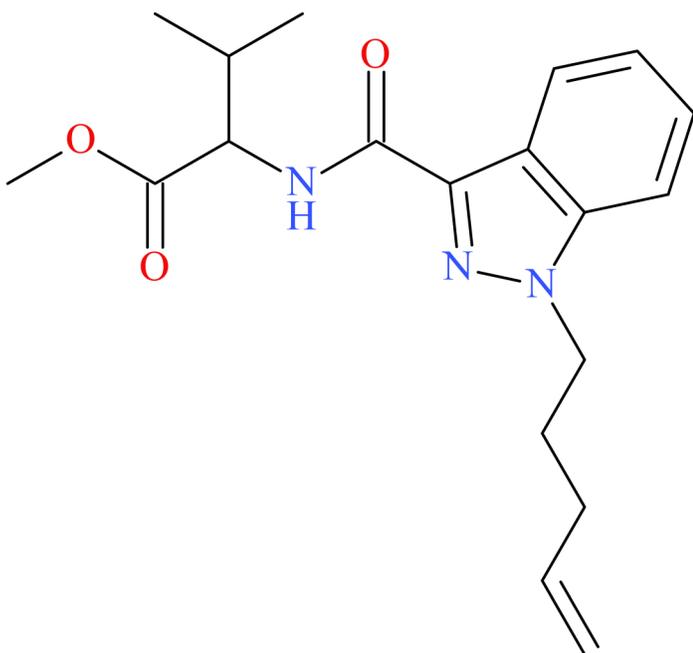




## MMB-4en-PINACA



NPS SUBCLASS	Synthetic Cannabinoid
REPORT DATE	June 20, 2024
SAMPLE RECEIVED	February 5, 2024
SAMPLE TYPE	Drug Material

Preferred Name	MMB-4en-PINACA
Synonyms	MMB-P-4en-INACA, 4en-MMB-PINACA
Formal Name	Methyl 3-methyl-2-[(1-pent-4-enylindazole-3-carbonyl)amino]butanoate
InChI Key	UJELURFNWPRFMM-UHFFFAOYSA-N
CAS Number	2659308-41-3
Chemical Formula	C <sub>19</sub> H <sub>25</sub> N <sub>3</sub> O <sub>3</sub>
Molecular Weight	343.42
Molecular Ion [M <sup>+</sup> ]	343
Exact Mass [M+H] <sup>+</sup>	344.1969

## Characterization & Intelligence

The following information was compiled in June 2024 and is subject to change as new research is conducted and as new information becomes available:

**Description:** MMB-4en-PINACA is a novel synthetic cannabinoid with structural similarity to MDMB-4en-PINACA, MMB-4en-PICA, and other synthetic cannabinoids. MMB-4en-PINACA was first detected in February 2024 by our laboratory and was confirmed in comparison to standard reference material.

**Sample Source:** Cook County Sheriff's Office (Chicago, IL)

**Sample Appearance:** Paper samples

**Pharmacology:** *In vitro* pharmacological data available for MMB-4en-PINACA show that this synthetic cannabinoid is active but less potent than its *tert*-leucine counterpart MDMB-4en-PINACA.<sup>1</sup>



**Toxicology:** MMB-4en-PINACA has not yet been identified in toxicology cases to date at the CFSRE.

**Drug Materials:** MMB-4en-PINACA has been detected in two drug materials to date at the CFSRE.

**Demographics / Geographics:** Drug materials originated from Chicago, Illinois. MMB-4en-PINACA was found in the absence of other drugs in one case and alongside MDMB-4en-PINACA in one case.

**Legal Status:** MMB-4en-PINACA is not currently scheduled in the United States.

### References:

- ▶ Cayman Chemical: [MMB-4en-PINACA](#)
- ▶ <sup>1</sup>Grafinger *et al.* (2021) [Systematic evaluation of a panel of 30 synthetic cannabinoid receptor agonists structurally related to MMB-4en-PICA, MDMB-4en-PINACA, ADB-4en-PINACA, and MMB-4CN-BUTINACA using a combination of binding and different CB1 receptor activation assays...](#)

**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.

**Acknowledgements:** This report was prepared by Sara E. Walton, Justin Wilks, Max T. Denn, Alexis D. Quinter, Joshua S. DeBord, Barry K. Logan, and Alex J. Krotulski at the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation. The authors acknowledge scientists and staff at the CFSRE and CCSO for their involvements and contributions. For more information, contact [npsdiscovery@cfsre.org](mailto:npsdiscovery@cfsre.org) or visit [www.npsdiscovery.org](http://www.npsdiscovery.org).

