K20 Analysis of THC and Its Metabolites Utilizing LC/MS/MS

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After attending this presentation, attendees will understand the utility of LC/MS/MS for toxicological analyses. Analysis of THC and its metabolites will be presented, but the basic principles can be extended to other analytes of interest.

This presentation will impact the forensic community and/or humanity by demonstrating a simple, sensitive technique for analysis of THC and its metabolites in biological matrices. Sample preparation and analysis times are significantly reduced versus other techniques. This presentation will also give the community more exposure to LC/MS/MS, which can be used as a complementary technique to GC/MS.

Cannabis (marijuana) is the most commonly used illicit drug. Δ^9Tetrahydrocannabinol (THC) is the active compound in cannabis and its major metabolites are 11-hydroxyΔ^9-tetrahydrocannabinol (11-OH-THC) and 11-nor-9-carboxyΔ^9-tetrahydrocannabinol (THC-COOH). Because of its prevalent use, there is an increased demand for detection and quantification of THC and its metabolites in toxicological assays. Until recently, screening has been accomplished by immunoassay and quantification utilizing GC/MS. Over the past 10 years, LC/MS/MS use has significantly increased in many analytical areas, including toxicology. LC/MS/MS often achieves better detection limits versus GC/MS and sample preparation is less labor intensive. A quick and rugged method for analysis of THC and its major metabolites was developed using a hybrid triple quadrupole/linear ion trap LC/MS/MS system. This instrument has the capability to acquire qualitative and quantitative data in a single experiment.

Sample preparation consisted of simple protein precipitation or solvent extraction followed by centrifugation. Detection limits of less than 0.1 ng/mL for all analytes were obtained with precision and accuracy within 10% and 5%, respectively. The reproducibility and ruggedness was shown to be extremely good.

An LC/MS/MS technique for extraction, detection, and quantification of THC and its metabolites was developed. This technique showed excellent precision and accuracy and improved detection limits versus GC/MS. Sample preparation was also greatly simplified versus GC/MS analysis, especially since no derivatization was required. Run times were less than 10 minutes, which further reduced the overall analysis time. The ability to acquire both qualitative and quantitative data in a single assay allowed for detection, confirmation, and quantification in a single run.

LC/MS, THC, Toxicology

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