

SPICE, BATH SALTS, AND BEHAVIORAL HEALTH

Spice (synthetic cannabinoids) and *bath salts* (synthetic cathinones) refer to two groups of designer drugs that have increased in popularity in recent years. These substances are created with *analogs* of commonly used illicit drugs. An analog is one of a group of chemical compounds that are similar in structure and pharmacology. This *Advisory* provides introductory information about spice and bath salts for behavioral health professionals who treat people with mental illness, substance use disorders, or both. It is not meant to present comprehensive information about spice or bath salts or treatment of substance use disorders involving their use. See the Resources section of this *Advisory* for links to additional information.

What Are Spice and Bath Salts?

Spice and bath salts are synthetic versions of controlled substances that are produced to avoid existing drug laws. In 2011, the U.S. Drug Enforcement Administration added, on a temporary, emergency basis, spice and bath salts analogs to its list of Schedule I substances. There are many synthetic chemicals that can be used to produce these drugs and their analogs; when federal or state regulations are amended to include new substance prohibitions, the makers of spice and bath salts turn to other synthetic analogs to produce these designer drugs. Both spice and bath salts are marketed online and sold in drug paraphernalia stores. They are attractively packaged and, to further help retailers evade the laws that prohibit possession or sale of designer drugs, may include labels that state “not for human consumption.”^{1,2}

Spice

Spice, also known as *herbal incense*, is dried, shredded plant material treated with a *cannabinoid* analog. Although labels on spice products will list the ingredients as “natural” psychoactive plant products, chemical analyses show that their active ingredients are primarily synthetic cannabinoids added to the plant material.² These synthetic analogs function similarly to the active ingredient in marijuana, Delta-9-tetrahydrocannabinol (Δ^9 -THC).

In this context, studies indicate that the synthetic cannabinoids act on the same receptors as natural cannabinoids, but they can bind with greater affinities and exhibit greater potency compared with natural cannabinoids.^{3,4} For example, many of the synthetic cannabinoids that have been found in spice are between 4 and 100 times more potent than Δ^9 -THC and produce correspondingly stronger psychoactive effects and side effects.³ These synthetics are known to alter various physiological processes, including neurotransmission and cardiovascular functioning, through the same signaling pathways as their natural counterparts.³ In addition, metabolites from some of these synthetic substances retain biologic activity and may account for a subset

Common Product Names for Spice

Arctic Synergy, Black Mamba, Bombay Blue, Cloud Nine, Genie, K2 Blonde, K2 Blueberry, Moon Rocks, Natures Organic, Skunk, Spice Diamond, Spice Gold, Spice Silver, Yucatan Fire, Zen, Zen Organic

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of the physiological changes associated with spice.⁴ It is also important to note that other psychoactive compounds may be added to spice (e.g., synthetic opioids have been found in spicelike blends), further amplifying and expanding its psychotropic effects.^{1,3}

Spice is marketed under more than 140 product names.⁵ Typically, it is smoked like marijuana⁶ or infused as a hot drink.² Spice is marketed as a “safer” alternative to marijuana and is not easily detected in urine or blood drug tests. Furthermore, the analogs that are added to produce the desired effects are constantly changing in response to federal regulations and state laws banning certain types of synthetic cannabinoids.^{4,7}

As a consequence, people who use these substances cannot know the precise array of chemicals that are in them or the serious, if not lethal, outcomes that may result from their use.^{1,8}

Bath salts

Bath salts, sometimes known as *plant food*, are usually produced as white, tan, or brown powders or crystals, but they are sometimes sold in tablets. Bath salts usually are ingested nasally as a powder, taken orally, injected, or smoked.⁹

Bath salts are synthetic cathinones. *Cathinone* is a naturally occurring substance found in the leaves of the *Catha edulis* plant, better known as *khat*. Khat is widely used for its stimulant effects, particularly in parts of Africa. Synthetic cathinones are derivatives of this

Common Product Names for Bath Salts

Bliss, Bloom, Blue Silk, Cloud Nine, Crazy Train, Drone, Energy-1, Hurricane Charlie, Ivory Wave, Lunar Wave, Ocean Snow, Purple Wave, Red Dove, Scarface, Snow Leopard, Stardust, Vanilla Sky, White Lightning, Zoom

compound and have effects similar to those of cocaine, amphetamine, or MDMA (3,4-methylenedioxy-N-methylamphetamine, or “ecstasy”).

Three of the most common compounds found in bath salts are mephedrone, methylone, and MDPV (3,4-methylenedioxypropylone). All three of these compounds have dopaminergic (among other) effects. Mephedrone appears to stimulate release of dopamine, whereas MDPV and methylone appear to increase dopamine levels by inhibiting dopamine reuptake.^{10,11,12} Synthetic cathinones have been found to increase dopamine levels equal to or more than those produced by the stimulant drugs they mimic.¹²

These three compounds are now illegal, but a wide range of other synthetic cathinones are now being used to create bath salts. Bath salts may contain any combination of unknown chemicals with unknown effects, making these substances more dangerous.¹³ In addition, the chemicals in bath salts are also often sold as ecstasy or other drugs, so they may be taken unintentionally.