**Funding:** CFSRE's NPS Discovery is supported by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice (Award Number 15PNIJ-22-CG-04434-MUMU, "Implementation of NPS Discovery – An Early Warning System for Novel Drug Intelligence, Surveillance, Monitoring, Response, and Forecasting using Drug Materials and Toxicology Populations in the US"). The opinions, findings, conclusions and/or recommendations expressed in this publication are those of the author(s) and do not necessarily represent the official position or policies of the U.S. Department of Justice.

**Suggested Citation:** Walton, SE; Wilks, J; Denn, MT; Quinter, AD; DeBord, JS; Logan, BK; Krotulski, AJ. (2024) *MMB-4en-PINACA* — *NPS Discovery New Drug Monograph*, Center for Forensic Science Research and Education, United States.

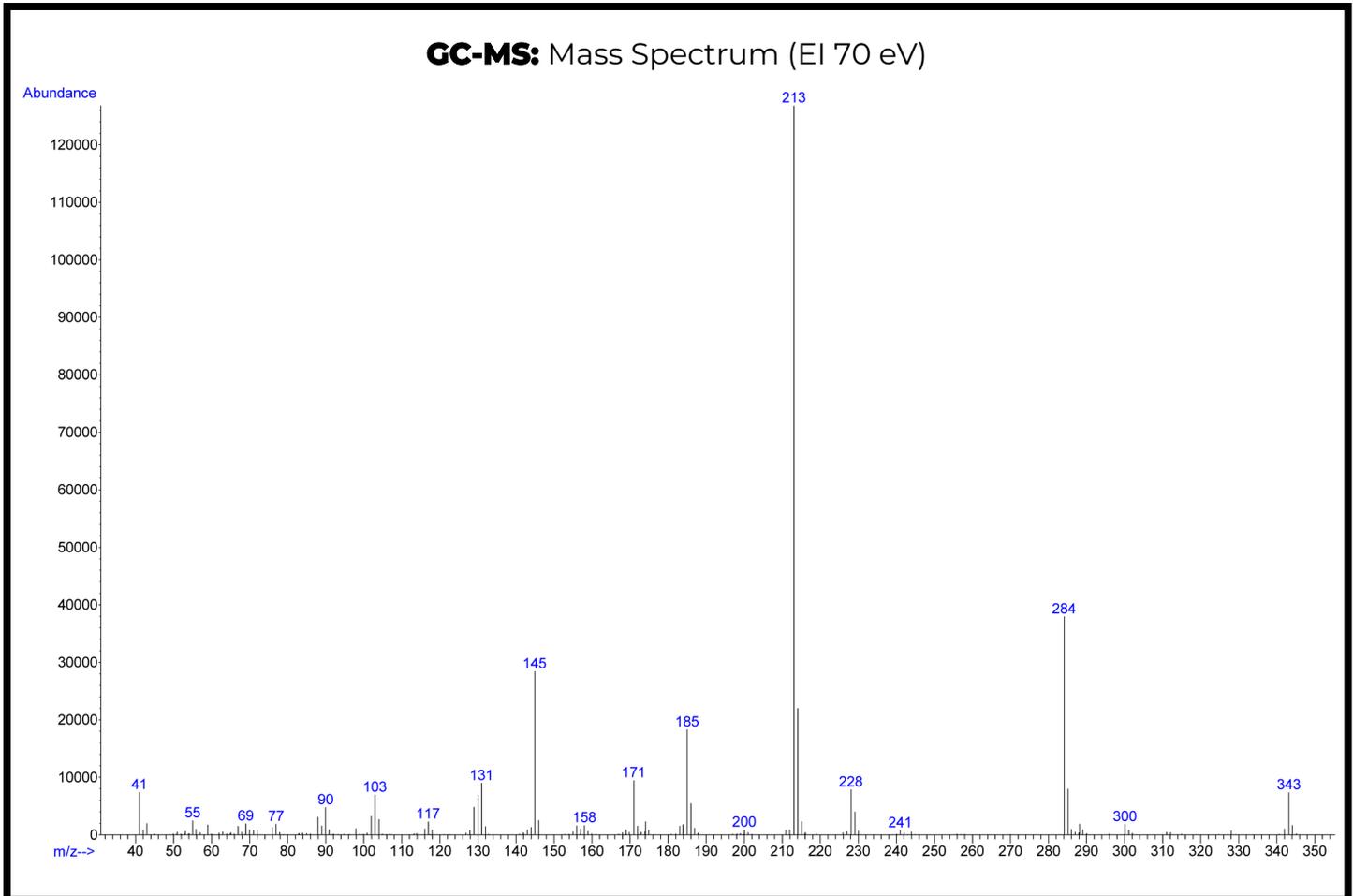
# Gas Chromatography Mass Spectrometry (GC-MS)

