K6 Determination of Synthetic Hallucinogens: 25I-, 25C-, and 25B-NBOMe by Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) Using D3-25I-NBOMe Internal Standard

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After attending this presentation, attendees will better understand a sensitive method for determining concentrations of 25I-, 25C-, and 25B-NBOMe in toxicology specimens using LC/MS/MS.

This presentation will impact the forensic science community by relaying a novel procedure that utilizes the sensitivity and selectivity of LC/MS/MS, while promoting lower Limit Of Detection (LOD) than previous studies. In addition, using a deuterated NBOMe (D3-25I-NBOMe) makes this method more reliable and robust in determining NBOMe drugs in blood and urine.

Among drug-using populations, use of designer compounds has increased over the past decade. An emerging synthetic LSD compound (NBOMe) has joined the popular designer compounds such as cathinones (bath salts) and synthetic cannabinoids (e.g., JWH). In postmortem cases, the average concentrations of NBOMe drugs encountered were less than 0.5ng/mL in biological specimens. Lower concentrations increase the need for a sensitive method to determine NBOMe drugs in biological samples. NBOMe drugs are available as powders, liquid solutions, laced on edible items, and soaked into blotter paper. In November 2013, the United States Drug Enforcement Administration placed three NBOMe drugs (25I-, 25C-, and 25B-NBOMe) on the Schedule I list for two years citing lack of medical use or human consumption. Street names for NBOMe drugs include: N-Bomb, solaris, cimbi-5, synthetic LSD, and Smiles. The NBOMe class drugs are extremely potent 5-HT2A agonists, particularly 25I-NBOMe.

Specifically, 1mL aliquots of blood and urine samples fortified with varying concentrations of the three NBOMe drugs and D3-25I-NBOMe as an Internal Standard (IS) were extracted with an organic solvent under basic conditions. Calibrators were at concentrations of 5pg/mL, 10pg/mL, 20pg/mL, 50pg/mL, 100pg/mL, and 500pg/mL. Chromatographic separation was achieved on a C-18 column with gradient elution. Mobile phases of water:methanol (90:10v/v) with 5mM ammonium formate (solvent A) and acetonitrile with 0.1% formic acid (solvent B) were used in a gradient elution program; 30% to 70% B over in 3mins, returning to initial 30% of B over in 0.5mins, and held for 0.5min for a total run time of 4min. Data was acquired on positive mode, Multiple Reaction Monitoring (MRM) transitions monitored for 25I (428m/z-121/91m/z), 25B (382m/z–121/91m/z), and 25C (336mz–121/91m/z).

The calibration range of this method was shown to be linear (R^2=>0.99) from 5pg/mL to 500pg/mL for all three NBOMe drugs in blood and urine with a LOD and Limit of Quantitation (LOQ) of 5pg/mL. The R^2 values for 25I-, 25B-, and 25C-NBOMe in urine were 0.9996, 0.9999, and 0.9997, and in blood were 0.9967, 0.9987, and 0.9997, respectively. The precision (%CV) at the LOQ for 25I-, 25B-, and 25C-NBOMe in urine were 12.6, 17.3, and 2.2, and in blood were 6.2, 7.0, and 4.6, respectively.

The method was validated and the calibration curves reconcile well with forensic toxicology criteria. The extraction and LC/MS/MS method developed for analysis of blood and urine for 25I-, 25B-, and 25C-NBOMe is precise, sensitive, and reproducible at forensically relevant concentrations.

25I-NBOMe, Synthetic LSD, D3-25I-NBOMe

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