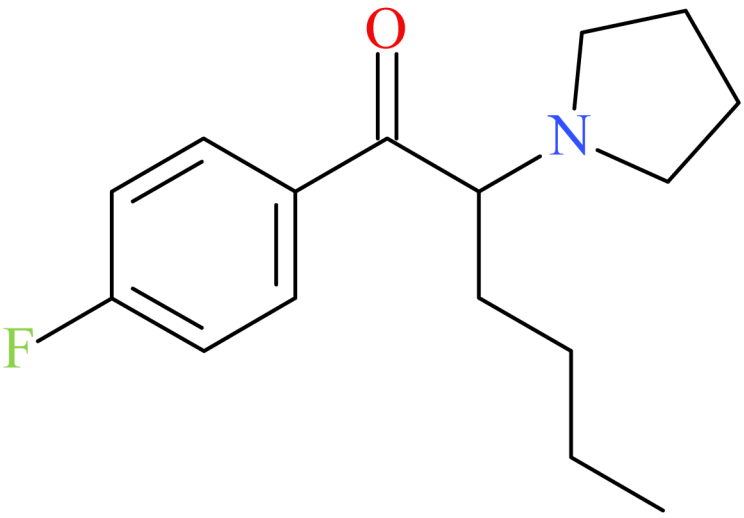
4F-Alpha-PHP



NPS SUBCLASS
Stimulant
REPORT DATE
June 24, 2025
SAMPLE RECEIVED
January 6, 2025
SAMPLE TYPE
Toxicology

Preferred Name	4F-Alpha-PHP
Synonyms	4-fluoro-PHP, 4F-Pyrrolidinohexanophenone, 4F-alpha-Pyrrolidinohexiophenone
Formal Name	1-(4-fluorophenyl)-2-pyrrolidin-1-yl-hexan-1-one
InChI Key	BCJXLSGKMNRRKO-UHFFFAOYSA-N
CAS Number	2748289-49-6
Chemical Formula	$C_{16}H_{22}FNO$
Molecular Weight	263.4
Molecular Ion [M⁺]	263
Exact Mass [M+H]⁺	264.1758

Characterization & Intelligence

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

Description: 4F-Alpha-PHP is a synthetic stimulant with structural similarity to other known synthetic cathinones (e.g., 4-methyl-PHP, 4F-alpha-PVP, alpha-PHP). 4F-Alpha-PHP was first identified in 2017 and has since been identified in bulk drug seizures and for sale on grey market sites.[1,2] 4F-Alpha-PHP was first identified by our laboratory in January 2025 and confirmed after acquiring standard reference material.

Sample Source: Florida 4th District Chief Medical Examiner's Office (Jacksonville, FL)

Sample Appearance: Blood specimen

Pharmacology: 4F-Alpha-PHP is reported to inhibit neurotransmitter reuptake with high potency at the dopamine transporter (hDAT) and lower potency at the norepinephrine transporter (hNET).[3]

Toxicology: 4F-Alpha-PHP has been detected in one toxicology case to date at the CFSRE.

Drug Materials: 4F-Alpha-PHP has not been detected in drug materials to date at the CFSRE.

Demographics / Geographics: The toxicology specimen originated from Jacksonville, FL, and 4F-alpha-PHP was found alongside other synthetic cathinones (e.g., alpha-PiHpP, alpha-PiHP, MD-PiHP, and *N*-isopropyl butylone), traditional stimulants (e.g., cocaine and methamphetamine), and fentanyl.

Legal Status: 4F-Alpha-PHP is not currently a scheduled substance in the United States.

References:

- Cayman Chemical: 4F-Alpha-PHP
- [1]Liu *et al.* Identification and analytical characterization of nine synthetic cathinone derivatives...
- [2]Apirakkan *et al.* Analytical characterization of three cathinone derivatives...
- [3]Eshleman *et al.* Structure-activity relationships of bath salt components...