**Laboratory:** Center for Forensic Science Research and Education (CFSRE, Willow Grove, PA, USA)

**Instrument:** Agilent 5975 Series GC/MSD

**Methods:** [GC-MS Method Details](#) & [Monographs](#)

**Sample Preparation:** Acid / base extraction



**Confirmation Using Drug Standard:** Reference material (Batch: 0605834-15) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be MMB-4en-PINACA based on retention time (sample: 7.22 min vs. standard: 7.19 min) and mass spectral data comparisons.

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

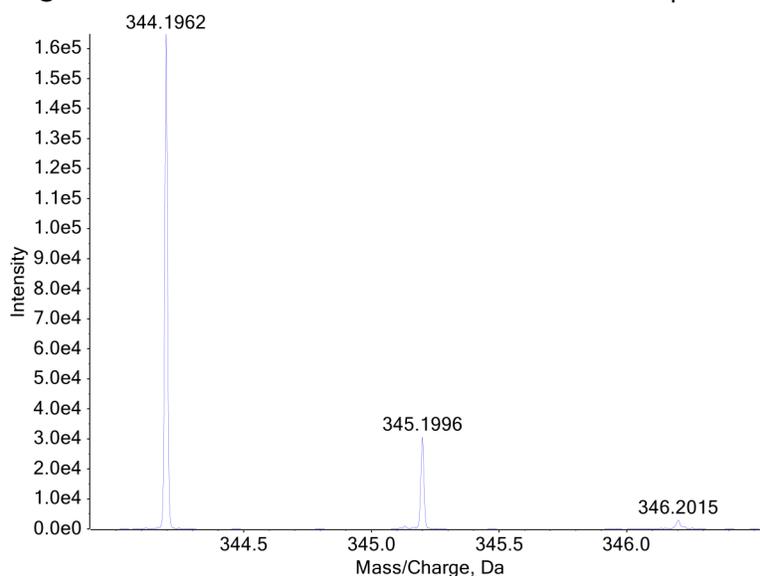
**Laboratory:** Center for Forensic Science Research and Education (CFSRE, Willow Grove, PA, USA)

**Instrument:** Sciex 5600+ LC-QTOF-MS

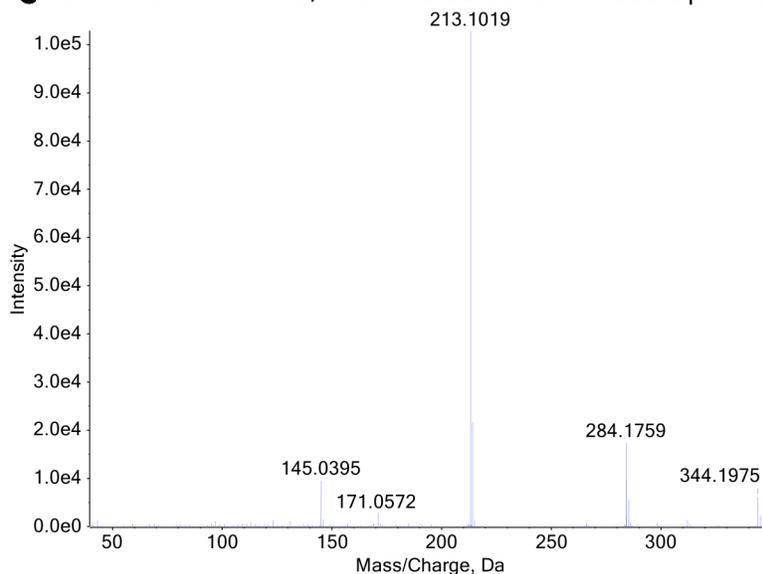
**Methods:** [LC-QTOF-MS Method Details](#) & [Monographs](#)

**Sample Preparation:** Dilution in mobile phase

## LC-QTOF-MS: TOF-MS Precursor Ion Mass Spectrum



## LC-QTOF-MS: TOF-MS/MS Product Ion Mass Spectrum



**Confirmation Using Drug Standard:** Reference material (Batch: 0605834-15) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be MMB-4en-PINACA based on retention time (sample: 9.53 min vs. standard: 9.56 min) and mass spectral data comparisons.