



K9 A Comparison of Alprazolam Levels in Blood and Urine

Danielle A. Dela Cruz, BS, 507 Oak Lake, Lake Dallas, TX 75065; Chris Heartsill, BS, Dallas County Institute of Forensic Sciences, 5230 Medical Center Drive, Dallas, TX 75235; and Jorn C.C. Yu, PhD, Box 2525, College of Criminal Justice, Sam Houston State University, Huntsville, TX 77341*

The goal of this presentation is to understand that there is an apparent correlation between the concentration levels of alprazolam in blood and urine specimen.

This presentation will impact the forensic science community by showing that there is an apparent correlation between urine and blood levels of Alprazolam that may assist the toxicologist in determining the possible intoxication.

It is generally accepted that blood levels of drugs are better indicators of impairment and urine concentrations cannot be correlated to levels of impairment; however, in many cases urine may be the only specimen received by the laboratory. Any correlation between urine and blood levels would assist the toxicologist in determining the possible level of intoxication.

Alprazolam is a common benzodiazepine that is used for the treatment of depression, anxiety disorders and panic attacks. Common side effects of the drug include drowsiness, confusion, hypotension, and tachycardia. Typical blood concentrations in persons using the drug therapeutically range from 0.005 - 0.05 mg/L; however, in cases of abuse or over dosage the levels may range between 0.1-0.4 mg/L. Alprazolam is commonly seen in cases related to intoxicated driving where urine may be the only specimen available. Labs typically use blood to determine the concentration of drugs that are present; however, in the case of alprazolam, urine specimens may work just as well. The goal of this study is to show that there is an apparent correlation between the levels of alprazolam in the blood and urine that is not typically seen with other drugs.

A total of 55 cases, from 2011, from the Southwest Institute of Forensic Science in Dallas, Texas were used for the study, all of which had previously had alprazolam quantitated in the blood specimen. The corresponding urine specimens were extracted for comparison using a liquid-liquid extraction method with two control standards, alphaprodine for an internal standard and cholestane for an external standard. The drug was first extracted into n-butyl chloride, followed by a back extraction into 1 N hydrochloric acid. Finally, the samples were concentrated into a chloroform layer and 2.5 μ L of the chloroform layer, containing the extracted drug, was injected onto a gas chromatogram-flame ionization detector. The instrument uses a split injection and contains two different columns, a 100% Dimethylpolysiloxane (DB-1) and a (5%-Phenyl)-methylpolysiloxane (DB-5) column; quantitation of the drug occurs on the DB-1 column but the concentration on the DB-5 column should be consistent. Alprazolam was measured at its respective retention time, approximately 20 minutes, and a concentration was generated based on a previously defined curve. The results indicate that approximately 76% of the urine specimen contained alprazolam levels that were within ± 0.05 mg/L of their corresponding blood level concentration. When therapeutic levels and abuse levels were categorized and evaluated, the results remained consistent. The urine and blood level concentrations for alprazolam do have an apparent correlation unlike most other drugs. In the absence of a blood specimen, a urine specimen could be quantitated for alprazolam and potentially be used to determine the approximate value of the blood concentration. Further studies will be done to broaden the scope of these initial findings.

Alprazolam, Urine, Concentration