

Detection of Escherichia coli Bacteria Using Near-Infrared Spectroscopy

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The goal of the project is to determine if E. coli bacteria is detectable with NIR spectroscopy. Both mid-infrared and near-infrared instruments will be used to analyze the prepared bacteria samples. The main elements of the project require an understanding of microbiology and physics.

Microbiology techniques will be used to manipulate and prepare the samples prior to analysis. Samples with different population sizes will be prepared to give a larger range of data. Spectroscopy will be used after proper preparation to analyze the sample. Spectroscopy uses infrared light to detect the chemical make up of a material. Infrared radiation is directed at the sample where it is either absorbed or reflected. The chemical bonds are determined based on the amount of light going past the sample to the detector. The amount and type of bonds present allows for the detection of bacteria.

The samples will be analyzed using the mid-infrared spectrometer first. This will serve as a baseline to compare the near-infrared results with. The two types of spectral data will be compared and this will hopefully conclude that bacteria can be detected with the near-infrared instruments.

Future applications of this research could be portable field instruments to detect the presence and amount of bacteria in a water source. It could also be used for detection of bacteria in food processing facilities and serve as a warning system.



Research Team uses software technology for spectral analysis.



Quinton and Tim explain the purpose of Their research at the MSA Open House.

