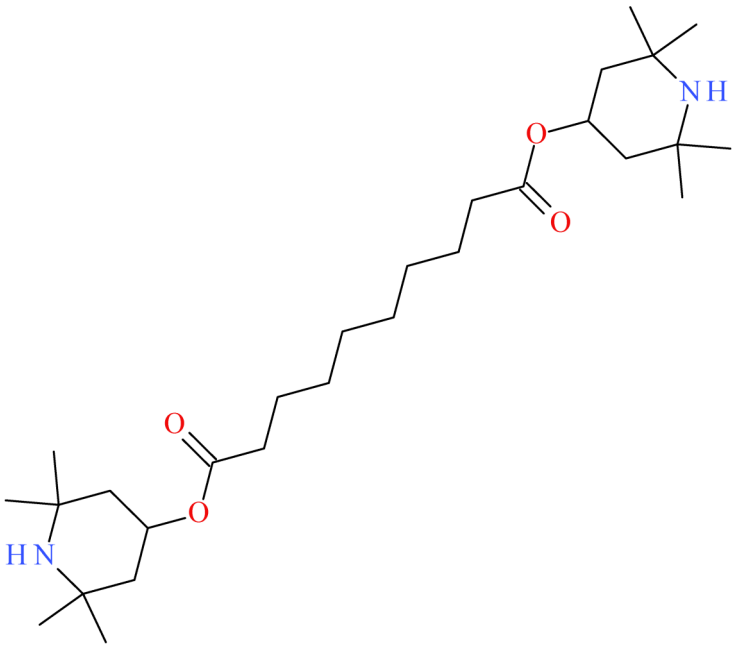
BTMPS



NPS SUBCLASS
Miscellaneous
REPORT DATE
September 3, 2024
SAMPLE RECEIVED
June 12, 2024
SAMPLE TYPE
Drug Material

Preferred Name	BTMPS		
Synonyms	Bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate, Tinuvin 770, T770, HALS770		
Formal Name	Bis(2,2,6,6-tetramethyl-4-piperidyl) decanedioate		
InChI Key	XITRBUPOXXBIJN-UHFFFAOYSA-N		
CAS Number	52829-07-9		
Chemical Formula	$C_{28}H_{52}N_2O_4$		
Molecular Weight	480.7		
Molecular Ion [M⁺]	480		
Exact Mass [M+H]⁺	481.4000	**Exact Mass [M+2H]²⁺**	241.2036

Characterization & Intelligence

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

Description: BTMPS, also commonly referred to as bis(2,2,6,6-tetramethyl-4-piperidyl)sebacate or Tinuvin 770, is the latest substance to appear in the recreational opioid supply as an adulterant alongside fentanyl. BTMPS is used as a light stabilizer and was initially evaluated for use in plastic materials.[1] BTMPS is reportedly used in the manufacturing and packaging of pharmaceutical products.[1]

Communications regarding a strange new opioid adulterant (later confirmed as BTMPS) first began in June 2024 as the substance emerged in Portland OR, Philadelphia PA, and locations across the country. The CFSRE, in collaboration with the UNC Street Drug Analysis Lab, first tentatively determined the adulterant was likely BTMPS and later confirmed its identity via a reference material.

Sample Source: Philadelphia Department of Public Health (Philadelphia, PA) **Sample Appearance:** White powder

Pharmacology: BTMPS is an active and potent L-type calcium channel blocker with potent inhibition at the benzodiazepine and phenylalkylamine-selective domains of calcium channels.[1,2] BTMPS is shown to be a non-competitive antagonist at nicotinic acetylcholine receptors.[2,3] BTMPS was evaluated in a study examining effects of the substance on rats self-administering morphine.[4]

Toxicology: Toxicology cases suspected of containing BTMPS are currently pending analysis at the CFSRE.

Drug Materials: BTMPS has been detected in at least twelve drug materials to date at the CFSRE to date.

