



3,4-Methylenedioxyethcathinone (Ethylone) [“Bath salt,” bk-MDEA, MDEC]

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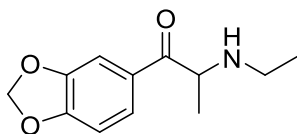
Introduction

3,4-Methylenedioxyethcathinone (ethylone) is a designer drug of the phenethylamine class. Ethylone is a synthetic cathinone with substantial chemical structural, and pharmacological similarities to 3,4-methylenedioxyethamphetamine (MDEA, eve). It is the β -keto analogue of MDEA. Evidence indicates that ethylone, like MDEA, 3,4-methylenedioxymethamphetamine (MDMA), and Schedule I synthetic cathinones is abused for its psychoactive effects. Abuse of ethylone has resulted in emergency department visits and fatal overdoses.

Licit Uses

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

Chemistry



Ethylone
Molecular Formula $C_{12}H_{15}NO_3$

The core chemical structure of ethylone identifies it as a phenethylamine, and it is related in chemical structure to MDEA differing only by an oxygen atom on the phenethylamine side chain. Ethylone is a common name for 1-(1,3-benzodioxol-5-yl)-2-(ethylamino)propan-1-one. The Chemical Abstract Service (CAS) number for ethylone base is 1112937-64-0.

Pharmacology

Ethylone, similar to Schedule I synthetic cathinones and Schedule I and II substances such as butylone, cocaine, methamphetamine, MDEA and MDMA, causes stimulant related psychological and somatic effects. Adverse effects associated with ethylone abuse include agitation, hypertension, tachycardia, and death. Conversely, online chat rooms discussed pleasant and positive effects of ethylone when used for recreational purpose.

Experimental evidence demonstrate that the pharmacological effects of ethylone on the central nervous system are like those of Schedule I or II substances such as 4-methyl-*N*-ethylcathinone (4-MEC), MDEA, MDMA, and cocaine which have high potential for abuse. Ethylone has been characterized as a cocaine-MDMA-mixed cathinone drug based on its effects on the monoamine transporters. In *in vitro* laboratory studies investigating the effects of drugs on monoaminergic systems, ethylone, similar to 4-MEC, MDEA, MDMA, and cocaine bound to the dopamine, serotonin and norepinephrine transporters and inhibited the reuptake of the

monoamine neurotransmitters dopamine, serotonin and norepinephrine, respectively. In addition, ethylone, like MDEA and MDMA, is a releaser of serotonin at the serotonin transporter. An increase in monoamine concentrations in the central nervous system is thought to be involved in the pharmacological effects of these substances.

Animal studies indicate that ethylone has MDMA-like and (+)-amphetamine-like behavioral effects. Ethylone has been shown to increase locomotor activity in mice. In drug discrimination studies, ethylone fully mimics the discriminative stimulus effects produced by methamphetamine, cocaine, and MDMA.

User Population

Ethylone, like other synthetic cathinones, is a recreational drug. Evidence indicates that the main users of ethylone, similar to Schedule I synthetic cathinones and MDMA, are youths and young adults.

Illicit Distribution

Law enforcement has encountered ethylone in the United States and around the world in the Americas, Europe, Australia, and Asia. 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. According to the NFLIS data, ethylone emerged on the United States' illicit drug market in 2011. As of July 19, 2019, NFLIS had 14 ethylone reports in 2011, 62 in 2012, and 17 in 2013. There was a sharp increase in 2014 to 5,273 reports, further increasing to 8,618 reports in 2015. Reports declined to 1,228, 281, and 124 in 2016, 2017, and 2018, respectively. Ethylone has been sold as the street drug “Molly” and encountered as a replacement for methylone and MDMA.

Control Status

As a positional isomer of butylone, ethylone is controlled in Schedule I of the Controlled Substances Act. Internationally, ethylone is controlled under the 1971 Convention on Psychotropic Substances.

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section, Fax 202-353-1263, Telephone 202-307-7183, or E-mail DPE@usdoj.gov.