K50 Confirmatory Analysis of Ethylglucuronide and Ethylsulphate in Urine by LC/MS/MS According to Forensic Guidelines

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After attending this presentation, attendees will understand the use of LC/MS/MS technology to analyze alcohol metabolites.

This presentation will impact the forensic community and/or humanity by demonstrating a new LC/MS/MS based and validated method for the analysis of Ethylglucuronide and Ethylsulphate for forensic toxicology and workplace testing laboratories.

Ethylglucuronide (EtG) and Ethylsulphate (EtS) are stable Phase II metabolites of ethanol which can be detected in urine samples several days after elimination of ethanol. Determination in urine is mainly performed by LC/MS, LC/MS/MS, or by GC/MS. For the mass spectrometric identification and detection of controlled substances in sensitive fields such as forensic toxicology, workplace drug testing, doping analysis, and veterinary organic residue control, official guidelines have been released requiring a chromatographic separation and a minimum of two mass spectrometric transitions of detected analytes.

Therefore, an LC/MS/MS method was developed to detect the following transitions: deprotonated molecule of EtG [M-H]- to product ions m/z 75, 85, 159 and EtS [M-H]- to m/z 80, 97. Isotopically labeled internal standards were used to evaluate ion suppression effects. Simple dilution with water containing 0.1% formic acid followed by centrifugation was found to be sufficient to prepare urine samples. HPLC separation was performed on a RP column using a gradient of water, acetonitrile, and formic acid. Post-column addition of acetonitrile was used to enhance sensitivity.

The method was validated regarding forensic guidelines. Urine samples were collected and analyzed after drinking experiments of volunteers. EtG and EtS were detected in these samples. Time plots are used to study the kinetics of metabolism of ethanol.

Ethylglucuronide, LC/MS/MS, Workplace Testing

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