



K3 Methyleneoxypropylvalerone (MDPV) Postmortem Blood Concentrations: A Series of Suicide Case Reports

George S. Behonick, PhD*, Kevin G. Shanks, MS, and Andrea R. Terrell, PhD, AIT Laboratories, 2265 Executive Dr, Indianapolis, IN 46241

The goal of this presentation is to gain an understanding of the analytical methods employed to qualitatively identify and quantitatively analyze postmortem specimens for the presence of MDPV and other related "bath salt" compounds. Additionally, attendees will gain insight into the interpretive relationships of MDPV postmortem blood concentrations in deaths where drugs were not a factor.

This presentation will impact the forensic science community by emphasizing these unique case histories and circumstances, frequently characterized with atypical or bizarre decedent behaviors, which can direct postmortem toxicological testing strategies to the analyses of MDPV and other "bath salt" compounds.

Methyleneoxypropylvalerone (MDPV), a synthetic beta-ketone resembling methylmethcathinone (mephedrone) and its analogs (commonly termed "bath salts"), has a worldwide distribution and is promoted as a "legal high." Dubbed "not for human consumption," these stimulant agents are easily purchased from a number of sources to include convenience stores, "head shops," and the internet. The agents are identified as "bath salts," "plant food," "jewelry cleaner," and "pipe cleaner" in an apparent attempt to circumvent laws regulating psychostimulant substances. MDPV is a stimulant chemically related to methylphenidate and methylenedioxymethamphetamine (MDMA); its pharmacological mechanism of action is similar to cocaine in acting as a dopamine and norepinephrine re-uptake inhibitor. The products are marketed with clever trade names (e.g., "Ivory Wave," "Vanilla Sky," "Hurricane Charlie," and "Bolivian Bath") and colorful creative packaging. Emergency departments and poison control centers throughout the United States have reported epidemic-like encounters characterized as sympathomimetic toxidromes accompanied by profound mental status and behavioral changes in users. Clinical case reports have also described paranoid psychosis and hallucinatory delirium following the use of MDPV. Persons intoxicated or under the influence of MDPV or other "bath salts" pose keen interest in forensic postmortem and human performance cases; however, routine toxicology screening techniques may not be adequate for detection and identification of these compounds. This study reports an analytical technique for the qualitative and quantitative analyses of MDPV in postmortem specimens. The method is suitable for the analyses of other "bath salt" compounds and is performed routinely by some laboratories in postmortem and human performance cases. The toxicological findings are presented for five postmortem cases submitted to a laboratory between February and November 2011, which include the quantitative analyses of MDPV in blood. The manner of death in all cases was suicide. Three of the cause-of-death classifications involved self-inflicted gunshot wounds, while two cases were attributed to hanging. Three of the five cases were male, with an age range of 25 – 36 years for the five decedents. The range observed for the concentration of MDPV in postmortem blood is 68.3 to 1,044ng/mL. MDPV and other "bath salt" compounds were extracted via a protein precipitation extraction with acetonitrile. Instrumental analysis utilized in identifying and quantifying MDPV was Liquid Chromatography with Tandem Mass Spectrometry (LC/MS/MS). Three of five cases exhibited other positive toxicological findings (ethanol, benzodiazepines, THC-COOH, opiates and opioids); one case included detection of mephedrone in blood and other postmortem specimens.

Apparent recreational use of MDPV and other "bath salt" derivatives and analogs is an emerging substance abuse problem. The index of suspicion should be high among forensic pathologists, medical examiners/coroners, and toxicologists when a case history is characterized by bizarre, delusional, and hallucinatory decedent behavior. Profound, intentional self-harm with fatal consequence is described for the five cases in this series of reports; MDPV was quantitatively reported for postmortem blood in all cases, and witness accounts for two of the cases confirmed decedent use of "bath salts" prior to death.

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