K43 Effects of Smoking the Synthetic Cannabinoids JWH-018 and JWH-073 on Human Performance and Behavior: Controlled Administration and DUID Case Reports

Amy Miles, BS, Wisconsin Laboratory of Hygeine, 465 Henry Mall, Madison, WI 53706; Barry K. Logan, PhD, and Allan Xu, PhD, NMS Labs, 3701 Welsh Rd, Willow Grove, PA 18901; Robert Welsh, MS, University of Central Missouri, Missouri Safety Center, UCM Humphreys Building, Suite 200, Warrensburg, MO 64093; and Tracey Durbin, University of Central Missouri, UCM Humphreys Building, Suite 200, Warrensburg, MO 64093*

After attending this presentation, attendees will be able to identify the drugs present in herbal "legal high" smoking blends, and describe the effects on subjects' behavior and performance following smoked administration.

This presentation will impact the forensic science community by describing the behavior of subjects under the influence of synthetic cannabinoids drugs, their performance in field sobriety tests, and observations of actual subjects arrested for DUI after using these products.

Herbal materials sold as "legal highs" containing synthetic cannabinoids agonists with purported effects similar to tetrahydrocannabinol (THC) have been appearing on the United States recreational drug market since 2008. The most popular of these products is the K2 brand, sold as a variety of blends including Blonde, Summit, Strawberry, and a variety of others. These products have been shown to contain the cannabinoid CB_1 agonists JWH-018, and JWH-073.

A variety of K2 blends were administered to human subjects in a controlled environment, and their clinical signs, symptoms, and performance in the Drug Recognition Expert (DRE) assessment matrix were evaluated. Additionally, driving performance and actual behavior of subjects arrested under suspicion of DUID after smoking K2 are reported and discussed.

Ethical review was provided by the University of Central Missouri Institutional Review Board. They approved an experiment involving the administration of low doses via smoked route of administration of K2 blends containing JWH-018 and JWH-073 to six subjects. Subjects were screened and determined to be drug free prior to administration. Subjects were administered either one or two inhalations of K2 from a water pipe. Their response and vital signs were monitored by medical personnel. Subjects completed the DRE evaluation before and after administration of the drug. Blood, urine, and oral fluid were collected from subjects for later analysis. Analysis was performed by liquid chromatography tandem mass spectrometry (LCTMS), with a limit of detection of 0.1ng/mL in blood for the parent compounds.

Subjects began to feel the effects of the drug within 2-3 minutes of administration. Effects included increased pulse and blood pressure, dry mouth, bloodshot, watery eyes, and lack of convergence. Subjects reported a variety of subjective effects, including lightheadedness, blurred vision, motor restlessness, some mild agitation, and temporal disorientation. Four of six subjects indicated some mild anxiety. Subjects indicated a preference to continue dosing, although this was not permitted. Those subjects who were experienced marijuana users described the experience as qualitatively inferior to marijuana. Subjects' performance in field sobriety and psychophysical tests was variable. Some subjects demonstrated loss of balance, impaired coordination, and difficulty following instructions. Others displayed negligible performance effects following this low dose. The acute effects diminished between two and four hours following administration. Three of six subjects indicated high levels of fatigue once the acute effects had worn off.

Blood and oral fluid collected within an hour of administration were positive for both JWH-018 and JWH-073. Urine was positive for glucuronidated monohydroxy-, dihydroxy-, and trihydroxy- metabolites of both parent compounds. In one subject urine continued to test positive for metabolites for up to 24 hours post-administration.

Data was reviewed for several subjects arrested for suspected DUI following use of K2. Subjects displayed similar symptoms including increased pulse and blood pressure, bloodshot eyes, lack of convergence, and poor performance in field sobriety tests.

The synthetic cannabinoids contained in K2 cause marijuana-like effects on subjects' psychophysical response and driving performance.

Synthetic Cannabinoids, K2, Driving

 ** Presenting Author*