

Investigating Your Watershed: Detection of Fecal Coliform Bacteria

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Fecal coliform bacteria, members of the family Enterobacteriaceae, are found in the feces of warm-blooded animals, including humans. Though not harmful themselves, large numbers of fecal coliform bacteria have been associated with the presence of other pathogenic organisms. These disease-causing organisms are often very hard to detect due to their small numbers, and low survival rate outside their host organisms. Fecal coliform bacteria, on the other hand, can be detected very easily, and are therefore useful indicators of contaminated water.

Micrology Laboratories has developed a simple method for fecal coliform detection called “Coliscan EasyGel®”. Each testing unit consists of a specially treated Petri dish and a bottle of liquid medium. A small sample of the water to be tested is added to the media and poured into the Petri dish. Ions in the Petri dish coating react with the liquid causing it to gel

completely within about 30-40 minutes. Plates are incubated from 24-48 hours (temperature is not critical) at which time colonies can be counted. The media contains two dye- linked sugars that are activated through bacterial enzymes. The enzyme β -galactosidase is produced by general coliform bacteria, including *E. coli* (a fecal coliform), and it results in a pink colony color. The enzyme β -glucuronidase is only produced by fecal coliforms and results in a blue-green color. Therefore fecal coliform colonies will appear as a dark purplish blue as a result of production of both of these dyes, and can easily be distinguished from the pink general coliform colonies.

This assay is one of many exercises used in a non-major course at the University of Maryland, Baltimore County called *Water: An Interdisciplinary Study*. Students work in groups throughout the semester, performing various lab exercises dealing with the chemical, physical, and biological properties of water. They then use these skills to design and complete a group project based on water quality. Many students choose to investigate the water quality of one of the ponds or streams on campus. The detection of high levels of fecal coliform bacteria in one of these ponds, especially after heavy rains, prompted a lively discussion in lecture. It also provided an opportunity for students to look at the drainage patterns within the local watershed and to suggest possible sources of the pollution.

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