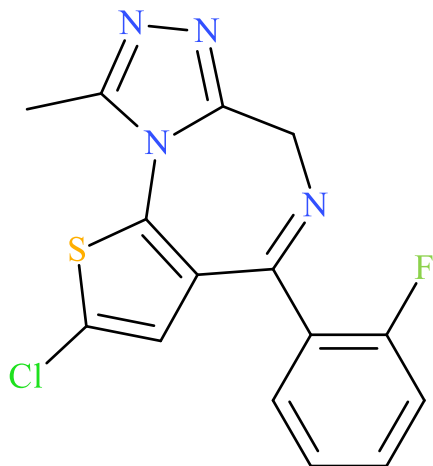


Fluclozepam

Sample Type: **Biological Fluid**

Latest Revision: **November 5, 2021**

Date of Report: **November 5, 2021**



1. GENERAL INFORMATION

IUPAC Name: 2-chloro-4-(2-fluorophenyl)-9-methyl-6H-thieno[3,2-f][1,2,4]triazolo[4,3-a][1,4]diazepine

InChI String: InChI=1S/C15H10ClFN4S/c1-8-19-20-13-7-18-14(9-4-2-3-5-11(9)17)10-6-12(16)22-15(10)21(8)13/h2-6H,7H2,1H3

CFR: Not Scheduled (11/2021)

CAS# 54123-15-8

Synonyms: Not Available

Source: NMS Labs – Toxicology Department

Important Notes: All identifications were made based on evaluation of analytical data (LC-QTOF-MS) in comparison to analysis of acquired reference material.

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2. CHEMICAL DATA

Analyte	Chemical Formula	Molecular Weight	Molecular Ion [M ⁺]	Exact Mass [M+H] ⁺
Fluclozepam	C ₁₅ H ₁₀ ClFN ₄ S	332.8	332	333.0372

3. SAMPLE HISTORY

To date, fluclozepam was identified in one case in October 2021. The geographical and demographical breakdown is below:

Geographical Location: Pennsylvania (n=1)

Biological Sample: Urine (n=1)

Date of First Receipt: October 2021

Other Notable Findings: Flubromazepam (n=1), Fentanyl (n=1)

4. BRIEF DESCRIPTION

Fluclozepam is classified as a novel benzodiazepine. Benzodiazepines are central nervous system depressants. Novel benzodiazepines, typically defined as emergent benzodiazepines not used medicinally, are often pirated from early drug discovery or pharmaceutical studies. Novel benzodiazepines have appeared on illicit drug markets in recent years and have caused adverse events, as described in the literature; fatalities linked to novel benzodiazepine use have occurred, commonly when used in combination with other depressants (e.g., opioids and alcohol). The synthesis of fluclozepam dates back to the 1970's based on previously published literature and patents.¹ Fluclozepam was first identified in Europe in 2017.^{2,3} Data suggest that fluclozepam may be 2-3 times more potent than etizolam.² Fluclozepam is structurally similar to etizolam. Neither substance is federally controlled in the United States; however, some states have moved to control etizolam.

