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Effects of Bacterial Specimen Preparation on Laser-Induced Breakdown Spectra

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There is an urgent need in the medical, environmental health and safety, security, and food-processing industries for a technology capable of rapid and sensitive bacterial pathogen identification. In response to this, we have shown that laser-induced breakdown spectroscopy (LIBS) can be used as a real-time elemental assay capable of discriminating between bacteria at both the species and strain levels. Recent experiments have been conducted to make this technique more attractive to professionals in a clinical setting while increasing the ability to acquire high signal-to-noise measurements from bacterial specimens in liquid suspension. We have introduced a new method of bacterial mounting using clinician-friendly nitrocellulose filters. We have also conducted viability studies to address the possibility of sample sterilization prior to testing, greatly reducing the risk associated with handling these pathogens.

In this poster, we will present these results as well as a multivariate bacterial classification based on the elemental content of four bacterial species, *E. coli*, *S. epidermidis*, *M. smegmatis*, and *P. aeruginosa*, that have all been sterilized via autoclave. We also compare changes in the LIBS spectra associated with various methods of cellular inactivation including sonication and bactericidal UV exposure.

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