NEW PSYCHOACTIVE SUBSTANCES

WHAT YOU NEED TO KNOW

Australian Government
Department of Health

WHAT ARE NEW PSYCHOACTIVE SUBSTANCES?

In recent years, many 'new' drugs have arrived on the market. These are often advertised as legal or alternative 'highs', despite the fact that in most cases they're not legal. Sometimes they are nicknamed "research chemicals" or "synthetic drugs". Some are also called "bath salts" or "plant food". They are all psychoactive substances, meaning that they affect the mind (e.g., how people think or feel).

While there are many types of new psychoactive substances, this factsheet focuses on drugs that are usually marketed towards people seeking similar effects to cannabis, as well those marketed towards people seeking a stimulant or an 'ecstasy'-like high.

SYNTHETIC CANNABINOIDS

DESIGNED TO COPY: CANNABIS

Synthetic cannabinoids are drugs that are often sold as a 'legal' alternative to cannabis, while claiming to have similar effects. They are often sold as 'herbal smoking blends' with different brand names, such as "K2", "Spice" and "Kronic". Usually these blends are plant material that has been sprayed with one or more active chemicals that, when smoked, mimic some of the effects of cannabis.[1]

Also, as the active ingredients used are often synthetic and produced in laboratories, they are neither 'herbal' nor 'natural', but rather they are engineered to be stronger than traditional cannabis, and therefore may pose a greater risk.

Despite having active ingredients that activate similar chemical systems in the brain as the main active ingredient in traditional cannabis (delta-9-tetrahydrocannabinol, or THC), they can produce different effects in addition to cannabis-like effects. This is because cannabis contains active ingredients aside from THC, which can moderate its effects. For example, traditional cannabis, along with THC, contains an active component which may reduce feelings of anxiety in addition to the effects of THC. Some synthetic cannabinoids do not contain this component, which likely explains some users experiencing extreme anxiety after smoking them.[1]

OTHER NEW PSYCHOACTIVE SUBSTANCES

These drugs are sometimes found in pills sold as ecstasy.[2] Like synthetic cannabinoids, many are sold under brand names (e.g. "Charge") but don't specify their ingredients; some products may contain single specific substances or a combination of several different substances.[3, 4]

Because these substances do not normally list their active ingredients, it can be difficult to know what they contain. However, some ingredients that have commonly been identified in these products include:

- **Synthetic cathinones[5] (e.g. Meow Meow, Bath Salts, M1)**
- **Synthetic piperazines[6] (e.g. Rapture)**
- **Substituted phenethylamines[7] (e.g. Trypstacy, N-Bomb, Benzo Fury)**

Others include:

- **Dissociative anaesthetics (e.g. MXE, Moxy; see 'Ketamine' factsheet for more information)**
- **Substituted tryptamines (e.g. Foxy) and salvia (see 'Hallucinogens' factsheet for more information)**

New psychoactive substances are sold under a wide variety of names, and these change frequently. Similar to ecstasy pills, users cannot be sure what they're getting because:

- **The pills or powders do not always contain what the packaging says they do[2]**
- **The packaging may not list any ingredients at all**
- **The packaging doesn't always guarantee what's inside; some brands with the same name can contain different ingredients and even the same branded product bought from the same outlet may contain different contents over time[3]**

ARE THESE DRUGS LEGAL?

Drugs, including the new psychoactive substances described in this booklet, are controlled based on how much of a risk they pose to public health and safety. For example, synthetic cannabinoids were recently identified as posing a risk to public health and safety and have subsequently been made illegal.

All of the drugs identified in this factsheet are illegal in Australia. This is due to the health risk they pose; a number of people have experienced harmful effects, or even died, after taking them. They are also illegal because the long term effects are, at this stage, largely unknown.

Existing (banned) substances are sometimes marketed under new names. However, as drug laws cover substances, these name changes would not make the product legal.

Continual changes to the marketing of these products make it even harder to know what the effects of these drugs are, and understand their impact on users' present and future health and wellbeing.

WHAT ARE..?

