



B174 Forensic Chemistry Analysis of Edible Goods Containing delta-9-Tetrahydrocannabinol (d9-THC)

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After attending this presentation, attendees will understand how to employ multiple physical techniques and instrumentation for the analysis of uncommon items containing the hallucinogenic component delta-9-THC.

This presentation will impact the forensic community and/or humanity by providing background and useful analysis information for analysts encountering rare exhibits classified as “medical marijuana.”

Recently, the Drug Enforcement Administration Southwest Laboratory (SFL-8) has been receiving numerous exhibits originated during the seizure of medical marijuana establishments throughout the state of California. These exhibits are usually labeled as containing hemp, weed, grass, cannabis, or THC and are usually obtained in the form of food products like cookies, chocolate bars, juice, muffins, caramels, lollipops, etc. These items have not been commonly encountered in the past. Their recent appearance and subsequently necessary analysis have provided for the opportunity to apply multiple analytical techniques in order to provide a confirmatory identification of the hallucinogenic ingredient.

This presentation will include experimental details of the extraction and solution chemistry procedures employed for the analysis of these edible goods and the isolation of the compounds of interest, usually delta-9-tetrahydrocannabinol. Results from the combination of multiple instrumental techniques will also be included and discussed. Numerous photos of these interesting exhibits will also be presented.

Identification of the hallucinogenic component delta-9- tetrahydrocannabinol has been possible using a combination of analytical techniques. Analysis of these food products has involved the development of various solid phase and liquid phase extraction methods as well as the development of a preliminary quantification procedure. The variable content of the exhibits has presented multiple experimental and instrumental difficulties. These subjects will also be addressed during the presentation.

Some of the food items received have been amenable to microscopic examination, and the presence of cystolithic hairs has been determined. The application of the Duquenois-Levine color test has also been investigated. However, the different physical characteristics and chemical composition of the various food items have made its use somewhat limited. The concentration of delta-9-tetrahydrocannabinol in these exhibits has also been a limiting factor during analysis. Organic solvent extracts have been analyzed using thin layer chromatography (TLC), gas chromatography with flame ionization detection (GC-FID), and gas chromatography with mass spectrometry detection (GC-MS). Acidic extracts have also been analyzed using liquid chromatography – mass spectrometry techniques (LC-MS) employing electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) interface sources.

For a limited number of these exhibits, analysis has also been possible using the newly developed technique of desorption electrospray ionization mass spectrometry (DESI-MS). This type of analysis has provided for a rapid identification of the active component (d-9-THC) without the need for extensive sample preparation and derivatization steps.

The combination of the various experimental procedures and instrumental techniques has made possible the confirmatory identification of delta-9-THC in most, if not all of the edible goods encountered to date. The techniques and methodology presented should be of interest to the criminalistics audience, especially those analysts involved in the analysis of “medicinal” marijuana items. The presentation will also illustrate and emphasize the importance and complementary nature of the multiple instrumentation techniques available to forensic chemists today.

Forensic Chemistry, delta-9-Tetrahydrocannabinol, Cannabis