In-field Determination of Drugs of Abuse and Drug Adulterants

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In this presentation we report on the use of a field portable gas chromatography/ion trap mass spectrometer (GC-MS) with Solid Phase microextraction and coiled wire sampling techniques to provide a fast response for in-field determination of Drugs of Abuse and Drug Adulterants.

In-Field drug analysis has not seen significant advancement in the past decade. Current techniques use colorimetric tests or tandem technologies such as GC-PID, and Raman/FTIR. The complexity of the matrices and adulterants means that these methods are not are adequate to provide accurate and reliable results and they lack the specificity needed to identify anything more than a couple of analytes in a clean sample. GCMS has long been considered the "Gold Standard" for the identification of controlled substances like drugs of abuse, as it allows for the detection of a broad range of analytes in diverse sample matrices. Typical GCMS instruments have been historically bound to a laboratory environment. Samples would normally be collected and sent to the laboratory for analysis, which can take weeks due to sample backlogs and long analysis times.

In this study we report on the use of Torion T9 field portable GC-MS to identify street drugs and contemporary drug adulterants found in those street drugs. This novel approach integrates a high speed, high resolution (HR), low thermal mass (LTM) capillary gas chromatograph with a miniaturized toroidal ion trap mass spectrometer. The entire analysis time is less than 3 minutes. The instrument uses retention time (RT) indices and an on-board spectral library to identify the compounds of interest. Capability is further enhanced by deconvolution algorithms to ensure reliable identification of even co-eluting compounds in complex mixtures.

Results of samples taken from Peru, Mexico, Canada, and the United States will be discussed.