K79 Forensic Investigation of PSU Herbal Incense Products Using GC/MS and LC/MS/MS

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After attending this presentation, attendees will gain knowledge on herbal incense products as an emerging designer drug, applications of method development for Gas Chromatography-Mass Spectrometry (GC/MS) and Liquid Chromatography with Tandem Mass Spectrometry (LC/MS/MS), in addition to the detection, identification, and quantification of synthetic cannabinoids in two commercially available products, Down2Earth Climax and Wet. In order to aid law enforcement's efforts to contain and prevent the use of these emerging designer drugs by youth, it is essential that the forensic science community develop rapid screening methods for detection that will enable rapid designer drug screening. This research will also provide significant chemical information regarding the unknown compounds in these street samples, and assist with drug awareness in a college town, a prevalent drug-consuming community, by presenting the findings at local high schools and colleges in the area.

This presentation will impact the forensic science community by developing methods for detection that will facilitate rapid designer drug screening, aiding law enforcement's efforts to contain and prevent the use of these emerging drugs.

Legal herbal products, found readily available through the internet and local gift shops, are increasingly being used for recreational drug use by youth. Marketed as herbal incense and specifically labeled "not for human consumption," these products are plant materials sprayed with cannabinoid-related chemicals that users vaporize and inhale.[1,2] Two commercial herbal samples, Wet and Down2Earth Climax, purchased in downtown State College, PA, are investigated and analyzed to determine synthetic cannabinoid presence and quantity. JWH-018, JWH-073, JWH-200, CP-47, 497, and cannabicyclohexanol are analyzed, as these represent five chemicals currently placed on Schedule I classification by the U.S Drug Enforcement Administration (DEA).[2] Scheduling was in response to an increase in the frequency of hospitalizations involving incense inhalation in the United States.[3] In addition to the five Schedule I chemicals listed above, 30 other synthetic cannabinoid related chemicals are being investigated in order to construct a library for instrumental drug screening.

To accomplish synthetic cannabinoid chemical screening, multiple extraction techniques were compared and the QuEChERS (Quick, Easy, Cheap, Rugged, and Safe) extraction method proved to be most suitable.[4] QuEChERS provides a time-effective option by combining the herbal sample with magnesium sulfate and calcium chloride buffering salts and methanol solvent in a 50mL centrifuge tube. After shaking the sample for 5 min, sample centrifuging ultimately allows for removal of the organic phase. Extracts are characterized using a GC/MS and an triple quadrupole LC/MS/MS. Optimized methods, coupled with library construction of synthetic cannabinoid standards, enable simultaneous screening of cannabinoid species, and permit a comparison of the two instrumental setups for drug screening and quantification of street herbal products.

Currently, employee drug testing does not incorporate these compounds, but as more analogs become illegal and available, screening will be forced to expand to include such chemicals. Thus, it is important to develop and validate instrumental methodology for such screening. Traditional crime laboratory drug analyses focus on GC/MS instrumentation, but semi-volatile and thermally unstable compounds may not be suitable. LC/MS/MS methods may prove more suitable for such chemicals. Preliminary results indicate a rapid, effective method for the separation and identification of synthetic cannabinoid standards and commercial herbal samples for GC/MS and LC/MS/MS. Using the method of internal calibration, deuterated analogs are utilized to quantify the synthetic cannabinoids in the samples. Products from the same brand allow for determination of inner-batch variability. Future analyses will expand to incorporate other street samples from the area, and to evaluate sample heterogeneity. Pending method optimization, the research project can be expanded to include other emerging cannabinoid-based drugs that come into vogue.

References:

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