SEWAGE CONTAMINATION AND MICROBIAL SOURCE TRACKING

Fecal contamination of natural water sources and reservoirs is a major public health concern necessitating the urgency to detect contamination and prevent human exposures. The pollution of recreational waters is associated with animal and human wastes entering water through aging sewer infrastructure, field stormwater run-off, deliberate and unintentional contamination by humans and waste from livestock, wildlife and pets.

Fecal indicator bacteria serve as a valuable tool to assess water quality and detect sources of fecal contamination by regulatory agencies and public health officials. The detection of traditional fecal indicator bacteria such as fecal coliforms, *E. coli* and enterococci bacteria does not differentiate human sources from animal sources, because they commonly occur in all mammalian intestines as well as birds.

More recently several microbial source tracking (MST) approaches have been developed to associate animals with fecal pollution in natural waters using molecular means. MST methods rely on the quantification of levels of certain fecal microorganisms using the detection of host-specific DNA targets in quantitative polymerase chain reactions (qPCR). Most MST methods for human and animal fecal waste detection are based on the use of *Bacteroides* as a potential indicator. *Bacteroides* are major members of the gut-microbiota, and host specific organisms within this genus have been used extensively to gain information on pollution sources. The amount of *Bacteroides* from human fecal samples was found to be around 1,000 fold greater than the levels of *E.coli*, thus making *Bacteroides* qPCR a better marker for fecal pollution investigations. The most widely used MST methods target the HF183 16S rRNA gene cluster of members of the genus *Bacteroides*.

Pace Analytical National Laboratory offers the following molecular MST qPCR tests:

- **Total Bacteroides by qPCR** to test for fecal contamination from non-human and human sources in environmental waters and on surfaces.
- **Human Bacteroides (HF183/BacR287) qPCR** to test for fecal contamination from human feces /sewage contamination in environmental waters and on surfaces.

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