Demographics / Geographics: Drug materials positive for BTMPS originated from Pennsylvania; however, the substance has also been identified in California, Oregon, and Michigan, among other states. BTMPS was identified alongside fentanyl, other synthetic opioids (e.g., *para*-fluorofentanyl), stimulants (e.g., methamphetamine, cocaine), and other adulterants (e.g., medetomidine, xylazine).

Legal Status: BTMPS is not a scheduled or regulated substance in the United States.

References:

- Sigma-Aldrich: BTMPS
- PubChem: BTMPS
- UNC Street Drug Analysis Lab: BTMPS
- [1]Glossmann et al. (1993) A light stabilizer (Tinuvin 770) that elutes from polypropylene plastic tubes...
- [2]Peter Sotonyi et al. (2004) Detection of Tinuvin 770, a light stabilizer of plastic materials from dialysis...
- [3]Graham et al. (2005) Functional central nicotinic acetylcholine receptor antagonism by systemic...
- [4]Hall et al. (2011) The use-dependent, nicotinic antagonist BTMPS reduces the adverse consequences of morphine...

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)

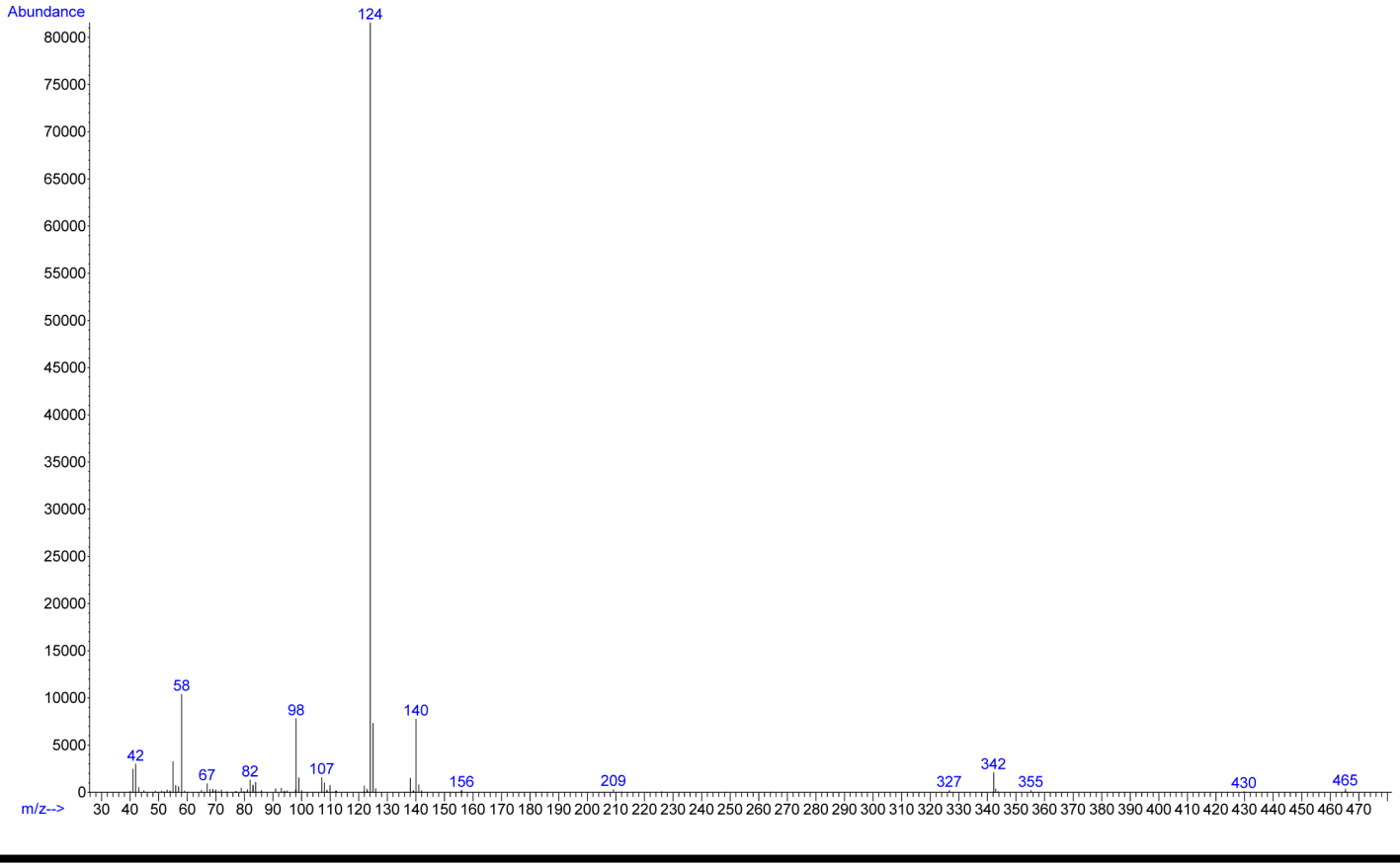
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