5. ADDITIONAL RESOURCES

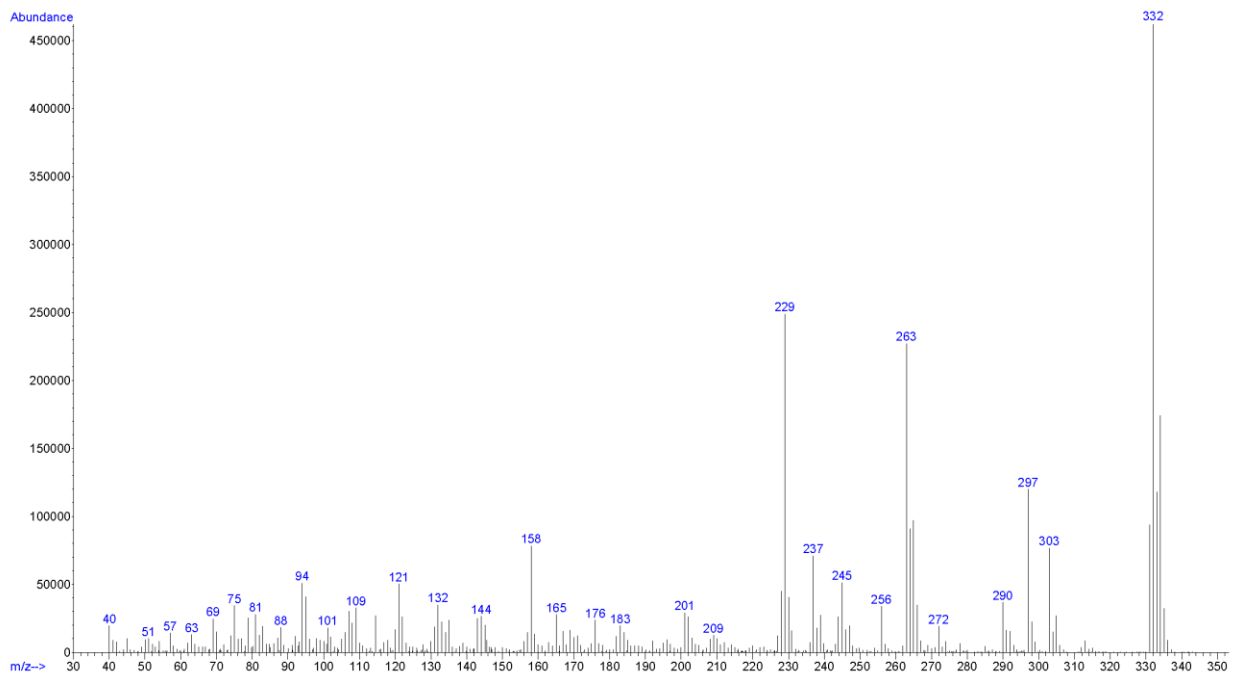
1. Hellerbach, J.; Zeller, P.; Binder, D.; Hromatka, O. (1979) Thienotriazolodiazepine derivatives. <https://patents.google.com/patent/US4155913A/en>
2. European Monitoring Centre for Drugs and Drug Addiction (2021), New benzodiazepines in Europe – a review, Publications Office of the European Union, Luxembourg. https://www.emcdda.europa.eu/system/files/publications/13759/TD0221596ENN_002.pdf
3. Orsolini, L.; Corkery, J.M.; Chiappini, S.; Guirguis, A.; Vento, A.; De Berardis, D.; Papanti, D.; Schifano, F. (2020). New/Designer Benzodiazepines': An Analysis of the Literature and Psychonauts' Trip Reports. *Current Neuropharmacology*. **18** (9): 809–837. <https://pubmed.ncbi.nlm.nih.gov/31933443/>
<https://www.caymanchem.com/product/23524/fluclotizolam>

6. QUALITATIVE DATA

6.1 GAS CHROMATOGRAPHY MASS SPECTROMETRY (GC-MS)

Testing Performed At:	The Center for Forensic Science Research and Education at the Fredric Rieders Family Foundation (Willow Grove, PA)
Sample Preparation:	Standard diluted in methanol
Instrument:	Agilent 5975 Series GC/MSD System
Standard:	Reference material for fluclotizolam (Batch: 0561392-4) was purchased from Cayman Chemical Company (Ann Arbor, MI, USA). (https://www.caymanchem.com/product/23524/fluclotizolam)

EI (70 eV) Mass Spectrum: Fluclozepam (Standard)



6.2 LIQUID CHROMATOGRAPHY QUADRUPOLE TIME-OF-FLIGHT MASS SPECTROMETRY (LC-QTOF-MS)

Testing Performed At: The Center for Forensic Science Research and Education at the Fredric Rieders Family Foundation (Willow Grove, PA)

Sample Preparation: Liquid-liquid extraction (LLE)

Instrument: Sciex TripleTOF® 5600+, Shimadzu Nexera XR UHPLC

Column: Phenomenex® Kinetex C18 (50 mm x 3.0 mm, 2.6 µm)

Mobile Phase: A: Ammonium formate (10 mM, pH 3.0)

B: Methanol/acetonitrile (50:50)