Can People Become Dependent on Spice or Bath Salts?

People start using designer drugs for many of the same reasons people use other drugs—to experiment or because friends pressure them to use the drugs. Once they start using designer drugs, people may continue to use them to relieve stress, alleviate pain, function better, have fun, or cope with mental disorders.

Spice and dependence

Although there have been few studies to date on withdrawal and addiction liability, anecdotal evidence suggests that people who regularly use spice experience withdrawal and addiction symptoms.²

Bath salts and dependence

Both anecdotal and experimental evidence suggest that bath salts are highly addictive and produce an intense craving.¹⁴ One study of laboratory mice found that mephedrone achieved a brain stimulation reward similar to that achieved by cocaine, underscoring mephedrone's potential for abuse.¹⁵ A 2013 review article concluded that the increase in dopamine transmission created by the cathinones in bath salts likely creates a high potential for addiction.¹⁰

Who Uses Spice and Bath Salts?

Spice

Spice appears to be popular among young people. The 2012 Monitoring the Future (MTF) survey¹⁶ found that, aside from alcohol and tobacco, spice was the second most widely used substance among 10th and 12th graders, after marijuana; it was the third most widely used illicit drug among 8th graders, after marijuana and inhalants. The survey indicated that 11.3 percent of high school seniors, 8.8 percent of 10th graders, and 4.4 percent of 8th graders in the United States reported using spice in the past year.

The 2013 MTF survey¹⁷ reported that annual prevalence rates declined in all three grades, but the decline was significant only among 12th graders (7.9 percent annual prevalence, down from 11.3 percent). The 2013 rates for 10th and 8th graders were 7.4 percent and 4.0 percent, respectively.

Bath salts

Fewer young people use bath salts than use spice. The 2012 MTF survey¹⁶ found annual prevalence rates of 0.8 percent for grade 8, 0.6 percent for grade 10, and 1.3 percent for grade 12. Data from the 2013 MTF¹⁷ showed a slight increase in use in 8th and 10th grades (annual prevalence of 1.0 percent and 0.9, respectively) and some decline in 12th grade use (0.9 percent annual prevalence).

Calls to Poison Control Centers

Calls to U.S. poison control centers about spice increased from 2,906 in 2010 to 6,968 in 2011;¹⁸ they decreased to 5,230 in 2012 and to 2,663 in 2013.¹⁹

Bath salts-related calls to U.S. poison control centers increased dramatically between 2010 and 2011, from 304²⁰ to 6,137²¹ calls. Calls decreased to 2,691 in 2012 and to 996 in 2013.²¹

One investigation of 35 Michigan emergency department episodes involving adverse reactions to bath salts use found that, although people of all ages and both genders presented at the emergency department with symptoms related to bath salts use, 63 percent were ages 20 to 29, and 54 percent were male.²²

Included in the marketing of spice and bath salts are the claims that these products cannot be detected through routine drug screening. This makes these drugs popular with individuals who are subject to workplace or other mandatory drug testing (e.g., clients involved in drug court programs or otherwise in mandatory treatment, individuals on probation, members of the military). Although testing *is* available for some of the psychoactive compounds that have been found in spice and bath salts, these chemicals are typically not included in routine drug screens.

Is the Use of Spice or Bath Salts Related to Mental Disorders?

Spice

A growing body of evidence suggests an association between using spice and having an acute episode of psychosis in individuals with no history of psychosis or triggering a psychotic episode among individuals with a history of psychosis.^{23,24,25} However, current evidence has not established a definitive, causal link; additional research in this area is important.

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Marijuana contains the compound *cannabidiol*, which has antipsychotic properties. Spice, however, does *not* contain an analog for cannabidiol. That lack, combined with spice's high potency, appears to increase the risk of psychosis.²⁶

Evidence underscores the relationship between spice and other adverse psychoactive effects. For example, individuals who are intoxicated on spice can exhibit an array of cognitive changes (e.g., difficulty thinking clearly, confusion, amnesia), behavioral disturbances (e.g., agitation, restlessness, aggression), mood changes (e.g., anxiety, negative mood), or sensory and perceptual changes (e.g., paranoia, delusions, hallucinations).²⁷ Because spice use is relatively new, the long-term effects remain unknown.

Bath salts

Bath salts intoxication can produce symptoms that resemble those of mental disorders.²⁸ Symptoms include:^{5,28,29}

- Aggression and violent behavior.
- Confusion.
- Delirium.
- Delusions.
- Anxiety.
- Hallucinations.
- Panic attacks.
- Extreme paranoia.
- Acute psychosis.
- Agitation.

Adolescents and adults with mental illness are at greater risk of abusing drugs and developing a substance use disorder than are people without mental illness.³⁰ An investigation of emergency room episodes in Michigan found that 46 percent of the individuals who presented with bath salts intoxication were people with a history of mental illness (e.g., bipolar disorder, schizophrenia, depression).²²

What Are the Adverse Physical Effects of Spice and Bath Salts?

