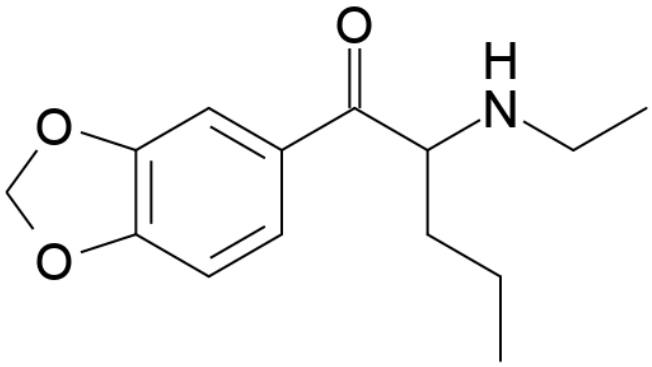
Short Communication for the Analysis of N-ethylpentylone

Date: May 2020

Synonyms: 1-(1,3-benzodioxol-5-yl)-2-(ethylamino)-1-pentanone 2'-N-ethylnorpentylone
Ephylone

Structure:



Formula: $C_{14}H_{19}NO$

Molecular Weight (nominal mass): 249.31

Theoretical M+H accurate mass: 250.1438

Pharmacological Drug Class: Central Nervous System Stimulant

Suggested LOD: 5 ng/mL

Suggested LOQ: 10 ng/mL

N-ethylpentylone is a synthetic cathinone and is primarily a mixed norepinephrine reuptake inhibitor and dopamine reuptake inhibitor. N-ethylpentylone was first identified in the United States of America at the end of 2016 and is a Schedule I substance in the country. It has since been encountered in New Zealand, Australia, Europe and South America. Case reports indicate that it may be sold as a white powder or pressed into pills similar to 'Ecstasy' tablets.

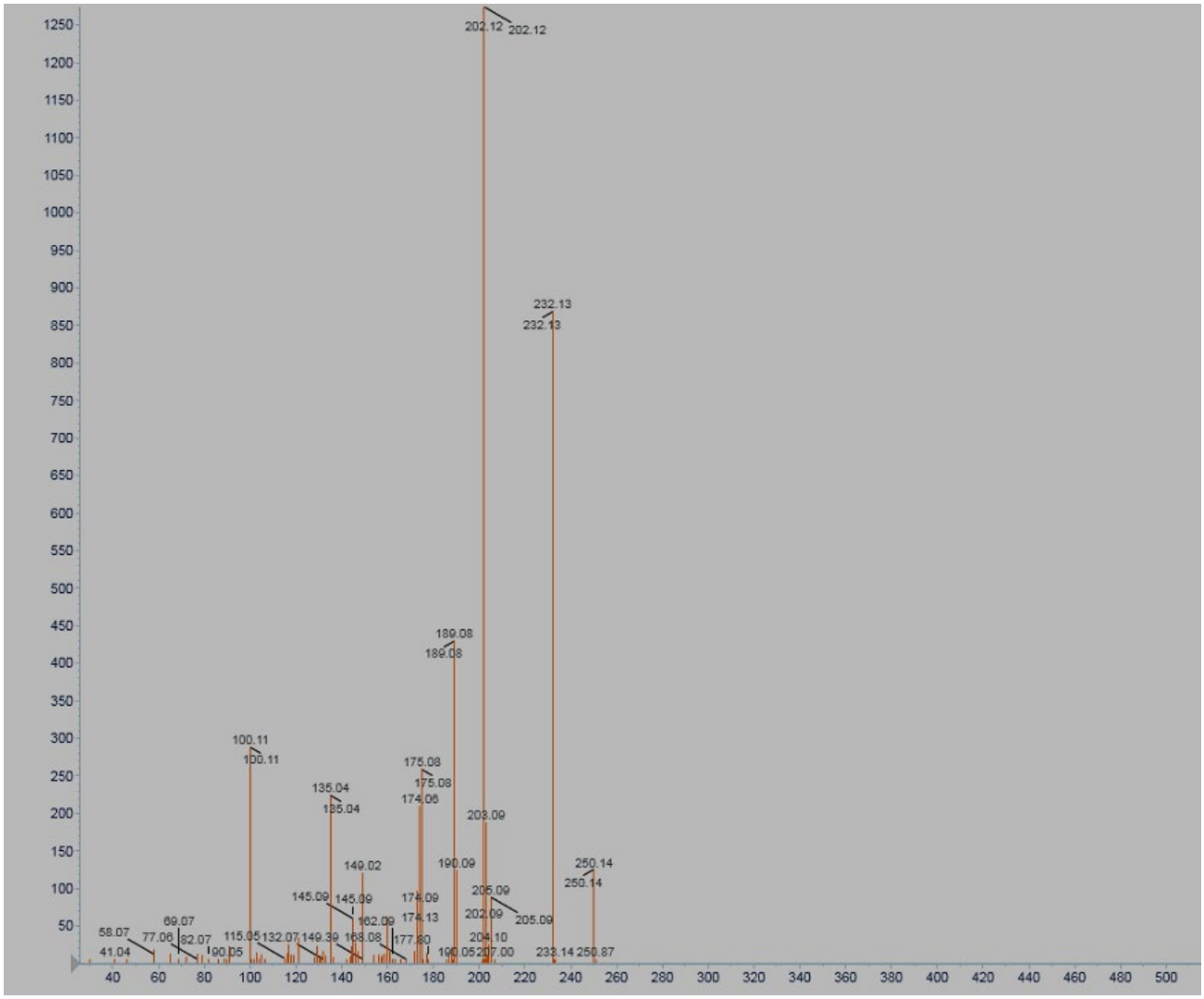
In 2018, the 41st meeting of the World Health Organization Expert Committee on Drug Dependence critically reviewed N-ethylpentylone (https://www.who.int/medicines/access/controlled-substances/N-Ethylnorpentylone.pdf). At its meeting in March 2019, the Commission for Narcotic Drugs voted to place N-ethylpentylone under international control as a Schedule II substance in the 1971 Convention on Psychotropic Substances.

