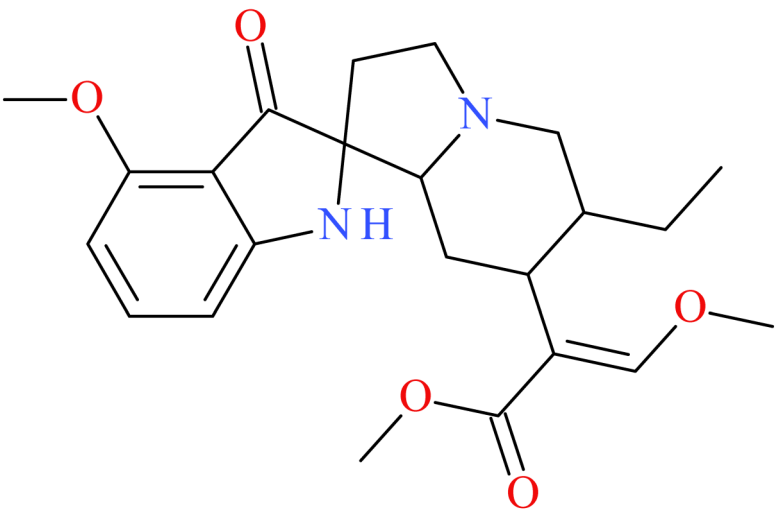
Mitragynine Pseudoindoxyl



NPS SUBCLASS
Miscellaneous
REPORT DATE
November 7, 2025
SAMPLE RECEIVED
September 30, 2025
SAMPLE TYPE
Drug Material

Preferred Name	Mitragynine Pseudoindoxyl
Synonyms	MP
Formal Name	methyl (E)-2-(6-ethyl-4'-methoxy-3'-oxo-spiro[3,5,6,7,8,8a-hexahydro-2H-indolizine-1,2'-indoline]-7-yl)-3-methoxy-prop-2-enoate
InChI Key	BAEJBRCYKACTAA-DTQAZKPQSA-N
CAS Number	N/A
Chemical Formula	$C_{23}H_{30}N_2O_5$
Molecular Weight	414.5
Molecular Ion [M⁺]	414
Exact Mass [M+H]⁺	415.2227

Characterization & Intelligence

The following information was compiled in November 2025 and is subject to change as new research is conducted and as new information becomes available:

Description: Mitragynine pseudoindoxyl is categorized as a semi-synthetic analogue of mitragynine, the primary psychoactive component in *Mitragyna speciosa* (Kratom). Mitragynine pseudoindoxyl is also a metabolite of mitragynine through 7-hydroxymitragynine and rearrangement of the hydroxyl-imine to a spiropseudoindoxyl core.[1,2] Mitragynine pseudoindoxyl has emerged as a primary component in drug products, often found alongside 7-hydroxy mitragynine and marketed as "Kratom" or alternatives.[3] Mitragynine pseudoindoxyl was first identified by our laboratory in September 2025 and confirmed after acquiring standard reference material.

Sample Source: CFSRE NPS Discovery Test Purchase Program (Philadelphia, PA)

Sample Appearance: Pills and tablets

Pharmacology: Mitragynine pseudoindoxyl (MP) is reported to be a potent mu-opioid receptor agonist with higher potency and affinity compared to mitragynine (MG) and 7-hydroxy mitragynine (7-OH-MG) [K_i (nM)= 1.5 (MP), 78 (7-OH-MG), 709 (MG); ED_{50} (μmol/kg) = 0.47 (MP), 0.66 (7-OH-MG), 2.4 (MG)].[4,5]

Toxicology: Mitragynine pseudoindoxyl has been detected in >10 toxicology cases to date at the CFSRE.

Drug Materials: Mitragynine pseudoindoxyl has been detected in >10 drug materials to date at the CFSRE.

Demographics / Geographics: The first drug materials originated from Pennsylvania and Illinois. Mitragynine pseudoindoxyl was identified alongside other kratom alkaloids.

Legal Status: Mitragynine pseudoindoxyl is not currently scheduled in the United States.

References:

- Cayman Chemical: Mitragynine Pseudoindoxyl
- [1]Kamble et al. (2020) Metabolism of a kratom alkaloid metabolite in human plasma...
- [2]Hanapi et al. (2021) Kratom alkaloids: interaction with enzymes, receptors, and cellular barriers
- [3]Hill et al. (2025) De facto opioids: characterization of novel 7-hydroxymitragnine and mitragynine...
- [4]Crowley et al. (2021) Assessment of contribution of 7-hydroxymitragynine and mitragynine pseudoindoxyl...
- [5]Varadi et al. (2017) Mitragynine/corynantheidine pseudoindoxyls as opioid analgesics with mu agonism...

About: In collaboration with medical examiner and coroner offices, crime laboratories, clinical partners, and other stakeholders, the Center for Forensic Science Research and Education (CFSRE) is documenting first confirmations of NPS through analysis of drug materials and/or toxicology samples. These reports are generated using comprehensive analytical techniques (e.g., GC-MS, LC-QTOF-MS, NMR) and include available information about the new substances identified at the time of reporting, as well as the analytical data generated during testing. Our new drug monographs are intended to assist with the rapid identification of NPS in forensic casework and related disciplines, and should not be used for confirmatory purposes alone.

