K17 A Validated Method for the Determination of Salvinorin A and Salvinorin B in Forensic Toxicology Samples

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After attending this presentation, attendees will be able to describe a simple and effective way to identify salvinorins in urine using Solid Phase Extraction (SPE) and Gas Chromatography/Mass Spectrometry (GC/MS).

This presentation will impact the forensic science community by providing a scientifically validated method for the determination of Salvinorin A and B in urine.

Salvia divinorum is a perennial plant from the Lamiaceae (mint) family found in the Sierra Mazateca region of Oaxaca, Mexico, and has been used in religious and medicinal rituals for centuries. *Salvia divinorum* is also used as a recreational drug due to its profound hallucinogenic properties. As many as 35 countries have enacted legislation to control *S. divinorum* and/or salvinorin A, its principal psychoactive component. Street names include Diviner's Sage, Maria Pastora, Sally-D, and Magic Mint. Salvinorin A and its major metabolite (Salvinorin B) are of forensic interest, but are rarely reported during routine toxicological testing. Salvinorin A is the only known naturally occurring non-nitrogenous hallucinogen with a high affinity for the Kappa-Opioid Receptor (KOR). Although it is not federally controlled at present, its rapid onset of action and powerful hallucinogenic effect contribute to its abuse potential.

An optimized and scientifically validated method for the determination of salvinorin A and salvinorin B in biological matrices is reported. SPE and GC/MS using Selected Ion Monitoring (SIM) were used throughout. Both the extraction method and GC/MS parameters were optimized to achieve optimal chromatographic separation and detection. In the absence of a commercially available deuterated salvinorin at the time of the study, testosterone-D3 was used as the internal standard. A GC inlet temperature of 250ºC and an initial oven temperature of 260ºC produced optimal results. The temperature program involved a 0.5min hold at 260ºC with a ramp up to 290ºC with a 30ºC/min rate and a final hold for 17 minutes. The retention times were 6.9min for Salvinorin B and 7.9min for Salvinorin A.

The method was evaluated using recommendations of the Scientific Working Group for Toxicology (Scientific Working Group for Forensic Toxicology (SWGTOX) standard practices for method validation in forensic toxicology, 2013). Analytical recovery, limit of linearity, limit of detection, quantitation, precision, bias, carryover, interference, and dilution integrity were evaluated. Both Salvinorin A and Salvinorin B were linear from 0ng/mL-1,000ng/mL. The limits of detection and quantitation for Salvinorin A were 5ng/mL and 10ng/mL, respectively. The limit of detection for Salvinorin B was 20ng/mL. Precision and bias were evaluated at three concentrations and produced %CVs and bias of <20%. Carryover was not present at 1,000ng/mL and no interferences were observed from common drugs of abuse. Interferences from other salvinorins and divinatorins were also evaluated. Dilution integrity was evaluated using biological matrices that were diluted 1:10 prior to SPE. These results also demonstrated acceptable precision and bias. This validated method provides an efficient and reliable method to quantitatively identify salvinorins of forensic interest in biological matrices using GC/MS.

Salvinorin A, GC/MS, Urine