SYNTHETIC CATHINONES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE

Synthetic cathinones are chemically similar to cathinone, which comes from the Khat plant. The most well-known of these drugs is mephedrone (4-MMC or meow meow), although there are several others, including methylone, methedrone, naphyrone, butylone and MDPV. These substances reportedly produce similar effects to methamphetamine and MDMA (ecstasy).[8]

Synthetic cathinones have only been used as street drugs since approximately 2007.[9] Until recently, these drugs were available under the guise of 'research chemicals' or 'plant food', either online or in shops which sell legal highs.

SYNTHETIC PIPERAZINES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE, HALLUCINOGENS

Synthetic piperazines have been used as street drugs since the late 1990s/early 2000s, with effects that have been compared to methamphetamine, MDMA (ecstasy) or hallucinogens.[6, 10] Piperazines include BZP and TFMPP. They are usually sold as pills[11] (including pills sold as ecstasy), but can come in other forms including capsules and powder.[10]

SUBSTITUTED PHENETHYLAMINES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE, HALLUCINOGENS

Substituted phenethylamines[11] is the drug class that includes MDMA (ecstasy), MDA and PMA (see 'Ecstasy and Pills' factsheet for more information on these drugs). Another subgroup of these drugs is the 2C-x family (also known as 2Cs), which are typically sold in pill form. The most commonly used forms belonging to this category are 2C-I and 2C-B.[12] The 2C-x drugs are sometimes sold as 'ecstasy'.

Another subgroup is the NBOMe family of drugs. These drugs are similar in chemical structure to the 2C-x drug class, though they can be much more potent at lower doses. They are largely sold in 'blotter' form, i.e. doses applied to small pieces of cardboard, and can be sold under their own name, or as LSD (see 'Hallucinogens' factsheet).

WHAT ARE SOME STREET NAMES AND BRANDS OF THESE SUBSTANCES?

New psychoactive substances are often known by street names, instead of their chemical names. The table below lists some common street names and brands of substances, though these can change often as new brands emerge when previous ones are made illegal.

TYPE OF SUBSTANCE	EXAMPLES	STREET NAMES	ATTEMPT TO COPY THE EFFECTS OF
Synthetic Cannabinoids	"Herbal Smoking Blends"	K2, Spice, Kronik, Northern Lights	Cannabis
Synthetic Cathinones	Mephedrone Methylone MDPV	Meow Meow, M-Kat M1 Ivory Wave, Bath Salts	Ecstasy, methamphetamine
Synthetic Piperazines	BZP, TFMPP	A2, Rapture	Ecstasy, methamphetamine, hallucinogens
Substituted Phenethylamines	2C-x family: 2C-I, 2C-B NBOMe family: 25I-NBOMe, 25B-NBOMe, 25C-NBOMe. DOI 6-APB	Trypstacy, Bromo, TWO's N-Bomb Death on Impact Benzo Fury	Ecstasy, methamphetamine, hallucinogens
Dissociatve Anaesthetics	Methoxetamine	MXE, Moxy	Ketamine
Substituted Tryptamines	5-MeO-DMT	Foxy	Hallucinogens

WHAT ARE THE EFFECTS?

SYNTHETIC CANNABINOIDS

DESIGNED TO COPY: CANNABIS

Synthetic cannabinoids, like cannabis, can have a wide range of effects when taken, and the strength of these effects can vary depending on the active ingredient. Their effects generally mimic the effects of cannabis, though depending on the chemical, or combination of chemicals, used they can cause many other effects. These may include:[1, 13, 14]

- Drowsiness
- Dilated pupils
- Very rapid heartbeat, as well as irregularity of heartbeat
- Slowing down of heart rate
- Paranoia (feeling extremely suspicious and frightened)
- Extreme anxiety
- Panic attacks
- Agitation
- Chest pain
- Nausea
- Vomiting
- Sedation or loss of consciousness
- Appetite changes
- Irritability
- Memory changes
- Tolerance and drug dependence, as well as drug withdrawal symptoms when usage is ceased
- Psychosis (some people may be more prone to these problems than others)
- Seizures and convulsions

SYNTHETIC CATHINONES, SYNTHETIC PIPERAZINES AND SUBSTITUTED PHENETHYLAMINES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE, HALLUCINOGENS

Synthetic cathinones, synthetic piperazines and substituted phenethylamines can have a range of effects, depending on the particular chemical(s) included in the tablet or powder taken. These drugs can have stimulant, hallucinogenic and/or entactogenic (ecstasy-like) effects. These may include:[2, 9, 10, 15-20]