Flow rate: 0.4 mL/min

Gradient: Initial: 95A:5B; 5A:95B over 13 min; 95A:5B at 15.5 min

Temperatures: Autosampler: 15 °C

Column Oven: 30 °C

Source Heater: 600 °C

Injection Parameters: Injection Volume: 10 µL

QTOF Parameters: TOF MS Scan Range: 100-510 Da

Precursor Isolation: SWATH® acquisition (27 windows)

Fragmentation: Collision Energy Spread (35±15 eV)

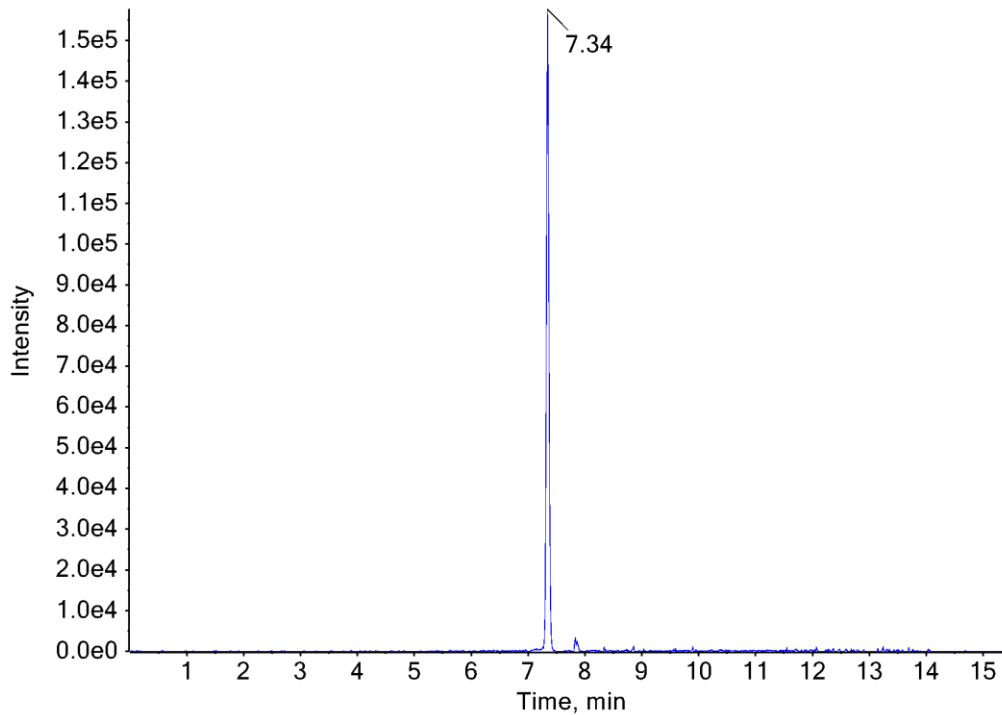
MS/MS Scan Range: 50-510 Da

Retention Time: 7.34 min

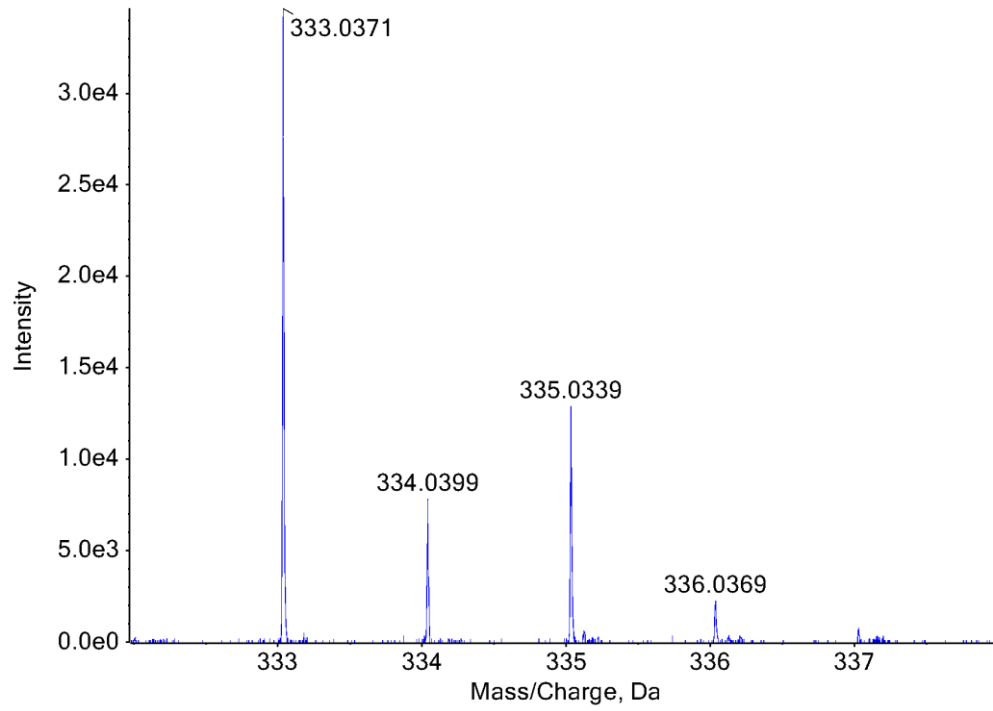
