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Y12 Optimization of a Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Method for the Separation and Identification of Synthetic Cannabinoids on Prison Mail Samples

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Learning Overview: After attending this presentation, attendees will understand the importance of developing analytical methods to better screen for drug-soaked paper disguised as mail samples being sent into prisons across the country and will understand why there remains a need for established research to ensure that drug-soaked prison mail samples do not pose a further threat to prison staff and inmates.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by describing the method development and validation results using synthetic cannabinoids JWH-018, JWH-073, AM2201, XLR-11, AB-CHMINACA, 5F-ADB, and AM-2233, the most commonly seen as published in the National Forensic Laboratory Information System (NFLIS) Special Report on Synthetic Cannabinoids and Cathinones.¹

Synthetic drugs, colloquially named with street names such as K2 or Spice, have seen a surge in popularity over the past decade. This popularity has posed a number of problems within the prison system, including the difficulty of detecting drugs coming in through the mail as well as the safety risk it poses to both inmates and prison staff. While numerous published methods exist for human drug screenings after the inmates consume the synthetic drugs, there remains the need for an established method to screen for the drug-soaked mail samples as they are being sent into the prisons.

In this study, a reliable and valid LC-MS/MS method was developed for separating and identifying synthetic cannabinoids utilizing seven synthetic drug standards: JWH-018, JWH-073, AM2201, XLR-11, AB-CHMINACA, 5F-ADB, and AM-2233. All seven drug standards were soaked into white printer paper in equal ratios and used as samples for method development. Matrix effects were accounted for using commonly encountered mail contaminant, such as pen, crayon, and lipstick, due to the unpredictable nature of prison mail. Ultrasonification was utilized to extract the synthetic cannabinoid from the paper substrate, followed by the development of an LC-MS/MS method by varying solvent ratios and optimizing mass spectral parameters. The developed method was then validated by analyzing 47 actual mail samples recovered from the Allegheny County Jail to test the ability of the method in analyzing true synthetic cannabinoid-soaked paper. The findings of this study suggest that a valid and reliable method can be developed, given the variety of synthetic cannabinoid classes tested. Matrix effects were not observed with the tested contaminants, suggesting that the extraction method is sufficient in removing extraneous substances other than the analyte in question.

Reference(s):

- ¹ Strom, K., Moore, K., Weimer, B., Heller, D., Ancheta, J., Pressley, D., and Polk, A. (2014). *National Forensic Laboratory Information System special report: Synthetic cannabinoids and synthetic cathinones reported in NFLIS, 2010-2013*. U.S. Drug Enforcement Administration.

Synthetic Cannabinoids, LC-MS/MS, Prison Mail