Spice

Spice can produce anticholinergic effects (dry mouth, dehydration), nausea, and seizures.⁵ Spice can also have cardiovascular effects, including tachycardia (rapid heart rate) and hypertension (increased blood pressure). In a few cases, the designer drug has been associated with heart attacks.² Because spice is a relatively new drug, it is not known whether it causes negative long-term physical effects.

Bath salts

Bath salts can also produce adverse physical effects, including hypertension, tachycardia, headaches, teeth grinding, overactive or overresponsive reflexes, nausea, vomiting, and seizures.⁵ As with ecstasy, there is heightened risk of hyperthermia and dehydration. In one study of emergency department episodes, the most commonly observed clinical symptom was tachycardia (56 percent).³¹ Less common clinical symptoms included twitching and other movement disorders (19 percent), hypertension (17 percent), and chest pain (17 percent).

What Are the Implications for Behavioral Health Services Providers?

It is likely that behavioral health services providers will encounter clients who use spice, bath salts, or both; practitioners should educate themselves about these substances and the ways in which they are advertised (see Resources).

Treatment for substance use disorders that involve the use of spice or bath salts does not differ significantly from treatment for substance use disorders that involve similar substances (e.g., marijuana or stimulants, respectively), although further research is needed.

However, there are a few substance-specific considerations, including assessment, education about the risks of use, and monitoring abstinence.

Assessment

Behavioral health services providers should include specific questions about spice and bath salts use when assessing clients at intake and periodically throughout treatment. Clients may not think to mention their use of these substances. Providers also need to remain mindful that clients sometimes switch from an initial drug of choice to spice or bath salts to avoid positive toxicology tests.

Because spice and bath salts can trigger psychosis or produce symptoms that resemble those of mental disorders, it is critical that practitioners provide careful assessment to distinguish between substance-induced symptoms and those of a preexisting mental illness.

Education about risk of use

Spice tends to be marketed as a natural, safe, and legal alternative to marijuana, and many individuals who use it believe those claims to be true. The 2013 MTF survey found that only 24 to 26 percent of 8th, 10th, and 12th grade students perceived “great risk” in using spice once or twice.¹⁷

Bath salts, although not marketed as natural botanical products, are marketed as legal alternatives to illicit substances. Consumers who use these substances may assume that “legal” means “safer.” For both spice and bath salts, it is important that behavioral health services providers offer specific education about the risks associated with use of these substances. Key points include the following:

- People who purchase spice or bath salts cannot know what psychoactive compounds or fillers were used to produce them. Products marketed with the same name may contain active ingredients different from or in addition to those stated on the packaging.

- The only “natural” ingredients in spice are the nonpsychoactive fillers. The psychoactive chemicals added to the fillers are synthetic, and they are much stronger than marijuana and carry higher risks of adverse effects, including psychosis.
- Spice and bath salts produce a wide range of both psychiatric and physical adverse effects that may be worse than those produced by the substances they mimic.
- The evidence suggests that spice and bath salts may be just as likely to produce addiction as the substances they mimic.

Monitoring abstinence

The compounds used in developing spice and bath salts are not typically included in routine toxicology screens. However, many laboratories have the capability to test for the most commonly used analogs in both spice and bath salts. Providers need to communicate with the laboratories they regularly use about providing testing for these substances.

As with marijuana, the commonly found compounds in spice have a long window of detection; one study reported the tested compounds to be detectable in urine for up to 102 days following self-reported cessation of use.³² For this reason, providers should monitor concentration levels over time rather than just the presence or absence of the compound.

Conclusion

Designer drugs are not new, and they are not a passing fad. Spice and bath salts are currently popular alternative drugs, but providers can expect that development of new psychoactive compounds specifically designed to evade substance regulations will continue, evolving as necessary to stay ahead of federal and state laws. Although substance use disorder treatment in instances where spice and bath salts are involved is not likely to vary from treatment involving similar substances, providers need to remain alert and informed to best help their clients.

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Resources

The DAWN Report: Drug-Related Emergency Department Visits Involving Synthetic Cannabinoids, Substance Abuse and Mental Health Services Administration

<http://www.samhsa.gov/data/2k12/DAWN105/SR105-synthetic-marijuana.pdf>

DrugFacts: Spice (“Synthetic Marijuana”), National Institute on Drug Abuse (NIDA)

<http://www.drugabuse.gov/publications/drugfacts/spice-synthetic-marijuana>

DrugFacts: Synthetic Cathinones (“Bath Salts”), NIDA

<http://www.drugabuse.gov/publications/drugfacts/synthetic-cathinones-bath-salts>

Drugs of Abuse, U.S. Drug Enforcement Administration (Spice, p. 62; Bath Salts, p. 74)

http://www.justice.gov/dea/pr/multimedia-library/publications/drug_of_abuse.pdf

NIDA’s Emerging Trends Web Page

<http://www.drugabuse.gov/drugs-abuse/emerging-trends>

Synthetic Drugs (factsheet), Office of National Drug Control Policy

http://www.whitehouse.gov/sites/default/files/page/files/synthetic_drugs_fact_sheet_455_2_15_12.pdf

Understanding the “Spice” Phenomenon, European Monitoring Centre for Drugs and Drug Addiction

<http://www.emcdda.europa.eu/publications/thematic-papers/spice>

Notes

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