



### K36 Chromatographic Analysis of Synthetic Amphetamine Street Samples

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After attending this presentation, attendees will learn what to look for when analyzing synthetic amphetamine street samples. This presentation will discuss the development of the extraction of the drug compounds from various commercial media, followed by separation using gas chromatography with mass spectrometric detection (GC/MS). Quantification of the active compounds based on the use of appropriate internal standards will also be addressed.

This presentation will impact the forensic science community by providing an efficient method for analyzing street amphetamine samples and hence increasing the amount of evidence that analysts can process in a given time. Identification of the active components and added constituents in the samples can be made. Additionally, if an individual is in a possible overdose situation, rapid analytical methodology is also important.

The production and marketing of synthetic amphetamines is an ever-increasing threat to society. In 2007 a new line of “legal highs,” labeled as bath salts, plant food, and jewelry cleaner, have flooded the streets of the United States, as well as other countries. Three years later in 2011, over one thousand calls were made to poison control centers across the country in response to these drugs.<sup>1</sup> Most of these products are cathinone analogs that are currently popular due to their amphetamine-like effects and their ease of access online and in “headshops” across the country.

Cathinone and its derivatives are extracted from the khat plant and can cause rapid heart rate, chest pains, insomnia, depression, suicidal thoughts, or seizures. The analogs used vary from sample to sample, as well as their concentrations, and when used in conjunction with other drugs can prove to be fatal.<sup>2</sup> Pyrovalerone is a Schedule V stimulant originally synthesized in 1964 to suppress appetite or treat chronic fatigue and MDPV, or 3,4-methylenedioxypropylpyrovalerone, is the methylenedioxy analog of pyrovalerone that is not currently scheduled in the United States. Both of these compounds have been found previously in “legal highs” along with cathinone analogs such as methylone and methymethcathinone (mephedrone). Plant feeder has also been found to contain 3-fluoromethcathinone and other isomers of the drug, and has become popular due to methcathinone’s simple synthesis from ephedrone.<sup>3</sup>

The Drug and Chemical Evaluation Section is a section of the DEA Office of Diversion Control (ODE) that is gathering information on the abuse of synthetic amphetamines to support their possible scheduling. Such information includes identification to establish prevalence and trends.<sup>1</sup> Therefore, the analysis of such designer drugs and the determination of their individual compounds may help ban their production and legalize their use. This study presents the development of a sample preparation and chromatographic method for the chemical characterization of selected synthetic amphetamine samples for the purpose of identification of the active components and added constituents.

Synthetic amphetamines are entering the drug market faster than they can be restricted. A quick and efficient extraction method will allow for a more efficient analysis of such compounds. In regards to the forensic community, crime labs already have a large workload. Thus creating a more efficient methodology will benefit analysts by increasing the amount of evidence that they can process in a given time. Additionally, if an individual presents a possible overdose situation, rapid analytical methodology is also important. This presentation will discuss the development of the extraction of the drug compounds from various commercial media, followed by separation using gas chromatography with mass spectrometric detection (GC/MS). Quantification of the active compounds based on the use of appropriate internal standards will also be addressed.

The developed chromatographic method provides qualitative and quantitative analysis of synthetic amphetamines in samples seized on the illegal drug market and in the compounds referred to as “legal highs.” Potentially, this method could reduce the time a new drug is on the market. Future studies will also involve diluents used in the processing of these “legal highs.”

#### References:

<sup>1</sup>The Drug Enforcement Agency. Microgram Bulletin 2011, 44(4), 31-37.

<sup>2</sup>Vardakou, I. et al. Drugs for youth via Internet and the example of mephedrone. Toxicology Letters 2011, 201, 191-195.

<sup>3</sup>Archer, R.P. Fluoromethcathinone, a new substance of abuse. Forensic Sci. Int. 2009, 185, 10-20.

#### Bath Salts, Chromatography, Amphetamines