



3,4-Methylenedioxymethcathinone (Methylone) [“Bath salt,” bk-MDMA, MDMC, MDMCAT, “Explosion,” “Ease,” “Molly”]

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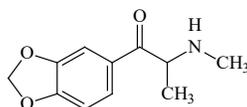
Introduction:

3,4-Methylenedioxymethcathinone (methylone) is a designer drug of the phenethylamine class. Methylone is a synthetic cathinone with substantial chemical, structural, and pharmacological similarities to 3,4-methylenedioxymethamphetamine (MDMA, ecstasy). Animal studies indicate that methylone has MDMA-like and (+)-amphetamine-like behavioral effects. When combined with mephedrone, a controlled schedule I substance, the combination is called “bubbles.” Other names are given in the above title.

Licit Uses:

Methylone is not approved for medical use in the United States.

Chemistry:



Methylone
Molecular Formula C₁₁H₁₃NO₃

The core chemical structure of methylone identifies it as a phenethylamine, and it is related in chemical structure to MDMA differing only by an oxygen atom on the phenethylamine side chain. Methylone is a solid at room temperature. The Chemical Abstract Service (CAS) number is 186028-79-5 and the Chemical Abstract index name is 1-(1,3-benzodioxol-5-yl)-2-(methylamino)-1-propanone.

Pharmacology:

There are substantial pharmacological similarities between methylone and MDMA. Methylone and MDMA, similar to cocaine and methamphetamine, inhibit in vitro the neuronal reuptake of the monoamines dopamine and serotonin and increase concentrations of these monoamines in the synaptic cleft. Similar to methamphetamine, methylone and MDMA also increase, in vitro, the neuronal release of these monoamines. An increase in monoamine concentrations in the central nervous system is thought to be involved in the pharmacological effects of these substances. Methylone also resembles MDMA in drug discrimination assays. Methylone fully substitutes (>80%) for MDMA in rats trained to discriminate MDMA from saline. Methylone (ED₅₀=6.9 μmol/kg) was about half as potent as MDMA (ED₅₀=3.5 μmol/kg) in these studies. In rats trained to discriminate (+)-amphetamine from saline, both methylone (ED₅₀=10.1 μmol/kg) and MDMA (ED₅₀=7.5 μmol/kg) completely (>80%) substituted for amphetamine with similar potencies. Furthermore, methylone, similar to MDMA, does not substitute for 4-methyl-2,5-dimethoxyamphetamine (DOM), a schedule I hallucinogen, in rats trained to

discriminate DOM from saline.

Because of the structural and pharmacological similarities between methylone and MDMA, the psychoactive effects, adverse health risks, and signs of intoxication resulting from methylone abuse are likely to be similar to those of MDMA. Several chat rooms discussed pleasant and positive effects of methylone when used for recreational purpose.

User Population:

Methylone, like other synthetic cathinones, is a recreational drug that emerged on the United States' illicit drug market in 2009. It is perceived as being a 'legal' alternative to drugs of abuse like MDMA, methamphetamine, and cocaine. Evidence indicates that youths and young adults are the primary users of synthetic cathinone substances which include methylone. However, older adults also have been identified as users of these substances.

Illicit Distribution:

Law enforcement has encountered methylone in the United States as well as in several countries including the Netherlands, United Kingdom, Japan, and Sweden. The National Forensic Laboratory Information System (NFLIS) is a DEA database that collects scientifically verified data on drug items and cases submitted to and analyzed by federal, state and local forensic laboratories in the United States. The System to Retrieve Information from Drug Evidence (STRIDE)/STARLiMS provides information on drug seizures reported to and analyzed by DEA laboratories. Methylone was first identified by forensic laboratories in 2009, with five drug reports. In 2011, there were 1,770 methylone reports with seizure reporting more than doubling to 4,312 in 2012 and 10,944 in 2013. Although since permanent scheduling became effective in 2013, laboratories have identified 4,230 methylone reports in 2014 with a sharp decrease to 369, 186, and 74 reports in 2015, 2016, and 2017, respectively. For 2018, there were an estimated 38 drug reports. Methylone has been found in products falsely marketed as research chemicals, plant food, or bath salts. These products are often sold at smoke shops, head shops, convenience stores, adult book stores, and gas stations and can also be purchased on the Internet. Methylone has been identified in law enforcement seizures that were initially suspected to be MDMA and marketed as “Molly.”

Control Status:

Methylone (including its salts, isomers, and salts of isomers) is controlled in schedule I of the Controlled Substances Act.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 571-362-4250, Telephone 571-362-3249, or E-mail DPE@usdoj.gov.