B47 Detecting Ketamine in Beverage Residues Using GC-MS and LC-MS/MS

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After attending this presentation, attendees will gain a greater understanding of the forensic field will be obtained, which will aid in the continuing development of a relatively new teaching and research program in this area.

No published report of detecting ketamine in liquid beverage residue (or dried residue) that remains in a glass after a beverage has been consumed was found. This presentation will impact the forensic community and/or humanity by demonstrating that this analysis can be performed and that ketamine can be identified in the remaining residue left in the glass.

In today's society one is confronted with an increasingly large percent of the population that abuses illegal substances. Many of these substances are known to have hallucinogenic effects and some can even cause black outs in large doses. People have been known to take advantage of such effects and drug women in order to facilitate sexual contact, commonly known as date rape. These drugs are often slipped into an unsuspecting victim's drink. One such commonly used drug is ketamine. Several published reports already describe methods for determining the concentration of ketamine in urine, blood serum, and hair. A literature search did not reveal any published accounts discussing the detection of ketamine in drinks however. Since mass spectrometry is a sensitive analytical technique, it should be able to detect small amounts of this drug in beverages and beverage residues.

A method has been developed to determine the presence of ketamine in water, Coca-cola, and New Castle Brown Ale solutions using GC-MS and LC-MS/MS techniques. Samples, based on the lowest dose generally used for a small female in a date rape situation, were made in the three solvents and then poured into a glass. The glass was emptied to simulate consumption of the beverage and then the remaining residue was washed into a vial using nanopure water. A second sample was collected by refilling the glass, pouring out the liquid, and allowing the residue to evaporate over night. The sample was then collected by washing out the glass into a vial using nanopure water the following morning.

GC-MS analysis utilized direct-immersion solid phase microextraction technique (SPME) with a PDMS/DVB fiber and yielded positive identification of ketamine in almost all the samples. LC- MS/MS analysis used electrospray ionization mass spectrometry and direct injection liquid chromatography to detect ketamine in all the samples. LC-MS/MS was deemed the better technique because it required less preparatory work and time since the aqueous sample can be directly injected onto the chromatography column

Attendees should expect to learn the techniques necessary to analyze ketamine samples in common beverages and beverage residues. They will learn how to use small amounts of solution to positively determine the presence of ketamine in a glass, whether the beverage contained in the glass was consumed recently, or many days earlier.

Honing and perfecting such a technique has large implications for the forensic community. A crime scene investigator could quickly obtain drink residue and test for a drug's presence before lab results from the victim were available. If the victim visited several locations, positive identification of a glass containing the drug in conjunction with a positive test for the drug in the victim's blood or urine could help determine where the spiking of the drink occurred. Forensic science would benefit from having such a technique available to help solve cases involving this date rape drug.

Ketamine, Beverage, Mass Spectrometry

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