E104 Preparation of "Gummy" Quality Control (QC) Material and the Analysis of Medible "Gummy" Products

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After attending this presentation, attendees will become familiar with the preparation of Tetrahydrocannabinol (THC) and Cannabidiol (CBD) in edible/medible "gummy" product QC materials and the detection and quantification of THC and CBD by Ultra-High Performance Liquid Chromatography/Tandem Mass Spectrometry (UHPLC-MS/MS). These products include "gummy" candies such as "medible gummy bears" and "medible gummy worms."

This presentation will become the forensic science community by providing a method for the preparation and analysis of matrix-matched QC material that is necessary for the analysis of "gummy" products.

The purpose of this study was to prepare QC material containing THC and CBD in edible/medible "gummy" products and to validate an LC-MS/MS method for the analysis of medible "gummy" products.

The legalization of marijuana in the United States for both medicinal and recreational use increased in the past few years. Currently, 24 states have legalized marijuana for medicinal use. The United States Drug Enforcement Administration classified marijuana as a Schedule 1 substance. The Food and Drug Administration (FDA) does not regulate formulations or products that contain marijuana/or marijuana extracts in states that "legalized" marijuana. THC and CBD are the two most common cannabinoids found in these formulations or products. Marijuana edibles or "medibles" are typically candies and baked goods labeled with THC and/or CBD and the cannabinoids come from marijuana or marijuana extracts. THC is the major psychoactive compound of marijuana. CBD found in marijuana is reported to have medical properties, including analgesic, anticonvulsant, and anti-psychotic activity.

Presented is a method for the preparation of QC materials containing THC and CBD for use in the analysis of medible "gummy" products and an LC-MS/MS method for the analysis of these products. "Gummy" QC samples were prepared at two different THC and CBD concentrations, 5mg/40g and 10mg/40g. The method calibration range for THC and CBD was 0.8µg/g – 80µg/g. Fortified QC samples were prepared at 0µg/g, 2.4 µg/g, 25 µg/g, and 60µg/g THC and CBD, and were analyzed with each analysis batch. The Limit Of Detection (LOD) and Limit Of Qquantitation (LOQ) were administratively set at 0.8µg/g. All samples were prepared by adding 8.0µg/g Internal Standard (ISTD) to a 25mg aliquot of either the calibrator, QC, or samples. Samples were dissolved in 0.5mL deionized water, incubated at 56ºC for five minutes, and extracted with 0.5mL deionized water using a UCT Clean Screen FASt™ column.

Extracted samples were analyzed using an LC-MS/MS operated in positive ionization mode. Chromagraphic separation was performed on a reverse phase C18 rapid resolution 4.6x75mm column. The mobile phase was 20mM ammonium formate in water (A) and 20mM ammonium formate in methanol (B) isocratic at 10:90 for six minutes, followed by a gradient to 0:100 over 1min. The column flow rate was 0.5 mL/min. The acquisition mode was Multiple Reaction Monitoring (MRM). The following transition ions (m/z) were monitored in MRM mode with their corresponding collection energies (eV) in parentheses: CBD: 315>43 (35) and 315>93 (23) THC:

315>43 (35) and 315>122 (29); and THC-d3: 318>93 (25) and 318>123 (35). The total run time for the analytical method was 8.0min.

No carryover was observed in the LC-MS/MS method. Precision and accuracy were determined at three fortified QC concentrations (*n*=3) on five separate days. The bias was <20% for each concentration with a <20%CV. No matrix effect was determined in ten different commercially available gummy bear brands/types. Prepared QC material was determined to be stable for at least one month.

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UHPLC-MS/MS, THC, Medible