



K56 The Quantitation of *N*-Ethylpentylone (Ephylone) in Blood Samples From Victims of Suspected Drug-Facilitated Sexual Assault

Lisa J. Reidy, PhD*, University of Miami Toxicology Laboratory, Miami, FL 33136; Kristin W. Kahl, MS, University of Miami Toxicology Laboratory, Miami, FL 33136; Alex Giachetti, BS, Miami-Dade Medical Examiner Department, Miami, FL 33136; Diane Boland, PhD, Miami-Dade Medical Examiner Department, Miami, FL 33136-1054

Learning Overview: The goal of this presentation is for attendees to learn about the prevalence and blood concentrations of *N*-ethylpentylone in drug-facilitated sexual assault casework.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by disseminating information regarding the prevalence of *N*-ethylpentylone, and that it is a concentration in blood specimens from victims of suspected drug-facilitated sexual assaults. This presentation also seeks to describe the associated findings and self-reports from the victims to document voluntary consumption and to ascertain any side effects experienced.

Background: The classification of a Drug-Facilitated Crime (DFC) includes Drug-Facilitated Sexual Assaults (DFSA), which can be defined as a sexual activity occurring whereby the victim is incapacitated by drugs and/or alcohol and thereby unable to consent. According to the media, drugs commonly implicated in cases of sexual assault are flunitrazepam (“roofies”), Gamma-Hydroxybutyrate (GHB) and ketamine. Conversely, according to published literature, when examining toxicological results from DFSA victims, ethanol is the most frequently encountered drug, and voluntary drug consumption identified as the highest risk factors for DFSA. While Central Nervous System (CNS) depressants are typically associated with DFSA crimes, any substance that can cause incapacitation through cognitive or psychomotor effects can render someone a victim of non-consensual sexual contact. *N*-1-(1, 3-benzodioxol-5-yl)-2-(ethylamino)-1-pentanone, also known as *N*-ethylpentylone or ephylone, is a synthetic cathinone belonging to the phenethylamine class. *N*-ethylpentylone can cause a state of mental confusion, and when used in combination with other drugs can have a synergistic or additive effect. Side effects from *N*-ethylpentylone use include euphoria, dizziness, vertigo, confusion, tachycardia, and agitation, which is similar to “molly” or “ecstasy,” substances commonly considered to be Methylenedioxymethamphetamine (MDMA), which has been implicated in DFSA cases.

Method: All DFSA cases that were submitted to the University of Miami Toxicology Laboratory (UMTL) in 2018 were examined for the presence of *N*-ethylpentylone. Urine specimens were screened and confirmed using a basic liquid-liquid extraction analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) and Liquid Chromatography/Time Of Flight (LC/TOF) instrumentation.

Urine samples were analyzed for ethanol using Headspace/Gas Chromatography/Flame Ionization Detector (HS/GC/FID) instrumentation. *N*-ethylpentylone was confirmed in 11 urine specimens. The associated blood specimens were then sent for quantitation of *N*-ethylpentylone at a reference laboratory (Miami-Dade Medical Examiner, Miami, FL). The case summaries and histories were evaluated in all 11 cases.

Results: In 2018, 8% of DFSA cases submitted to the UMTL were positive for *N*-ethylpentylone in the urine specimens. The time from the alleged incident to the time of blood collection ranged from 5 to 56 hours. Five of the 11 cases confirmed *N*-ethylpentylone in the blood specimens at less than the lower limit of quantitation (10ng/mL). Two cases had no detectable *N*-ethylpentylone in the blood specimen. Of the 4 cases where quantitative values were within the linear range, the concentrations ranged from 10–46ng/mL. None of the 11 cases had detectable alcohol in the urine or blood specimens, and 7 cases had other drugs present, some of which were reported as ingested by the subjects. Other drugs identified include benzodiazepines (alprazolam and clonazepam), cocaine, antidepressants (citalopram, quetiapine, and fluoxetine), and cannabis.

Information obtained from the toxicology questionnaire for sexual assault cases documented that 7 out of the 11 victims reported using cannabis recently. One of the victims reported using recreational “molly,” another reported that she had been forced to ingest “ecstasy” before the incident occurred. Common side effects reported include: drowsiness (73%), sedation (73%), confusion (45%), memory loss (45%), blackout (45%), and hallucinations (27%).

Conclusion: Despite the literature documenting the prevalence of alcohol in DFSA cases, alcohol was not detected in the blood or urine specimens in any of the cases in which *N*-ethylpentylone was identified. From the results presented, testing for designer drugs, including the synthetic cathinones, should be incorporated into routine DFSA casework, even if not indicated by the victim. The side-effect profile of *N*-ethylpentylone could lead a victim to be vulnerable and more susceptible as a victim of non-consensual sexual contact.

N-Ethylpentylone, Sexual Assault, Side Effects