonstrated. We hypothesize that the accuracy of using a bacterial indicator to predict the presence of Cryptosporidium is method dependent. To test this hypothesis, comparison of current EPA approved methods, in situ hybridizations, and the polymerase chain reaction for the detection of Cryptosporidium and potential indicator organisms will be performed. The proposed methods are currently being tested with Cryptosporidium-infected calf manure samples in preparation for future field experiments and data collection. As expected, these initial results indicate a difference in sensitivity amongst the methods. In the future, a field-based comparison of Cryptosporidium and potential indicator organisms die-off kinetics will be performed by suspending whole bovine feces in environmental chambers, and monitoring for the ability of E.coli, enterococci, and Bacteroides, to predict the presence of Cryptosporidium over time.