



Criminalistics Section – 2007

B171 The Use of Electrospray Ionization - Mass Spectrometry for the Identification of Controlled Substances

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After attending this presentation, attendees will understand the principles of electrospray ionization – mass spectrometry (ESI-MS) and how this analytical technique can be used for the analysis of some common controlled substances such as cocaine, heroin, phencyclidine, methamphetamine, 3,4-methylenedioxyamphetamine (MDMA), and 3,4-methylenedioxyamphetamine (MDA).

This presentation will impact the forensic community and/or humanity by demonstrating an additional analytical technique that may be used to identify controlled substances. The method is very fast, typically taking approximately 2-3 minutes for analysis.

Atmospheric pressure ionization mass spectrometry (API-MS) is an analytical detection method used for samples in the liquid phase and is typically interfaced with an instrument capable of separating chemical mixtures, such as a high pressure liquid chromatograph (HPLC). The basic caveats of mass spectral analysis require a sample to be ionized, analyzed via the mass charge ratio, and detected. Ionization, or the charging of molecules, can be accomplished using different modes such ESI, which is a soft ionization process whereby a low voltage electrical field creates a series of charged droplets via nebulization. This procedure allows for the analyst to by-pass the traditional separation stage (i.e., liquid chromatography), and directly inject the sample into the MS. The resulting data is a series of spectra that provides composite information. Since the ionization is a “soft” process, spectral data should be easily interpreted with regards to major constituents.

The results from extensive developments of the method and protocol will be presented. The presentation will report on the advantages and disadvantages of the practical usage of this relatively new technique and the possibility of using it for quantitative analysis as well.

Electrosprayionization, ESI-MS, Controlled Substances