Evaluating the Potential for Somatic Coliphage Replication in Environmental Waters

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Fecal indicator bacteria (e.g. *Escherichia coli*, fecal coliforms) are used to assess the presence of disease causing fecal bacterial/viral contamination in recreational waters. Recent research has suggested that these bacteria may have the ability to replicate in the environment, thus limiting their usefulness as indicators of recent pollution. In current epidemiological studies, somatic coliphages have shown promise as a potential replacement for current indicator bacteria. However, publications including U.S. Environmental Protection Agency (USEPA) documents, have suggested that coliphages are also capable of replicating in natural waters. Since coliphages cannot replicate outside a host cell, their proliferation in the environment is dependent on their ability to infect *E. coli* cells. This study focuses on whether *E. coli* isolated from sites in South Carolina and California can effectively serve as hosts for somatic coliphages isolated from the same locations. The major hypothesis is that only a small percentage of environmental *E. coli* will support somatic coliphage replication; and these percentages will not differ significantly when analyzing only coliphages and *E. coli* isolated from a single water sample.

Initially, somatic coliphages will be obtained from water samples using the USEPA Single Agar Layer technique, and *E. coli* will be isolated by membrane filtration and growth on mFC agar. Somatic coliphages will be spotted onto pour plates; each containing a single environmentally-collected *E. coli* strain. The formation of plaques where the coliphage was spotted indicates that *E. coli* cells in that area have been lysed as a result of coliphage infection and replication. The percentage of *E. coli* able to support replication of the somatic coliphages will be evaluated. Failure of the majority of *E. coli* strains to effectively serve as somatic coliphage hosts would weaken arguments that somatic coliphages would make poor fecal indicators as a result of environmental replication.

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