



B136 The Evaluation of a Hand-Held Raman Spectrometer for Field Identification of Controlled Substances

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After attending this presentation, attendees will understand the advantages of using a hand-held Raman spectrometer over colorimetric field tests for suspected controlled substances. Attendees will also be aware of the types of samples that are suitable for Raman spectroscopy identification.

This presentation will impact the forensic science community by presenting an evaluation of an alternative method of preliminary identification of unknown substances. This method offers a safe, non-contact method of field analysis for law enforcement officers.

The PGR-1064™ Raman Spectrometer was evaluated for its suitability as a field test for suspected controlled substances. Its suitability was determined using controlled substance identification data as well as user observations about the functionality of the spectrometer. There are many advantages of Raman spectroscopy over commonly used colorimetric field tests. With Raman, there are no harsh chemicals or solvents, there is no need to open the packaging, and the interpretation of the results is not subjective.

Two identical PGR-1064™ Raman Spectrometers were used in this study. Blind triplicate scans of 135 samples suspected to contain controlled substances were taken with each Raman spectrometer and searched against two of its library databases. Each sample was then analyzed using Fourier Transform Infrared (FTIR) with an Attenuated Total Reflectance (ATR) attachment; IR spectroscopy is complementary to Raman spectroscopy. Once each sample was preliminarily identified using both Raman and FTIR, the results were compared to the true identity of the substance from Gas Chromatography/Mass Spectrometry (GC/MS) analysis.

Twenty-one samples had at least one compound that was not in the current library of the Raman spectrometer. Analysis of the 14 samples of plant material was not successful; the material was too dark and charred when it came into contact with the laser. Excluding the new compounds and plant material, the Raman library correctly identified the sample or part of the mixture in at least one of the scans 79% of the time. Separating results by compound, cocaine was identified 74% of the time (203/274 scans) and methamphetamine was identified 83% of the time (121/146 scans).

The Raman spectrometers evaluated in this study are suitable for field use for preliminary identification of suspected controlled substances. This technology would be most effective at identifying suspected cocaine and methamphetamine.

Field Test, Hand-Held Raman Spectroscopy, Controlled Substances