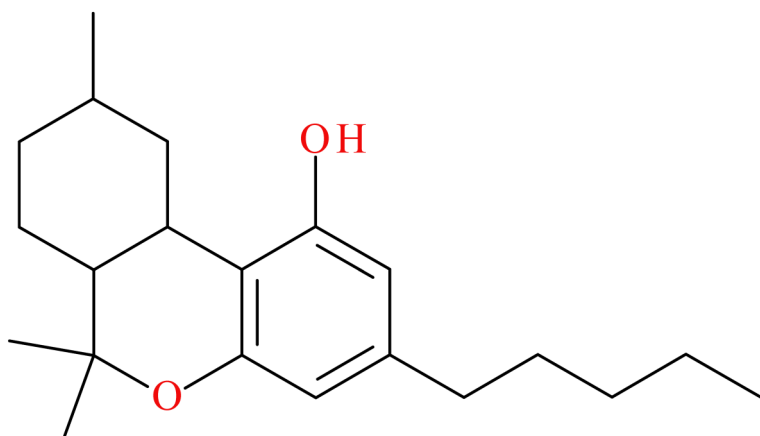




HHC



NPS SUBCLASS
Cannabinoid
REPORT DATE
December 18, 2024
SAMPLE RECEIVED
September 9, 2024
SAMPLE TYPE
Toxicology

Preferred Name	HHC
Synonyms	Hexahydrocannabinol, 9R-HHC, 9S-HHC, 9 α -HHC, 9 β -HHC
Formal Name	6,6,9-trimethyl-3-pentyl-6a,7,8,9,10,10a-hexahydrobenzo[c]chromen-1-ol
InChI Key	XKRHRBJLCLXSGE-UHFFFAOYSA-N
CAS Number	N/A
Chemical Formula	C ₂₁ H ₃₂ O ₂
Molecular Weight	316.5
Molecular Ion [M ⁺]	316
Exact Mass [M+H] ⁺	317.2475

Characterization & Intelligence

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

Description: HHC is classified as a semi-synthetic cannabinoid and is structurally similar to known phytocannabinoids (e.g., delta-9-THC). HHC has two stereoisomers, 9R-HHC and 9S-HHC, both of which have been identified in drug materials and biological specimens in many countries since recreational emergence in 2022.^{1,2,3,4} HHC was identified in October 2024 by our laboratory and confirmed using standard reference material.

Sample Source: Forensic Science Network (Columbia, SC)

Sample Appearance: Blood specimen



Pharmacology: *In vitro* data available show that HHC is an agonist at the CB₁ receptor with potency less than that of delta-9-THC.^{1,5} 9R-HHC is more potent than its stereoisomer, 9S-HHC.⁵

Toxicology: HHC has been identified in four toxicology cases to date at the CFSRE.

Drug Materials: HHC has been detected in drug materials at the CFSRE.

Demographics / Geographics: Toxicology specimens positive for HHC originated from South Carolina and New York. HHC was identified alone and alongside traditional drugs (e.g., methamphetamine, fentanyl, delta-9-THC).

Legal Status: HHC is not currently a scheduled drug in the United States.

References:

- ▶ Cayman Chemical: [9R-HHC](#)
- ▶ ¹Kronstrand et al. (2024) [Quantitation of hexahydrocannabinol \(HHC\) and metabolites...](#)
- ▶ ²EUDA (2023) [Technical report: hexahydrocannabinol \(HHC\) and related substances](#)
- ▶ ³Tanaka et al. (2024) [Identification of hexahydrocannabinol \(HHC\)...](#)
- ▶ ⁴Schirmer et al. (2023) [Identification of human hexahydrocannabinol metabolites in urine](#)
- ▶ ⁵Graziano et al. (2023) [Hexahydrocannabinol pharmacology, toxicology, and analysis...](#)