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, Brianna N. Stang, Alyssa G. Reyes, Savannah M. Baker, 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 at the CFSRE for their involvements and contributions. For more information, contact npsdiscovery@cfsre.org or visit www.npsdiscovery.org.

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Gas Chromatography Mass Spectrometry (GC-MS)

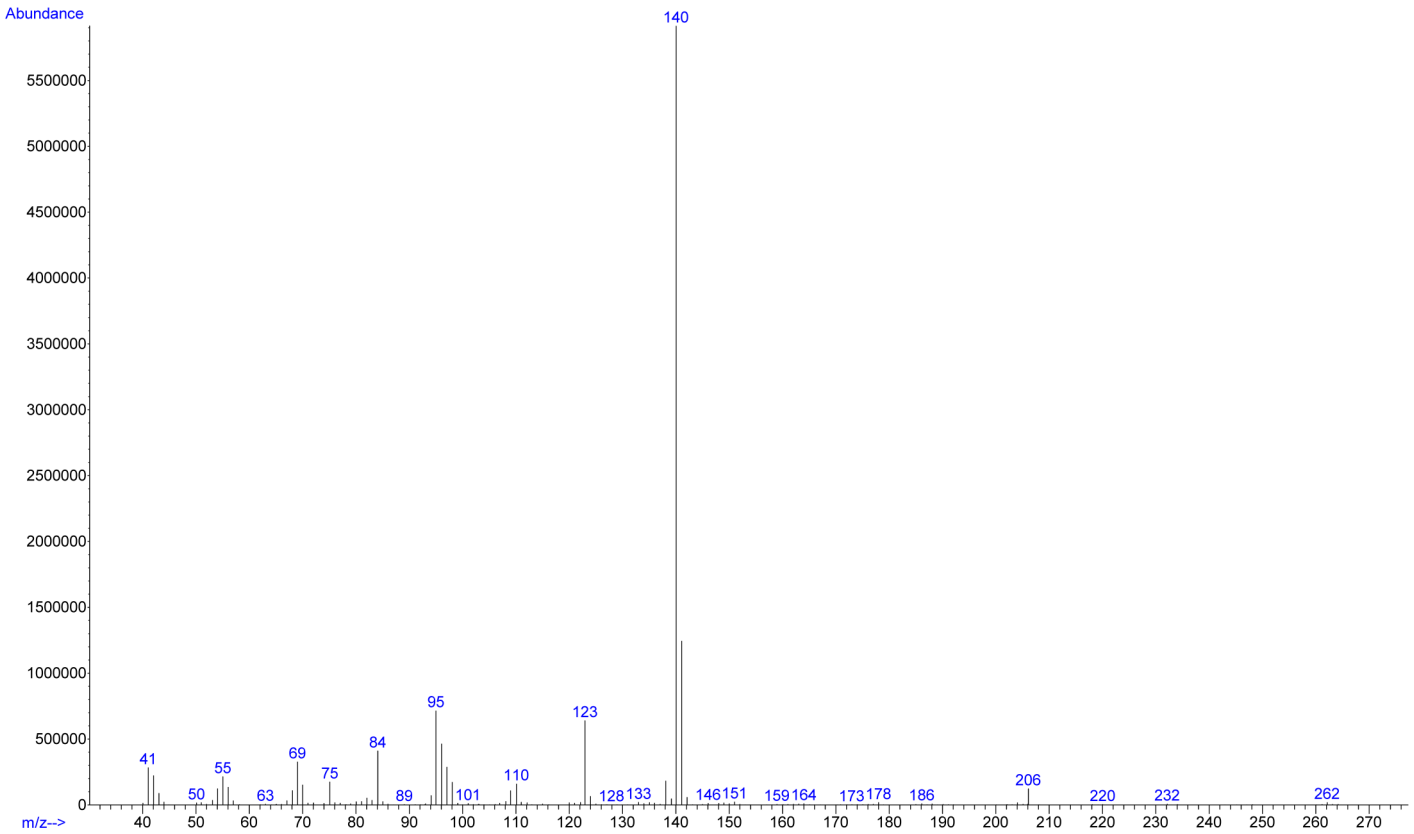
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham PA, USA)