Standard Comparison: Reference material for fluclozotizolam (Batch: 0561392-4) was purchased from Cayman Chemical Company (Ann Arbor, MI, USA). Analysis of this standard resulted in positive identification of the analyte in the extract as fluclozotizolam, based on retention time (7.37 min) and mass spectral data.

<https://www.caymanchem.com/product/23524/fluclozotizolam>

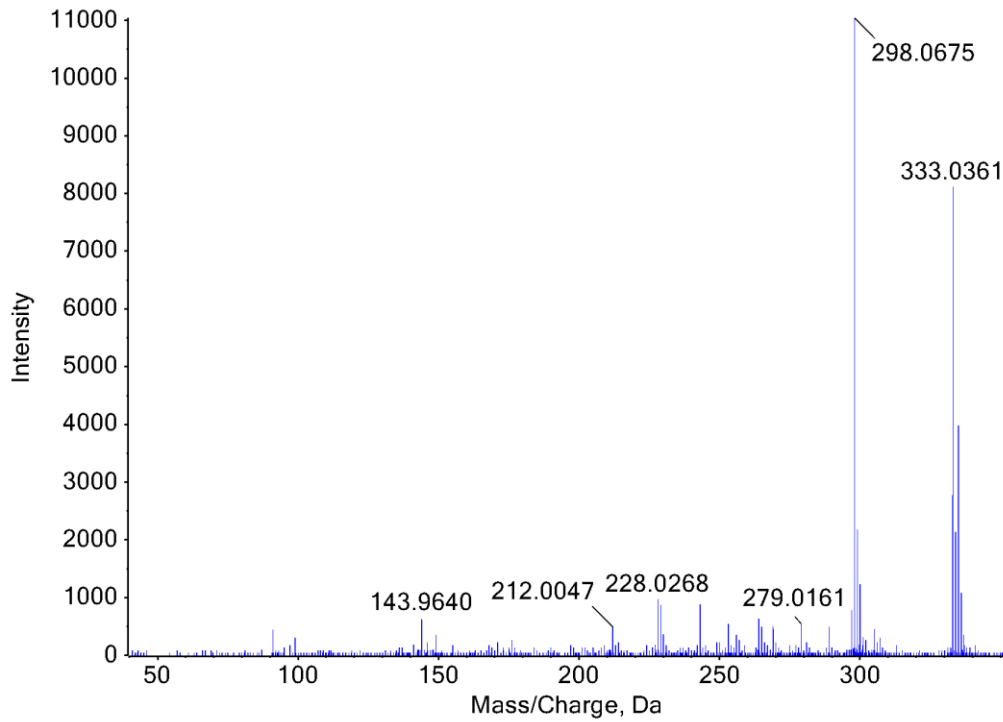
Extracted Ion Chromatogram: Fluclozotizolam



TOF MS Spectra: Fluclozepam



MS/MS Spectra: Fluclozepam



7. FUNDING

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