A125 Detection of Designer Cathinones in "Bath Salts" Using Ion Mobility Spectrometry

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After attending this presentation, attendees will gain insight into the utility of ion mobility spectrometry for the detection of novel designer stimulants that have gained popularity as legal highs.

This presentation will impact the forensic science community by expanding the current detection menu of ion mobility spectrometers to include synthetic cathinones thereby improving the field detection of these stimulants.

Recent news and law enforcement reports indicate that there is increasing concern regarding the abuse of designer stimulants being marketed as components of several legal products.[1,2] Of these products, the so called "bath salts" have taken prominence and have been readily available over the internet through European websites and in various local gas stations, smoke shops, and tattoo parlors. The active stimulants found in these products are several derivatives of cathinone which is a central nervous system stimulant. These chemicals have been reported to provide euphoric effects that are similar to drugs such as cocaine and the phenethylamine class of drugs which include methamphetamine and methylenedioxymethamphetamine (MDMA). The increased prevalence of these "legal highs" has led some states to ban the sale of these substances though the chemicals are currently not regulated by the controlled substances act.[1] There is very little research on the detection and analysis of these chemicals mostly due to their recent rise in popularity. The Drug Enforcement Administration (DEA) reported the characterization of Methylenedioxypyrovalerone (MDPV) using various spectrometric and mass spectrometric methods.[3] There is a need for a rapid and robust analytical method that can serve as a screening method for these chemicals. Ion mobility spectrometers (IMS) are widely used in airports and other high security areas to detect trace levels of illicit substances such as explosives and drugs of abuse. It will be demonstrated that several synthetic cathinones such as mephedrone, MDPV, and naphyrone can be detected with an ion mobility spectrometer. All five target compounds included in this study produced characteristic peaks in the positive ion mode and the reduced mobility for each peak is used as the qualitative measure of the ion peak produced. A majority of the compounds produced single reproducible ion peaks while the fragment and dimer peaks found were concentration dependent. Assigning accurate masses to the peaks can be achieved by coupling a mass spectrometer to an ion mobility spectrometer and this is being investigated further. The discussion includes data on the limits of detection and limits of quantitation of these compounds. The overall limit of detection for all five target compounds was below five nanograms. Current detection menus of IMS instruments include detection parameters for amphetamine and its derivatives. The data presented will demonstrate the differentiation of the cathinones from these compounds. A discussion on the resolution of these compounds in a bench-top IMS instrument and future studies to improve and expand the current stimulant detection menu will also be presented. Currently studies are being conducted to test several bath salts and possible interfering substances to validate the IMS method for the different compounds of interest.

References:

1. Goodnough, A. An Alarming New Stimulant, Legal in Many States. New York Times, http://www.nytimes.com/2011/07/17/ us/17salts.html, July 16, 2011.
2. Drug Enforcement Administration, Methylenedioxypyrovalerone (MDPV), http://www.deadiversion.usdoj.gov/drugs_concern/ mdpv.pdf, March 2011.
3. Yohannan, JC, Bozenko, JS, Jr. The Characterization of 3,4-Methylenedioxypyrovalerone (MDPV). Micogram Journal 2010**;** 7:1.

Designer Stimulants, Ion Mobility Spectrometry, Bath Salts

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