

Effects of Post-sampling Conditions on Ethanol and Ethyl Glucuronide Formation in the Urine of Diabetes Patients

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Abstract : Ethanol must be accurately identified and quantified to establish their use and contribution in criminal cases and forensic medicine. In some situations, it may be necessary to reanalyze an old specimen; therefore, it is essential to comprehend the effect of storage conditions and how long the result of a reanalyzed specimen can be reliable and reproducible. Additionally, ethanol can be produced via multiple in vivo and in vitro processes, particularly in diabetic patients, and the results can be affected by storage conditions and time. In order to distinguish between in vivo and in vitro alcohol generation in diabetes patient urine samples, various factors should be considered. This study identifies and quantifies ethanol and EtG in diabetic patients' urine samples stored in two different settings over time. Ethanol levels were determined using gas chromatography-headspace (GC-HS), and ethyl glucuronide (EtG) levels were determined using the immunoassay (RANDOX) technique. Ten urine specimens were collected and placed in a standard container. Each specimen was separated into two containers. The specimens were divided into two groups: those kept at room temperature (25 °C) and those kept cold (2-8 °C). Ethanol and EtG levels were determined serially over a two-week period. Initial results showed that none of the specimens tested positive for ethanol or EtG. At room temperature (15-25 °C), 7 and 14 days after the sample was taken, the average concentration of ethanol increased from 1.7 mg/dL to 2 mg/dL, and the average concentration of EtG increased from 108 ng/mL to 186 ng/mL. At 2-8 °C, the average ethanol concentration was 0.4 and 0.5 mg/dL, and the average EtG concentration was 138 and 124 ng/mL seven and fourteen days after the sample was collected, respectively. When ethanol and EtG levels were determined 14 days post collection, they were considerably lower than when stored at room temperature. A considerable increase in EtG concentrations (14-day range 0-186 ng/mL) is produced during room-temperature storage, although negative initial results for all specimens. Because EtG might be produced after a sampling collection, it is not a reliable indicator of recent alcohol consumption. Given the possibility of misleading EtG results due to in vitro EtG production in the urine of diabetic patients.

Keywords : ethyl glucuronide, ethanol, forensic toxicology, diabetic

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