From the United Nations Office on Drugs and Crime (UNODC) ToxPortal, 17 cases of clinical admission, drug driving or death have been reported involving N-ethylpentylone. Of the reported fatalities, blood concentrations of N-ethylpentylone ranged from 170 – 1300 ng/mL, similar to other cathinones. The lowest and highest reported concentrations in the literature are 12 ng/mL and 50,000 ng/mL, respectively. No body tissue concentrations have been reported in the literature or

the UNODC ToxPortal at the time of this publication. However, there are reported concentrations in oral fluid, ranging from 12.6 – 1377 ng/mL. Similar to other drugs in this class, N-ethylpentylone can also be detected by GC-MS or GC-NPD.

In vitro metabolite research has suggested four metabolites by the following pathways: hydroxylation, demethylation, N-deethylation and hydrogenation. All four metabolites were confirmed and could be used to identify N-ethylpentylone ingestion in blood and urine samples.

LC-MS Spectrum:



[source: Sciex X500R, Orange County Crime Laboratory, California, USA]

Additional References:

Costa JL, Cunha KF, Lanaro R, Cunha RL, Walther D, Baumann MH. Analytical quantification, intoxication case series, and pharmacological mechanism of action for N-ethylnorpentylone (N-ethylpentylone or ephylone). Drug Test Anal. (2019) 11(3):461-471

Ikeji C, Sittambalam CD, Camire LM, Weisman DS. Fatal intoxication with N-ethylpentylone: a case report. J Community Hosp Intern Med Perspect. (2018) 8(5):307-310

Krotulski AJ, Papsun DM, De Martinis BS, Mohr ALA, Logan BK. N-ethyl pentylone (Ephylone) Intoxications: Quantitative Confirmation and Metabolite Identification in Authentic Human Biological Specimens. J Anal Toxicol. (2018) 42:467 – 475.

Thirakul P, Hair LS, Bergen KL, Pearson JM. Clinical Presentation, Autopsy Results and Toxicology Findings in Acute N-Ethylpentylone Fatality. J Anal Toxicol. (2017) 41:342 – 346.