## K47 Confirmation of Synthetic Cannabinoids in Driving Under the Influence (DUI) and Sexual Assault (SA) Cases by Liquid Chromatography With Tandem Mass Spectrometry (LC/MS/MS)

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After attending this presentation, attendees will understand the application of using LC/MS/MS to identify and confirm synthetic cannabinoids and metabolites in DUI and SA cases. In addition, attendees will learn of drug recognition experts' observations in cases in which synthetic cannabinoid usage was confirmed.

This presentation will impact the forensic science community by providing and demonstrating the applicability of a validated method that can be used to identify a combination of 52 synthetic cannabinoids and metabolites in urine. In addition to the analytical method, drug influence evaluation reports will be presented from cases in which synthetic cannabinoid usage was confirmed.

Synthetic cannabinoid use and popularity has increased over recent years with new synthetic cannabinoid entities entering the drug market frequently. This has created a challenge for law enforcement as it is difficult for many laboratories to update screening and confirmation methods to keep up with the changing drug trends. In an attempt to create a relevant synthetic cannabinoid confirmation method, previous literature and local drug seizure reports were reviewed to generate a list of synthetic cannabinoids and metabolites. From this list, an LC/MS/MS confirmation method was developed and validated.

An enzyme hydrolysis was performed on the urine , followed by liquid/liquid extraction. The extract was then separated by a reverse phase LC gradient method using a Pentafluorophenyl (PFP) column. The run time was 9.5 minutes. A dynamic Multiple Reaction Monitoring (MRM) method was created on an Agilent® 6460 LC/MS/MS in positive electrospray ionization mode. The method targeted a combination of 52 synthetic cannabinoids and metabolites. Method validation was performed following the Scientific Working Group for Toxicology (SWGTOX) and the United Nations Office on Drugs and Crime (UNODC) recommendations. Validation studies included limit of detection, interference, carry over, and matrix enhancement/suppression.

More than one different synthetic cannabinoid was present in each of the positive DUI (seven cases) and SA cases (one case). The synthetic cannabinoids confirmed in these cases were: 5-Fluoro-PB-22 metabolite (one case), AB-CHMINACA (four cases), AB-CHMINACA metabolite (five cases), AM2201 metabolite (one case), JWH-018 metabolite (three cases), JWH-073 metabolite (one case), UR-144 metabolite (five cases), and XLR-11 metabolite (two cases). DRE evaluations were performed on three of these cases.

Typical cannabis impairment indicators include the following: eyelid and body tremors, lack of convergence, and rebound and pupil dilation. Individuals also usually demonstrated an increase in pulse and blood pressure. In order to determine if these indicators are similar to synthetic cannabinoid use, cases with only synthetic cannabinoids or synthetic cannabinoids and cannabis were further analyzed for trends in the DRE evaluations ($n$=3).

In each of the three cases, the subject had a breath alcohol of 0.00; however, signs of impairment were observed. The subjects shared some similar clinical indicators that aren't considered an indicator of cannabis impairment, such as the presence of horizontal gaze nystagmus, which was observed in all three cases, and the presence of vertical gaze nystagmus was observed in two cases. Two cases displayed lack of convergence. The subjects' blood pressure and pulse were normal for two of the cases and slightly lowered in the third case. One subject had an elevated body temperature. The opinion of the DRE for two of the cases was that of a Central Nervous System (CNS) depressant and CNS stimulant impairment. In the third case, the DRE concluded that impairment was due to a CNS depressant, narcotic analgesic, and cannabis usage. Uncharacteristic cannabis use indicators have been observed in cases in which only synthetic cannabinoid and cannabis use has been confirmed.

**Synthetic Cannabinoids, LC/MS/MS, DRE**





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