

D28 An Overview of an Integrated Cannabis Measurement Services Program to Help the Forensic Community in the Determination of Δ -9-Tetrahydrocannabinol (Δ -9-THC), Tetrahydrocannabinolic Acid (THCA), and Total THC in Seized Cannabis (Hemp and Marijuana)

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Learning Overview: The goal of this presentation is to provide forensic scientists with an overview of a recently developed cannabis research program that is developing analytical tools to help in confidently distinguishing seized cannabis samples as marijuana or hemp.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by summarizing new analytical methods, a cannabis Quality Assurance Program (QAP), and hemp reference materials underway to help forensic laboratories to confidently distinguish seized cannabis samples as marijuana or hemp.

Cannabis (marijuana and hemp) and its psychoactive constituent, Δ -9-THC, have been classified as Schedule I controlled substances since the 1970s. In the past, seized cannabis samples have been tested by forensic laboratories, who verify the identity of the plant through macro- and microscopic evaluation. The presence of Δ -9-THC through presumptive (colorimetric) and confirmatory chemical testing via Gas Chromatography/Mass Spectrometry (GC/MS). Currently, marijuana and Δ -9-THC remain on the controlled substances list, although medical marijuana is legal in 33 states and recreational marijuana is legal in 11 states as well as the District of Columbia. The 2018 Farm Bill defined hemp as cannabis containing less than or equal to 0.3 % potential Δ -9-THC content and removed hemp from the controlled substances list. These legal changes have required forensic laboratories throughout the United States to implement quantitative analytical methods to distinguish cannabis seizures as marijuana or hemp. However, the majority of these laboratories have little to no experience in or accreditation to perform quantitative drug analysis.

To help federal, state, and local forensic laboratories, a new integrated measurement services program has been developed to provide analytical tools to confidently distinguish seized cannabis samples as illegal marijuana or legal hemp. The new cannabis program will help ensure the quality of routine analysis in forensic laboratories with a three-pronged approach: (1) robust analytical methods for a range of techniques on a variety instrumental platform; (2) cannabis Reference Materials (RMs); and (3) cannabis Quality Assurance Program (QAP). This presentation will provide a summary of these new developed analytical tools that permit the accurate measurements of Δ -9-THC, THCA, and total THC in cannabis plant, oils, and edibles samples. The analytical techniques being developed include GC/MS, Liquid Chromatography with Ultraviolet Detection (LC-UV), Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Near-Infrared (NIR), and sample extraction protocols, which will be used for the characterization of all potential cannabis RM and QAP samples. RMs are a critical measurement service that is presently lacking and could provide forensic laboratories with quality control materials to be used as part of their validation schemes. In addition, a cannabis QAP will help forensic laboratories demonstrate and improve measurement comparability and/or competence. Participation in a cannabis QAP will also help assist in the design and characterization of cannabis RMs. The first exercise of a cannabis QAP is focusing on the determination of cannabinoids in two different hemp oils. In addition, attendees will also be asked to identify the type of sample preparation and analytical methods employed in their testing to facilitate conclusions about potential method bias.

Seized Samples, Cannabis, Δ -9-THC