Emerging Designer Drug Monograph

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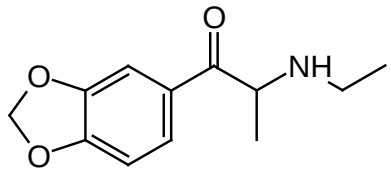
Drug Name: **Ethylone**

Synonyms: 3,4-methylenedioxy-*N*-ethylcathinone (MDEC); β-keto-3,4-methylenedioxy-*N*-ethylamphetamine (bk-MDMA); (*RS*)-1-(1,3-benzodioxol-5-yl)-2-ethylaminopropan-1-one. Usually supplied as hydrochloride

Structure:



Formula: $C_{12}H_{15}NO_3$

Molecular Weight: 221.2

Pharmacological Drug Class: Stimulant: based on the chemical similarity with amphetamines, 3,4-methylendioxy-amphetamines, cathinone and methcathinone and the self reported use as alternative to these drugs with similar effects.

Metabolism: In rats and humans ethylone metabolizes by demethylenation of the methylendioxy ring, followed by conversion to isomeric 4-hydroxy-3-methoxy- and 3-hydroxy-4-methoxy-*N*-ethylcatinones and subsequent conjugation (1-3). *N*-deethylation and keto- reduction to respective alcohols were the minor routes (1-4). Free parent ethylone appears more abundant in human urine than any of the identified metabolites (3, 4).

Blood Concentrations:

Effects and Toxicity: Ethylone is closely related to methylone, butylone, pentylone, MDPV, MDMA and MDEA. Pharmacological effect of ethylone has not been systematically studied or published in scientific literature. Internet drug forums report stimulating effects similar to methylone, but less potent with slower onset. It is usually taken by oral ingestion in divided doses, totaling 50-400 mg over a period of 2-4 hours. Excitation, increase in energy, feeling of mental happiness starts at about one hour after the first dose. Coming down begins after about 4-5 hours, depending on re-dosing. Desire to re-dose was very common and persistent. All users report unpleasant hangover effects after the experience has gone, feeling tired or “burned out” even at low

doses. During the crash, sleeping and eating is difficult or impossible, which lasts for at least 10-12 hours. The users often ingest high doses of benzodiazepines to counteract negative effects.

Analysis: Ethylone and metabolites in human urine were analysed by GC/MS after enzymatic deconjugation and liquid/liquid extraction either underivatized, or as trifluroacetyl (TFA) derivatives (1, 3). LC/MS and LC/MS/MS with electrospray ionization have also been used (1, 3), although differentiation between ethylone and its isomer butylone and metabolites was quite difficult due to poor chromatographic separation.

Parent ethylone excreted free in human urine is effectively detected by GC/MS after basic liquid/liquid extraction and TFA derivatization (4), similar to amphetamines.

In a large scale study of 34561 random urine samples in 2011 and 2012 (4) ethylone positivity rate was 0.05% (16 total cases), well behind mainstream synthetic cathinones, such as methylone (0.54%), MDPV (1.7%) and α-PVP (2.47%).

References:

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2. Meyer, M. R., Maurer, H. H. (2010) Metabolism of designer drugs of abuse: an updated review. *Current Drug Metabolism*, 11, 468 - 482.

3. Zaitsu, K., Katagi, M., Tatsuno, M., Sato, T., Tsuchihashi, H., Suzuki, K. (2011) Recently abused β-keto derivatives of 3,4-methylenedioxyphenylalkylamines: a review of their metabolism and toxicological analysis. *Forensic Toxicology*, 29, 73 - 84.

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