Sample Preparation: Standard diluted in methanol

Instrument: Agilent 5975 Series GC/MSD

Methods: GC-MS Method Details & Monographs

GC-MS: Mass Spectrum (EI 70 eV)



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

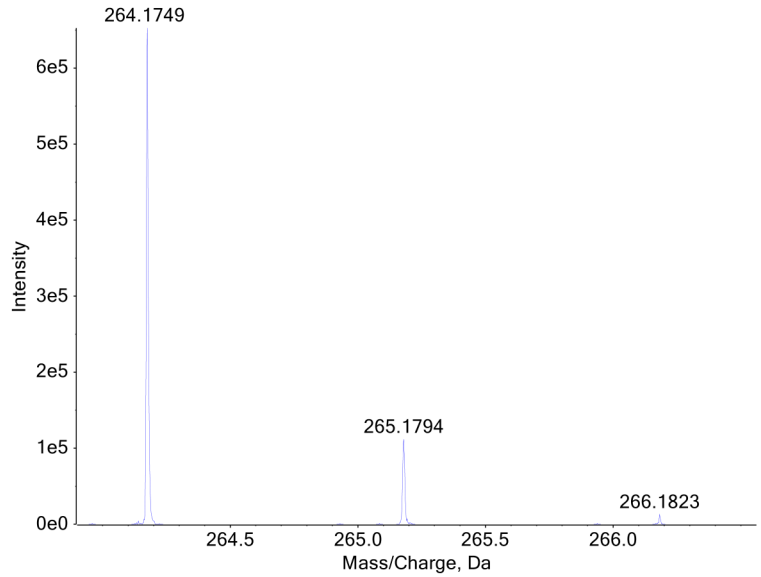
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Liquid-liquid extraction

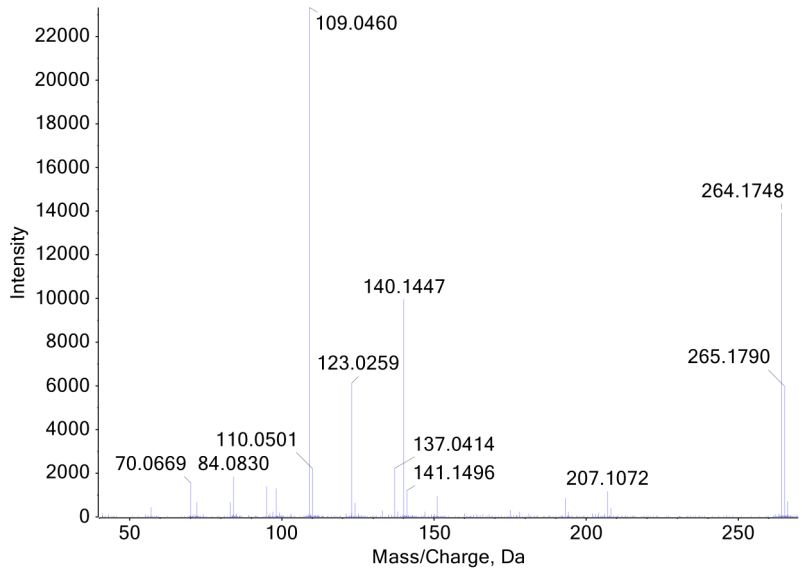
Instrument: Sciex X500R LC-QTOF-MS

Methods: LC-QTOF-MS Method Details & Monographs

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 for 4F-alpha-PHP (Batch: 0478874-33) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be 4F-alpha-PHP based on retention time (sample: 5.94 min vs. standard: 5.97 min) and mass spectral data comparisons.*