

Synthetic Marijuana (K2/Spice)

K2 or “spice” are terms used to describe a variety of products made of dried, shredded plant material laced with synthetic compounds.¹ The products are sold surreptitiously as herbal incense, although they are known to be used as a marijuana substitute.^{1,2} K2/spice is marketed under names such as Black Magic, Genie, Spice Diamond, and Spice Gold¹ and sold online, in convenience stores, and in “head” or smoke shops.^{1,3} Many are labeled as “Not for human consumption” and labeled as “safe” and “natural” alternatives.¹ The synthetic ingredients are identified as substances with chemical and/or pharmacologic similarities to marijuana, K2/spice users have reported feelings that are similar to those produced by marijuana and, in some reports, the feelings are even stronger than when using marijuana. Experiences include elevated mood, relaxation, altered perception, psychotic effects such as extreme anxiety, paranoia, and hallucinations.¹

These "synthetic cannabinoids" make up large family of chemical structures functionally (biologically) similar to δ -9 THC, the primary psychoactive constituent of marijuana.⁴ To date, the United Nations Office on Drugs and Crime reports that more than 100 synthetic cannabinoid substances have been synthesized and identified.²

Over the years, there have been increasing reports to poison control centers and emergency room visits of exposure from synthetic marijuana users. The American Association of Poison Control Centers reports the following statistics on human exposure to synthetic marijuana.⁵

“Synthetic Marijuana Exposure Calls to Poison Control Centers, 2010 to May 31, 2012”⁵

Year	Number of Calls
2010	2,906
2011	6,959
2012 as of May 31, 2012	2,883

These numbers reflect the closed human exposure calls to poison centers about exposures to synthetic marijuana (THC homologues) as of May 31, 2012. The numbers may change as cases are closed and additional information is received.⁵

On March 1, 2012, the Drug Enforcement Administration (DEA) issued a final order to place five synthetic cannabinoids temporarily in Schedule 1 of the Controlled Substances Act (CSA). Schedule 1 substances have been found to have a high potential for abuse with no known medical benefit. The new Schedule 1 substances are 1-pentyl-3-(1-naphthoyl)indole (JWH-018), 1-butyl-3-(1-naphthoyl)indole (JWH-073), 1-[2-(4-morpholinyl)ethyl]-3-(1-naphthoyl)indole (JWH-200), 5-(1,1-dimethylheptyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol (CP-47,497), and 5-(1,1-dimethyloctyl)-2-[(1R,3S)-3-hydroxycyclohexyl]-phenol (cannabicyclohexanol; CP-47,497 C8 homologue).⁶ The final order makes it illegal to manufacture, distribute, possess, import, or export any of the listed substances.

The DEA continues to monitor and act to control dangerous synthetic drugs. On June 19, 2012, the DEA released a notice commending House and Senate negotiators for agreeing to add 26 substances to Schedule I of the Controlled Substances Act. The legislation would also create a new definition for “cannabimimetic agents” and would double the length of time a substance may be temporarily placed in Schedule I (from 18 to 36 months).²

One of the challenges for toxicology laboratories is that K2/spice products contain a variety of composition in the chemicals used in the mixtures. The rapidly changing composition of these products makes it challenging for the toxicology laboratory to assure that its assays target the metabolites of these ever-changing compounds.

Traditional assays for cannabinoids do not detect synthetic marijuana; however, specialized techniques have been developed to detect metabolites of synthetic cannabinoids in urine. Quantitation in urine appears to be better with the use of liquid chromatography and tandem mass spectrometry (LC/MS-MS).³

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