



National Drug Court Resource Center

EMERGING ISSUE

SPICE, K2 AND THE PROBLEM OF SYNTHETIC CANNABINOIDS

BY PAUL CARY, JULY 14, 2010

Many drug courts are experiencing a significant and disturbing surge in client's use of synthetic cannabinoids. In many areas of the country "herbal incense" can be legally purchased and smoked with impunity due to the lack of specific drug detection methods. Products such as Spice and K2 have been widely reported as producing many of the same physiological effects as marijuana. Without laws to control its distribution and insufficient detection methods, courts face a significant challenge in addressing the problem of synthetic cannabinoids.

WHAT ARE SYNTHETIC CANNABINOIDS?

Synthetic cannabinoids represent the most recent advent of "designer drugs." Designer drugs are pharmaceuticals, created or reformulated (if the drug already exists) to avoid current laws (such as the Control Substance Act) by modifying the molecular structures of drugs to varying degrees. The manufacturers' ability to successfully modify a drug chemically (so as to retain its pharmacological activity while changing the structure enough to skirt existing legal controls) drives the designer drug market. The goal is to satisfy users' demands for popular drugs that can be obtained without prescriptions or other legal constraints.

The developmental history of designer drugs includes alternative esters of opium in the 1920's, synthetic hallucinogens (modifications of LSD and PCP) in the 1960's, MDMA (ecstasy) and methcathinone in the 1980's and the derivatives of anabolic steroids used in major league baseball in the last decade. Synthetic cannabinoids are but the latest example of "look-a-like" drugs created to indulge users attempting to evade established restrictions.

Synthetic cannabinoids are marketed under dozens of product names including Zombie World, Bad to the Bone, Black Mamba, Blaze, Fire and Ice, Dark Night, Earthquake, Berry Blend, The Moon and G-Force. Dispensed in small packets (1-5 grams each), nearly all contain the moniker "herbal incense," along with the disclaimer "not for human consumption." Synthetic cannabinoids are retailed widely on the internet, through "head" shops, alternative medicine stores, and can even be purchased on eBay. While the

content of each product is unique, all of these products contain differing varieties of herbs and other botanicals. The list below is typical:

- *Canavalia rosea*: commonly known as beach bean or bay bean - vine found in tropical and subtropical beach dunes
- *Nymphaea caerulea*: also known as Blue Egyptian water lily
- *Scutellaria nana*: perennial herb also known as Dwarf skullcap
- *Pedicularis densiflora*: known commonly as Indian warrior - a perennial herb
- *Leonotis leonurus*: also known as Lion's Tail and Wild Dagga - a perennial shrub native to southern Africa
- *Zornia latifolia*: a perennial herb
- *Nelumbo nucifera*: known by a number of names including Indian Lotus, or simply Lotus - aquatic perennial commonly found in China
- *Leonurus sibiricus*: commonly called Honeyweed or Siberian motherwort, herbaceous plant native to Asia

While some of these plant species can produce mild psychoactive or hallucinating effects if consumed, the significant marijuana-like effects are not associated with the plant materials themselves. The dried/crushed/chopped botanicals are sprayed with a liquid form of synthetic cannabinoids, thus greatly enhancing their potency and creating the classic marijuana "high" when the herbal incense is smoked.

These synthetic cannabinoids go by such innocuous identifiers as:

- HU-210
- HU-211
- CP 47,497
- JWH-018
- JWH-073

This is but a partial listing. The origins of these compounds are actually quite legitimate. HU-210 and HU-211 were synthesized in 1988 at Hebrew University in Israel. HU-210 has anti-inflammatory properties and HU-211 is an anesthetic agent. CP 47,497 was developed by the pharmaceutical manufacturer Pfizer in 1980, and is also an analgesic drug. JWH-018 and JWH-073 were developed by a researcher at Clemson University in 1995 for use in THC receptor research. The researcher was John W. Huffman, hence the prefix JWH. Synthetic cannabinoids are particularly useful in experiments designed to determine the precise relationship between the structure of drugs, like delta 9-THC, and brain receptor activity. By making incremental modifications to the cannabinoid molecule, researchers are able to identify THC's active sites, which promote our understanding of how marijuana effects the human body.

GROWING POPULARITY

The first appearance of synthetic cannabinoids sold as herbal incense occurred on the Internet in 2004. While Europe was the first target market and misuse of herbal incense was widespread there by 2008, its manifestation in this country did not lag far behind. Reports of synthetic cannabinoids use in the US began in earnest in 2008 and by 2009 products like Spice and K2 were nearly epidemic in parts of the country. In late 2008, the first article appeared in the scientific literature (University Hospital in Freiburg, Germany) describing the chemical analyses linking the incense to synthetic cannabinoids. The Drug Enforcement Administration's Office of Diversion Control published a one-page update on Spice in its Year 2008 Annual Report.