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

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Gas Chromatography Mass Spectrometry (GC-MS)

Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham PA, USA)

Sample Preparation: Acid-base extraction

Instrument: Agilent 5975 Series GC/MSD

Methods: GC-MS Method Details & Monographs

GC-MS: Mass Spectrum (EI 70 eV)

Confirmation Using Drug Standard: *Reference material for mitragynine pseudoindoxyl (Batch: 0721796-9) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be mitragynine pseudoindoxyl based on retention time (sample: 8.52 min vs. standard: 8.49 min) and mass spectral data comparisons.*

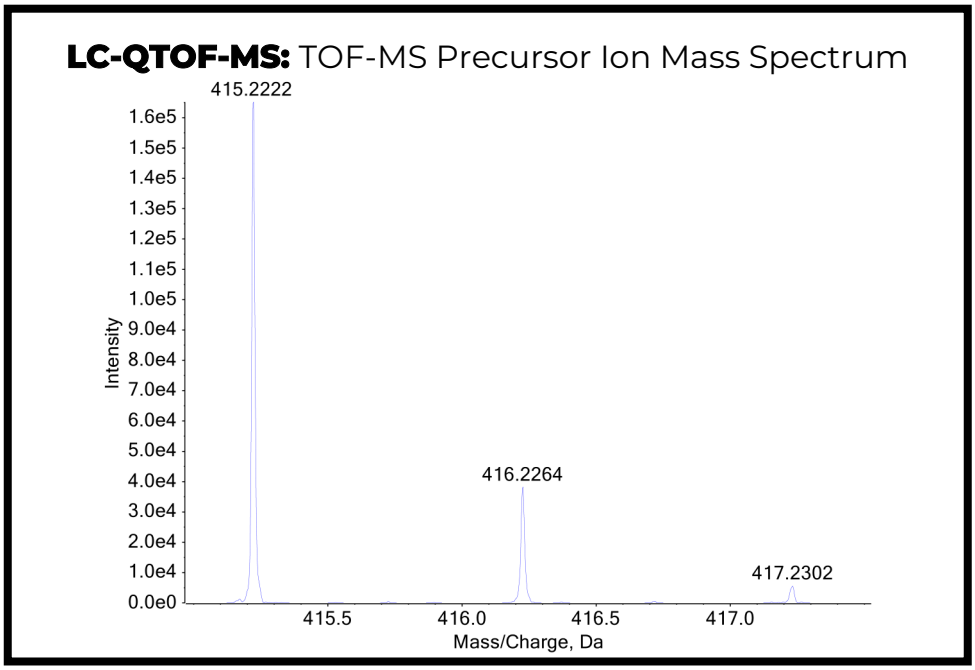
Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF-MS)

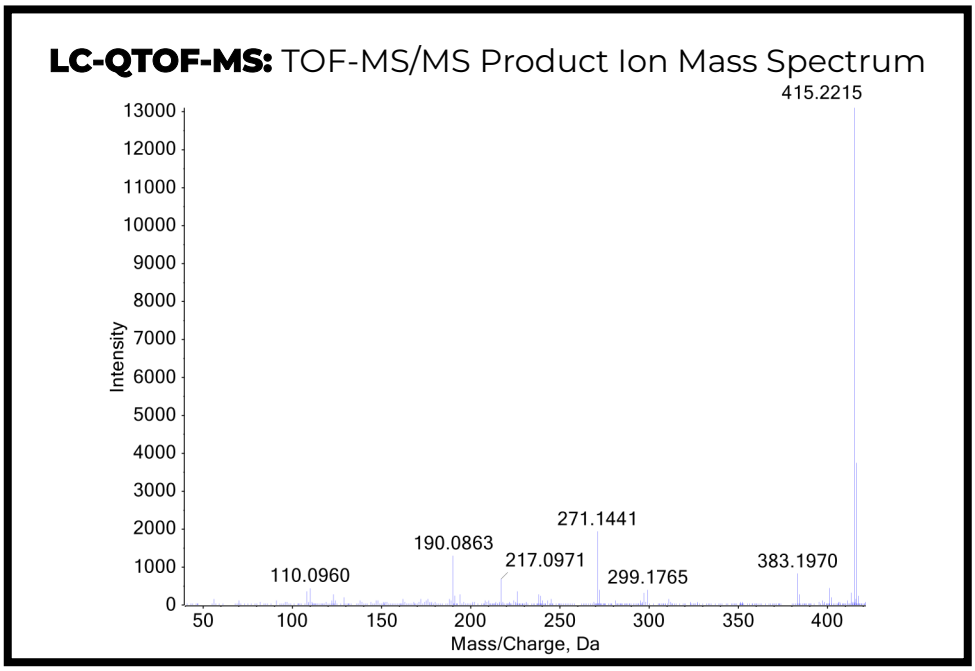
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Dilution in mobile phase

Instrument: Sciex X500R LC-QTOF-MS

Methods: LC-QTOF-MS Method Details & Monographs





Confirmation Using Drug Standard: *Reference material for mitragynine pseudoindoxyl (Batch: 0721796-9) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be mitragynine pseudoindoxyl based on retention time (sample: 5.88 min vs. standard: 5.88 min) and mass spectral data comparisons.*