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WATER QUALITY AND HEALTH LABORATORIES
WATER MICROBIOLOGY CAPABILITIES

The Water Quality and Health (WQH) laboratories at MSU are now set up for microbial water testing. The WQH laboratories are capable of testing for bacteria, protozoa and viruses with standard methods as well as the most current advanced methodologies. The types of environmental samples include surface waters, beaches, source waters, groundwaters, treated waters, wastewaters, biosolids and in some cases various crops and foods. Feces from animals and humans can also be directly analyzed. The WQH laboratories have the capability of testing for the microorganisms on the “Contaminant Candidate List” developed by the Environmental Protection Agency.

Testing for these waterborne pathogenic microorganisms has been recognized as an important approach for developing science-based data and information which aids in appropriate decision making in regard to determining the health risk and developing pollution controls.

The types of analytical testing includes the following:

1. *Cryptosporidium* and *Giardia* testing utilizing method 1623 (EPA method of choice) This can also include the use of Texas Red internal controls to define recovery efficiencies associated with various types of water. High levels of cysts and oocysts can be found in wastewater, CSOs, and animal wastes, monitoring has lead to better approaches for protection of water quality.
2. *Cryptosporidium* oocyst viability testing using cell culture. This can be used to evaluate survival, new disinfection methods (uv) as will as evaluate viability directly in environmental samples. Issues of oocysts over-wintering have not been fully resolved, inactivation models are needed and can be developed using cell culture methods.
3. *Cryptosporidium* genotyping and speciation assessment, which can be undertaken to evaluate sources (eg. birds, cattle, humans; potential transmission can be evaluated and this method can be used for environmental samples and epidemiological investigations).
4. Cultivable enteric viruses by cell culture and PCR or RT-PCR methods. Both human and animal viruses can be isolated and distinguished. These analyses have been used to address source tracking and human health risks associated with non-point sources eg septic tanks. The viruses associated with the CCL including adenoviruses, coxsackie viruses and the noroviruses, can be tested for.
5. Source tracking using antibiotic resistance, ribotyping, PCR and/or genotyping for *E.coli*, Enterococci, and Coliphage.
6. Alternative indicator testing which includes *Clostridium perfringes* (suggested to be useful for irrigation waters), Enterococci, and Coliphage as well as conventional indicator testing (coliform and *E.coli*).
7. *Aeromonas hydrophila*, and the presence of the toxin genes related to disease in animals and humans.

8. Cyanobacteria, blue-green algae and their toxins using both ELISA, HPLC and PCR technology.
9. Tracer studies for field evaluation of contaminant flow. Used for septic tanks and drain fields, injection wells, treatment processes. Tracers have included bacteriophage, bacteria and fluorescent spheres.

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