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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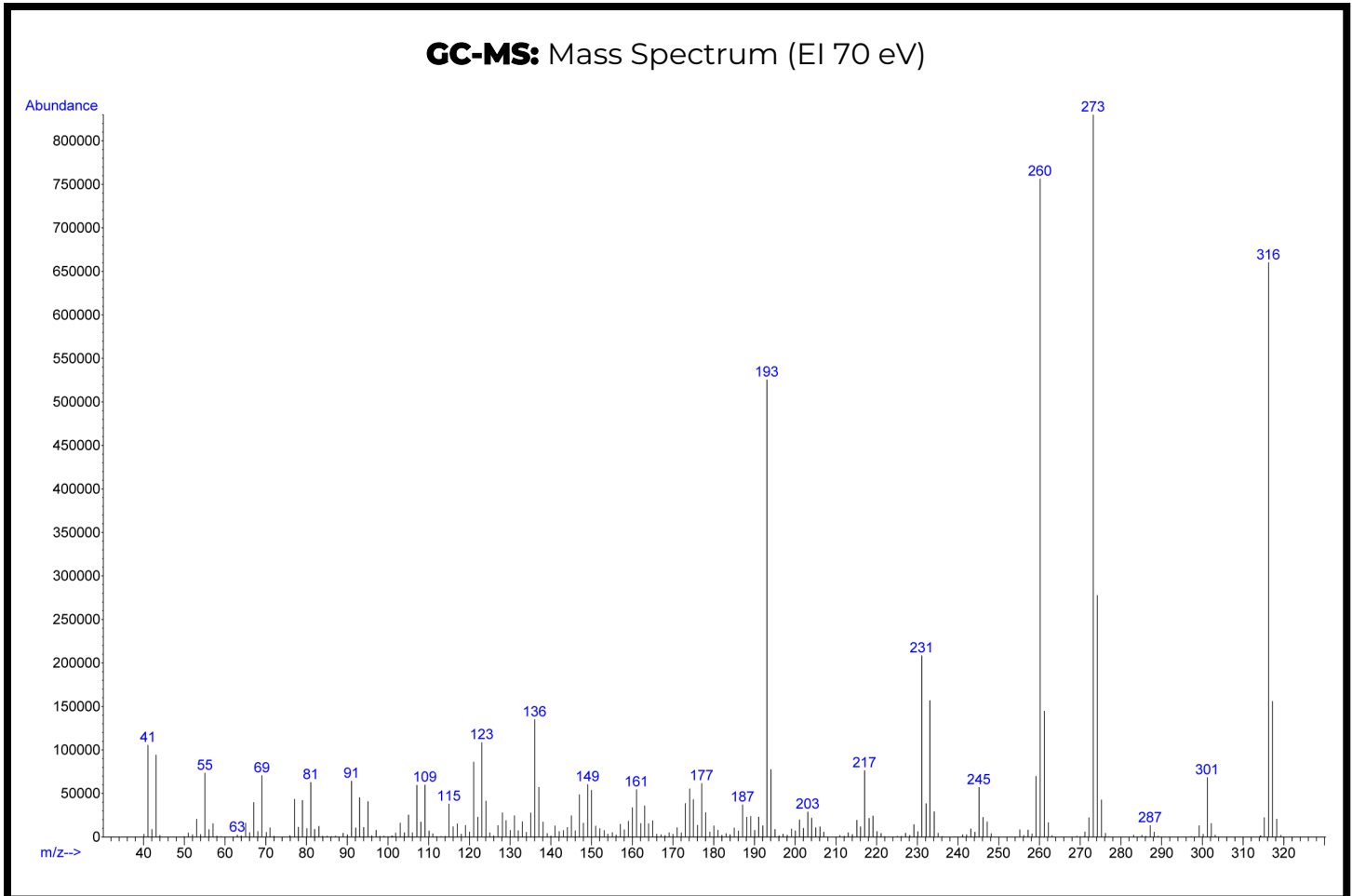
Gas Chromatography Mass Spectrometry (GC-MS)

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

Instrument: Agilent 5975 Series GC/MSD

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

Sample Preparation: Standard diluted in methanol



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

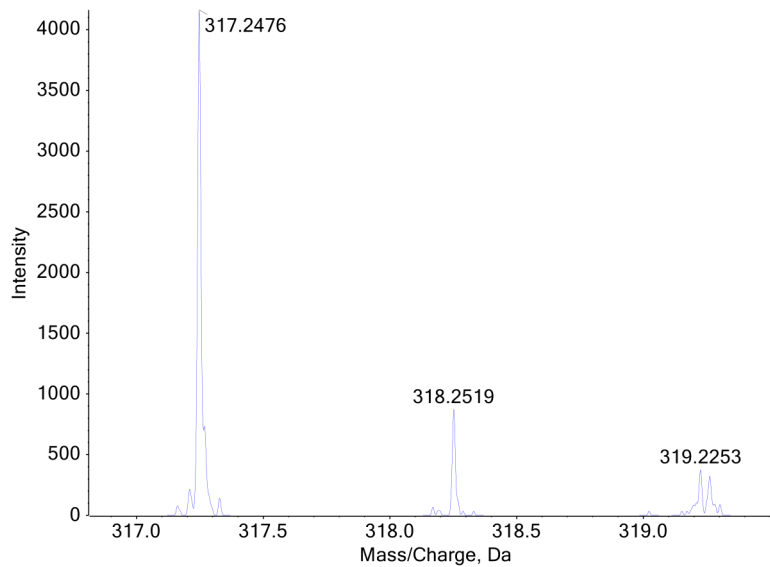
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Instrument: Sciex X500R LC-QTOF-MS

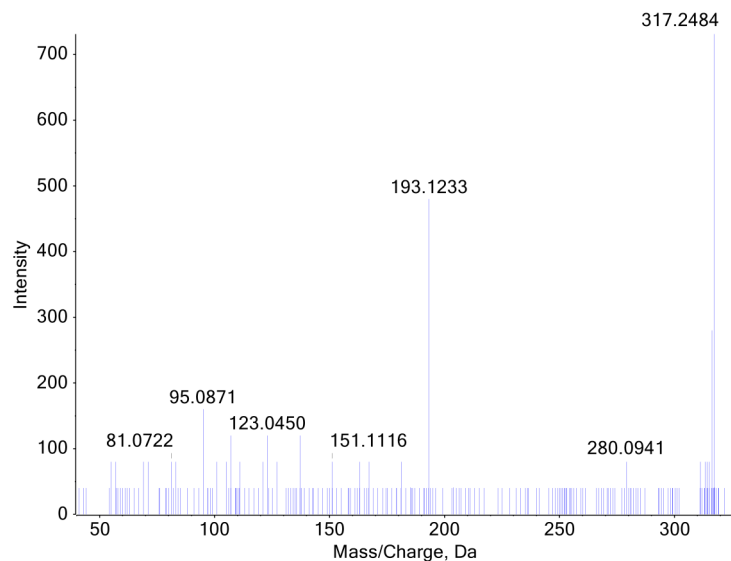
Methods: [LC-QTOF-MS Method Details](#) & [Monographs](#)

Sample Preparation: Liquid-liquid extraction

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: 0650290-4) was purchased from Cayman Chemical (Ann Arbor, MI, USA). The analyte was confirmed to be HHC based on retention time (sample: 11.03 min vs. standard: 11.09 min) and mass spectral data comparisons.