EFFECTS ON SYNTHETIC CANNABINOIDS USERS

The reported pharmacological effects of smoked synthetic cannabinoids are very similar to that of marijuana. This comes as no surprise given that Spice and K2 are THC agonists - meaning they chemically bind to the same brain receptor (CB1) and trigger many of the same responses as marijuana. The physiological effects of synthetic cannabinoids include:

- Increase heart rate & blood pressure
- Altered state of consciousness
- Mild euphoria and relaxation
- Perceptual alterations (time distortion)
- Intensification of sensory experiences
- Pronounced cognitive effects
- Impaired short-term memory
- Increase in reaction times

Some reports indicate that JWH-018 binds to the CB1 receptor with even greater affinity than marijuana. Researchers in Japan have surveyed over 40 herbal preparations on the market and determined that the concentration of synthetic cannabinoids varied by a factor of fifteen, which likely explains the variability of the intensity of effects reported by users. Prolonged use of the synthetic cannabinoids has also led to publications indicating that, like marijuana, Spice and K2 can produce withdrawal symptoms and dependency syndromes similar to those identified in chronic marijuana smokers. Recently, the American Association of Poison Control Centers reported 567 cases in 41 states in which people had suffered adverse reactions to Spice during the first half of 2010. As opposed to only 13 cases reported in all of 2009. The long-term health ramifications of smoking synthetic cannabinoids remain unstudied.

LAWS REGARDING SYNTHETIC CANNABINOIDS

At the present time, there is no federal ban on most of the synthetic cannabinoids. As a result, the current legal status of synthetic cannabinoids is an evolving patchwork of local and state laws. Products such as Spice and K2 have been banned in a half-dozen states and in some local jurisdictions. More such prohibitions are making their way through many state legislatures.

As is often the case with designer drugs, the ability to detect these compounds through drug testing lags behind the popularity of their emergence. At the writing of this article, there are no screening tests capable of detecting synthetic cannabinoids in urine. Due to the fact that the pure synthetic cannabinoids compounds are difficult to obtain and the reluctance of manufacturers/laboratories to invest significant resources in what may be a transient abuse trend, the prospects for either on-site, rapid tests or laboratory-based screening appears unlikely. There have been reports of laboratories developing GC/MS assays for some of the synthetic cannabinoids, but many questions remain: Which of the many synthetic cannabinoids would be detected? What are the appropriate detection cutoff levels? How is GC/MS testing useful without a preliminary screening test? What would the costs be for such testing?

In view of the lack of synthetic cannabinoids detection methods, courts are urged to use existing community supervision personnel to extend the court's surveillance reach. Increased search and seizure practices employing probation, law enforcement and court marshals can be effective in monitoring client behaviors in situations where drug testing approaches are insufficient. For clients suspected of synthetic cannabinoids abuse, searches should be frequent, random, unannounced and occur during non-governmental hours. An intrusive inspection of a client's home, car, school, work, "hangouts" and other restricted areas provides a visible message to all participants as to the court's monitoring vigilance. Some courts have established sanctions of greater severity if evidence of synthetic cannabinoids is identified – believing that the use of these drugs by clients is a purposeful attempt to perpetrate a fraud on the court (since current testing for synthetic cannabinoids is not available).

It is unclear as to whether the phenomenon of synthetic cannabinoids is a passing fancy or a substance abuse trend that will remain taxing to client monitoring efforts. With an uncertain legal future and a lack of drug detection strategies, in the short term, evaluating synthetic cannabinoids usage will continue to be a challenging endeavor for drug court programs.

Paul L. Cary, M.S., is director of the Toxicology and Drug Monitoring Laboratory at University of Missouri Health Care in Columbia Missouri. For the past thirty years, Mr. Cary has been actively involved in the management of a nationally-recognized toxicology laboratory (SAMHSA certified) that performs drug testing for drug courts, hospitals, mental health facilities, attorneys, coroners and medical examiners, athletic programs, and public and private employers. He has authored numerous scientific publications and monographs, has served on a variety of clinical and technical advisory committees, teaches at the university, is involved in drug testing research, and serves as a consultant in toxicology-related matters. Mr. Cary has also provided judicial education including lecturing at the National Judicial College on alcohol pharmacology, the use of expert testimony and on drug testing issues. He has been certified as an expert and provided expert testimony in court (local, state and federal) and in labor arbitration. Mr. Cary has been a resource to drug court teams throughout the nation and overseas and serves as visiting faculty for the National Association of Drug Court Professionals, the Center for Court Innovation, the National Council of Juvenile and Family Court Judges and the National Drug Court Institute.

Have Questions? [Contact Us](#)

Due to the nature of this subject matter and the limited amount of scientific information on synthetic cannabinoids, much of the source material used in this publication was obtained from news organizations, relevant web sites and personal communications with government officials, researchers, laboratory directors and actual synthetic cannabinoids users. Other source materials included the following:

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