- Dilated (enlarged) pupils
- Increased arousal/alertness
- Very rapid heartbeat, chest pain, palpitations. This is extremely dangerous for people with pre-existing problems (e.g. high blood pressure or heart disease). This risk is even greater when used with other drugs that have stimulant effects (e.g. ecstasy or ice)
- Increased energy
- Involuntary jaw clenching and teeth grinding
- Twitches and tremors
- Feelings of excitement or euphoria (a ‘high’)
- Feelings of warmth and sociability

- Visual distortions (things looking weird or different)
- Hallucinations (e.g. seeing or hearing things that aren't really there)
- Aggressive behaviour
- Anxiety, agitation and panic attacks
- Nausea and vomiting
- Confusion
- Dehydration, overheating and excessive sweating, especially if taken in a hot or humid environment such as a club or dance party and the user is moving around a lot. This can lead to kidney failure (if they don't drink enough water and try to cool down, although drinking too much water can also be dangerous)
- Insomnia
- Stomach pains
- Dizziness
- Headaches
- Unpleasant after-effects (the 'comedown' or 'crash' phase; see below)
- Seizures
- Psychosis (some people may be more prone to these problems than others)
- Serotonin syndrome (see 'What Are the Risks?' for more information)
- Overdose (especially if mixed with other drugs), which can be fatal

HOW LONG CAN THE EFFECTS LAST?

SYNTHETIC CANNABINOIDS

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Depending on the active chemical or chemicals used in the making of the blend, the amount of time the effects last can vary. On average, the effects can last about 90 minutes although, depending on the strength of the chemical, they can last significantly longer.[14]

SYNTHETIC CATHINONES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE

Most research has focused on mephedrone. When snorted, the effects are evident after a few minutes. When swallowed, mephedrone and methylone can take 15–45 minutes to take effect. These effects last only around 2–3 hours.[2, 21]

MDPV is considered to be more powerful than mephedrone or methylone.[4] It takes effect after approximately 15–30 minutes and effects can last from 2–7 hours.[4] Of all the synthetic cathinones, it has been the largest cause of synthetic cathinone-related admissions to emergency departments in the USA in recent years. This may partly be because it seems to cause adverse effects at lower doses than other synthetic cathinones.[5]

SYNTHETIC PIPERAZINES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE, HALLUCINOGENS

Synthetic piparazines can take a while to have an effect (up to two hours after they've been taken). Sometimes people think that it's not working and take more, which can increase their risk of overdose.[20] Piperazines vary in their effects according to the person and the particular substance(s) taken.[6] BZP and TFMPP are sometimes combined in pills.[4]

SUBSTITUTED PHENETHYLAMINES

DESIGNED TO COPY: ECSTASY, METHAMPHETAMINE, HALLUCINOGENS

The effects of drugs such as 2C-I and 2C-B can be especially variable, depending on the person and the particular substance or combination of substances taken. Some have 'ecstasy'-like effects, while others may be more hallucinogenic. Some are more like stimulants such as methamphetamine.

Like the 2C-x family, the effects of taking NBOMe variants can be different depending on the specific substance taken and the concentration of the dose. These substances tend to produce hallucinogenic effects similar to LSD. However, different variants of NBOMe produce effects of different lengths, varying from two hours all the way up to fifteen hours, and possibly longer.

WHAT ARE THE RISKS?

Simply because something is sold in a shop or online, or as a legal or alternative 'high', doesn't mean that it's harmless or safe to use. Taking new psychoactive substances is like a roll of the dice — they haven't been around long enough for us to know what the immediate risks are or what might happen later in life to people who use them. In addition to this, many people think that because these substances mimic traditional drugs, their dosages will be the same. This is not always the case, with new psychoactive substances often being designed to be stronger than the drugs they mimic. This can lead to overdosing and serious adverse effects.

