K11 A Quick LC/MS/MS Method for the Analysis of Common Benzodiazepines and Opiates

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After attending this presentation, attendees will understand LC/MS/MS and its utility as an analytical technique to detect use or abuse of benzodiazepines and opiates.

This presentation will impact the forensic community by teaching about a method that is easier and has a faster turnaround time than many techniques in use today.

The objective of this paper is to develop a fast method for analysis of common opiates and benzodiazepines in urine. The method presented has a faster run time, simple sample preparation, and combines analysis of two drug classes into a single assay.

Analytes included in this method are: 6-Monoacetyl Morphine (6- MAM), Codeine, Morphine, Oxycodone, Hydrocodone, Hydromorphone, Desalkylflurazepam, Alprazolam, α- Hydroxyalprazolam, Diazepam, Nordiazepam, Lorazepam, Oxazepam, Temazepam, Triazolam, 7-Aminoclonazepam, and Clonazepam. Deuterated analogs of each analyte were used as internal standards.

Urine samples were hydrolyzed, centrifuged for 2 minutes and diluted 1:5 with LC mobile phase. LC/MS/MS analysis was performed on a Shimadzu Prominence LC stack interfaced to an Applied Biosystems hybrid triple quadrupole/linear ion trap mass spectrometer. Injection-to-injection analytical run time was 6.5 minutes. Two MRM transitions per analyte were monitored and one transition per internal standard. The Scheduled MRM™ algorithm was use for optimal method performance for this multi-analyte method.

Results showed that all analytes were successfully detected in the 6.5 minute run time utilized. The LLOQs for most analytes was around ≤5 ng/mL and all analytes had an LLOQ ≤50 ng/mL. Precision and accuracy were both within 10% except at or near the LLOQ, where both precision and accuracy were within 15%. The linear dynamic range was at least three orders of magnitude for all analytes.

An LC/MS/MS method was developed to quickly analyze common benzodiazepines and opiates in urine. The minimal sample preparation, combined with short LC/MS/MS run time drastically decreased sample turnaround time and increased throughput without compromising sensitivity or selectivity. Additionally, the ability to combine two assays into one quick LC/MS/MS run further decreased analysis times and costs.

Opiates, Benzodiazepines, LC/MS/MS

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