

Maislinn Helfer

*Lights Out: The Use of Vibrio fischeri to Determine Water Quality*

Bioassay is increasingly being incorporated into environmental monitoring programs in several countries based on research that has shown the bacterium *Vibrio fischeri*'s bioluminescence decreases in the presence of many common water contaminants. This study explored the effectiveness of *V. fischeri* as a bioluminescent indicator for determining water quality in the Fountain Creek Water Shed. *V. fischeri* were cultured in complete darkness in liquid photobacterium broth for 24 hours, at room temperature, using a water bath shaker. Water samples collected from several locations in the Fountain Creek Water Shed were then added to the bacteria. After 30 minutes light intensity was measured by rapidly stirring each sample for 60 seconds with a vortex mixer and then visually comparing them to control samples. The average of multiple trials was used to determine the effect of potential contaminants on bioluminescence. To verify the effectiveness of *V. fischeri*, all collected water samples were also tested with commercial water quality tests. An analysis of data showed that *V. fischeri* bioluminescent levels did vary when testing the water quality in the Fountain Creek Water Shed area, however there was a low correlation to commercial water quality tests making it ineffective in determining overall water quality. However, changes in light intensity did show some consistency to changes in pH, hardness, total nitrites/nitrates, and the presence of other bacteria. The development of efficient testing protocols to improve the performance of *V. fischeri* will be needed before it can effectively improve protection of human health and the environment.