A185 Synthetic Cannabinoid Colorimetric Detection

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After attending this presentation, attendees will learn what a synthetic cannabinoid is, how they were originally used, and the detection of marijuana and synthetic cannabinoids.

This presentation will impact the forensic science community by providing a field test specific to detecting synthetic cannabinoids.

Marijuana is illegal and highly abused used due to the psychoactive effects that the user would experience. The active component in marijuana is tetrahydrocannabinol (THC) which is what gives the psychoactive properties.[1] In the last 40 years compounds known as synthetic cannabinoids(SC) have been developed in an effort to research the possible medical uses of marijuana without having the consequences of the negative unwanted side effects.[2] Synthetic cannabinoids are able to produce similar effects to the body as THC because they bind to the same receptor sites however they do not have a similar structure.[3]

In 2004 an herbal mixture of plant material called "Spice" came into the drug community.[4] The plant material was believed to give a similar or a more potent "high" as THC. In truth, "Spice" is a combination of plant material that has been sprayed with one or more SCs and then passed as an herbal drug. Synthetic cannabinoids were not detected in "Spice" until late 2008 by a German pharmaceutical company called THC Pharm. The first reported death due to "Spice" occurred in 2010 in Iowa and since the identification in 2008 many hospital cases across the globe have been reported. Currently there is no ban placed on all SCs, only a few specific cannabinoids have been banned in numerous countries. Little research and literature is available on the detection of SCs in the field and this study will lead to exponential progress in that area.

Recently, a colorimetric field test has been developed that positively identifies the THC compound and claims to positively identify SCs. There are two tests marketed: a general screening test and a THC specific test. To conduct this study test samples were broken up into two different sections: known positives and known negatives. These groups would determine the test's specificity toward SCs. The positive samples were comprised of SC standards, THC standards, and "Spice" samples that had tested positive for SCs. The known negatives had samples of "Spice" that had tested negative for known SCs and household items that would not contain SCs like sugar, flour, oregano, and tobacco paper. "Spice" samples and known negative samples were tested as a solid and in solution for the presence of SCs. A 1mg/mL solution was prepared and tested to determine if there was a positive reaction. A positive reaction for identification occurs when the test solution in contact with the sample turns red.

The study yielded a range of results. In regards to the known positive samples only THC; CP-47, 497; and HU-210 had positive results for both tests when analyzed in the solid form and in a solution form. The other SCs and most of the true negatives did not have a color change for both the general screening test and the cannabis specific test. A few of the "Spice" samples had faintly positive results for both the tests. The study did yield some ambiguities including a lack of consistency in tests results depending on the physical state of the sample when tested. Some samples had a positive result in the solid test but did not have the same result while in liquid form. The test shows signs of movement in a positive path in regards to field detection. It is able to detect classic cannabinoids as well as THC which is a necessity in field detection.

The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

References:

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