Laser Ablation Mass Spectrometry of Individual Particles in Environmental Samples

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Samples of chicken house dust, cotton dust, and machine cutting fluids were analyzed for the presence of bacteria using single particle laser ablation ion trap mass spectrometry. Sample introduction into the ORNL airborne particle mass spectrometer was either by nebulization from aqueous suspension or by dry aerosolization of the powdered samples, with the particles passing through an atmospheric pressure inlet into the instrument. A positive or negative ion mass spectrum was acquired for each particle sampled by the 308-nm pulsed excimer laser, fired on demand as the particles passed through the center of the ion trap electrodes. The chicken house dust was found to contain a high concentration of bacteria. While bacteria were not found in the samples of cotton dust or machine cutting fluids, their signatures may have been obscured by matrix background or the sample size too small.

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