B176   Medible Testing: The Preparation of Matrix-Matched Calibrators and Controls for Forensic Analysis

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Learning Overview: After attending this presentation, attendees will understand how to prepare matrix-matched calibrators and controls for analysis of edible marijuana products.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by presenting a method to prepare matrix-matched materials that are commercially unavailable.

Background/Introduction: In the last decade, the number of states in the United States that have legalized marijuana for both medical and recreational use has risen to 29. Marijuana edibles, or "medibles" are typically packages of candy or baked goods consumed for medicinal as well as recreational use. These products contain the major psychoactive drug in marijuana (delta-9-tetrahydrocannabinol (THC)) and/or cannabidiol (CBD), as well as other cannabinoids that have reputed medical and recreational properties. Federally, the U.S. Drug Enforcement Administration (DEA) has classified marijuana as Schedule 1 substance, and the only legal formulation of THC is Marinol®, which is regulated by the U.S. Food and Drug Administration (FDA). Medibles are regulated by the states in which they are legal rather than the federal government, and therefore there is no standardized method for preparation or analysis of these matrices. The three most common medible matrices were used to prepare matrix matched calibration and control materials (high fiber (brownies), high sugar (gummies), and high fat (dark chocolate)).

Objective: To prepare matrix-matched high fiber, high sugar, and high fat materials for forensic analysis of medibles.

Methods: Calibration materials were prepared by fortifying 25 mg of each prepared drug-free matrix to the following cannabinoid concentrations (0.8, 1.6, 4, 8, 16, 40, and 80 mcg/g). Control materials were prepared by fortifying drug-free matrix before preparation (i.e., baking, mixing, and tempering) to the following cannabinoid concentrations (0.8, 2.4, 24, and 60 mcg/g). The high fiber matrix was prepared using commercial brownie mix, eggs, and oil. The brownies were baked in a lab oven at 300ºF, until done. The high sugar matrix material was prepared using a mix of commercial flavored gelatine with no preservatives, unflavored gelatin, and water. The gummy mix was heated in a microwave, then molded, and chilled, using a previously presented method. The high-fat matrix was prepared using cacao butter, cocoa powder, oil, honey, and vanilla. Several recipes were evaluated for ease of preparation and palatability. The ingredients were melted in a double-boiler and tempered the following day. The concentrations were chosen based on the classification of a serving of THC in states that have legalized marijuana.

Results: The high fiber matrix should be baked in mini-muffin or brownie bite tins < 300°F to maintain the stability of the cannabinoids and reduce the baking time needed. The high sugar matrix should be heated only sufficiently to dissolve the sugar matrix and molded soon after dissolution. The high fat matrix should be tempered properly to eliminate the formation of fat blooms.

Conclusion: Methods for the preparation of high fiber, high sugar, and high fat matrix-matched materials was determined. Due to unavailability of commercial matrix-matched materials, these methods are available for the preparation of medible materials for future work.

Cannabinoids, Medibles, Matrix-Matched