A2 Analysis and Characterization of Several Varieties of Herbal Blends Containing Synthetic Cannabinoids

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After attending this presentation, attendees will be familiar with the various methods in which synthetic cannabinoids may be analyzed and how cannabinoid content within marketed products may vary.

This presentation will impact the forensic science community by demonstrating various methods in which products containing synthetic cannabinoids may be analyzed. As a number of states have controlled these substances within the past year, with more expected to follow, it is important to have an understanding of which successful analysis methods are available.

Forensic identification of synthetic cannabinoids involves the detection of an increasing number of synthetic compounds. The specific compound(s) included within the product varies greatly among brands and, in some instances, batches. Sample content, in some cases, has been reported to rapidly change in response to local regulations; presumably to maintain a presence within the "legal high" market. An increasing number of states in the United States, including Kentucky, and local jurisdictions, have introduced legislation making the sale, purchase, possession, and/or use of these substances illegal. However, many states have no such regulation and the majority of these substances are not federally regulated.

The rapid evolution of the presence of these compounds presents a challenge for forensic investigators in instances where synthetic cannabinoids are banned, as opposed to those instances in which specific cannabinoid compounds are regulated. Some of the most frequently reported synthetic cannabinoids include HU-210, CP 47,497(and its homologs), JWH-018, JWH-073, JWH-398, and JWH-250. These compounds are added to a mixture of vegetative material in order to produce cannabis-like effects when smoked. They are commonly marketed as herbal incense or potpourri with the disclaimer that these substances are "not for human consumption." Reported effects are similar or greater in intensity than the effects of actual marijuana. The number of brands and types of these products are continuously growing and a current list of brand names rapidly becomes obsolete.

Standard marijuana color tests do not produce positive results as no delta-9-tetrahydrocannabinol (THC) is present within these products. Toxicological identification of the presence of synthetic compounds within blood samples is commonly available. However, it is limited in the ability to detect usage after a short period of time from consumption. Urine analysis allows for detection of these compounds over a longer period of time, currently, methods of detection are for the identification of a few synthetic cannabinoid compounds.

A simple methanol extraction followed by GC/MS analysis is sufficient for the identification of many of these compounds utilizing a small amount of sample of the unburned product. An analysis of the burnt residue and ashes remaining after burning a portion of synthetic cannabinoid sample indicates a diminished yet identifiable and sustained presence of several of these compounds. Derivitization of these substances was also studied for optimization of the analysis and detection of the synthetic compounds.

Analysis of several different brand name samples revealed the presence of various concentration and types of known synthetic compounds, including JWH-073, JWH-018, and CP 47,497-C8. Samples included in this study were obtained on the local market, from the internet, or as evidence submitted to the laboratory for analysis and identification.

Marijuana Mimics, Cannabinoids, Drug Analysis

Future studies should be made using different controlled substances, derivatizing agents, and GC and MS conditions. This will help to determine which derivatizing reagents would produce the most unique and identifiable mass spectra for controlled substances, and also which chromatographic conditions would give the most ideal separation of drug mixtures.

Amphetamines, TFA Derivatization, GC-MS

 ** Presenting Author*