It is known that a small number of people have died from using synthetic cathinones.[21-23]

Early information suggests that use of these new psychoactive substances may lead to a range of problems, including a number that are similar to those associated with other stimulant drugs. Along with those listed in the previous section, these may include:[1, 2, 9, 10, 15-20, 24, 25]

- **Dependence (addiction) (the synthetic cathinones mephedrone and MDPV in particular have been linked to powerful cravings to keep using. This can also increase the risk of heart problems and overdose)**
- **Withdrawal symptoms when usage is ceased, including cravings, nightmares, sweating and overheating, nausea and tremors**
- **Increased risk of accident or injury (e.g. through violence or road traffic accidents)**
- **Vein problems, gangrene, abscesses (if injected)**
- **An intense burning sensation, particularly if synthetic cathinones such as mephedrone are injected**
- **Dental problems**
- **Increased likelihood of risky sexual behaviour, which can lead to unplanned pregnancy or catching sexually transmitted infections**
- **Memory problems**
- **Rapid weight loss**

Different substances have different levels of risk. At the moment, many of these drugs are too new to be completely certain about the risks and outcomes. For example, it is hard to know how many people have overdosed on piperazines because toxicology tests don't routinely screen for them.[10] Users sometimes use these substances alongside other drugs such as ecstasy, methamphetamine and/or alcohol, which makes it difficult to know which drug or drug combination causes the greatest problems. Using drugs in this way is also likely to increase the risk of harm as using multiple drugs places a greater stress on the body.

WHAT IS SEROTONIN SYNDROME?

Serotonin syndrome can be a life-threatening condition. It occurs when the brain is overloaded with a neurotransmitter (brain chemical) called serotonin (which is responsible for making us feel happy). It usually starts within 24 hours of taking the drug.[26] It can be hard to recognise it developing as many of the early signs are the same as the expected effects of taking ecstasy and other drugs that increase serotonin levels (e.g. piperazines and substituted phenethylamines). These include sweating, excitement, tremors and a rapid heartbeat.

More serious symptoms require immediate medical help and include:[26, 27]

- **Coma**
- **Seizures**
- **Muscle twitches, spasms and tremors**
- **Shaking or shivering**
- **Fever or overheating**
- **Agitation**
- **Confusion**
- **Distress**
- **Rigid muscles**

Serotonin syndrome is more common when other drugs that increase serotonin levels are also used, including pharmaceutical stimulants (e.g. dexamphetamine and Ritalin, and some types of antidepressants). Ecstasy and other substituted phenethylamines (e.g. MDA, PMA), synthetic piperazines, methamphetamine, cocaine, LSD and some other medications and herbal supplements also affect serotonin levels and have been linked to serotonin syndrome.[26]

WHAT IS MEANT BY THE 'COMEDOWN' PHASE OR 'CRASH'?

Some people experience a 'comedown' phase that occurs after the drug starts to wear off.[28, 29] These feelings vary according to the substance(s) taken and can last for several days. These include:[2, 29]

- **Lethargy and feeling physically exhausted**
- **Nasal congestion (stuffy nose)**
- **Inability to concentrate**
- **Irritability**
- **Headaches**
- **Nausea**

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FOR MORE INFORMATION

We have listed some of the national telephone helplines and websites below.

For free and confidential advice about alcohol and other drugs, call the

National Alcohol and Other Drug Hotline

1800 250 015

It will automatically direct you to the Alcohol and Drug Information Service in your state or territory. These local alcohol and other drug telephone services offer support, information, counselling and referral to services.

Australian Drug Foundation

Provides information about drugs and links to services in each state and territory

www.adf.org.au

DrugInfo Line

Provides information about drugs and alcohol. Open 9am–5pm, Monday to Friday

1300 85 85 84 or **03 8672 5983**. Or visit **www.druginfo.adf.org.au**

Just Ask Us

Provides information about drugs, alcohol, health and well-being

www.justaskus.org.au

Kids Helpline

Free, private and confidential telephone and online counselling service for young people aged 5–25 years Open 24 Hours **1800 55 1800**

Lifeline

24 hour crisis line **131114**

Also available is one-on-one chatlines for crisis support, visit

www.lifeline.org.au/Find-Help/Online-Services/crisis-chat

Counselling Online

Free, confidential counselling service for people using drugs, their families and friends

www.counsellingonline.org.au

National Drugs Campaign

Australian Government website provides information about illicit drugs and campaign resources.

www.australia.gov.au/drugs

Family Drug Support

For families and friends of people who use drugs or alcohol

1300 368 186

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