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 (Batch: S27I049) was provided by Sigma-Aldrich (St. Louis, MO, USA). The analyte was confirmed to be BTMPS based on retention time (sample: 8.44 min vs. standard: 8.48 min) and mass spectral data comparisons.*

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

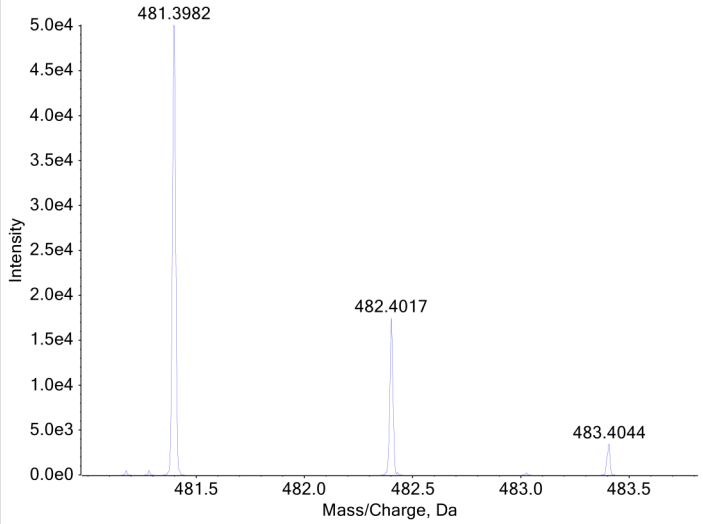
Laboratory: Center for Forensic Science Research and Education (CFSRE, Horsham, PA, USA)

Sample Preparation: Dilution in mobile phase

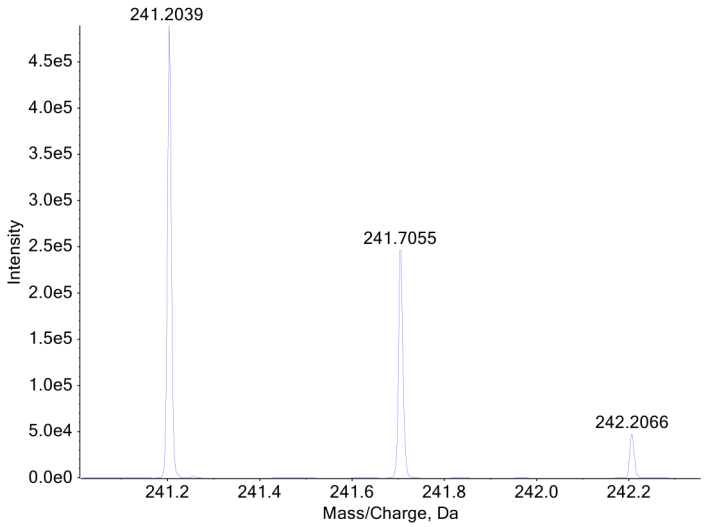
Instrument: Sciex 5600+ LC-QTOF-MS

Methods: LC-QTOF-MS Method Details & Monographs

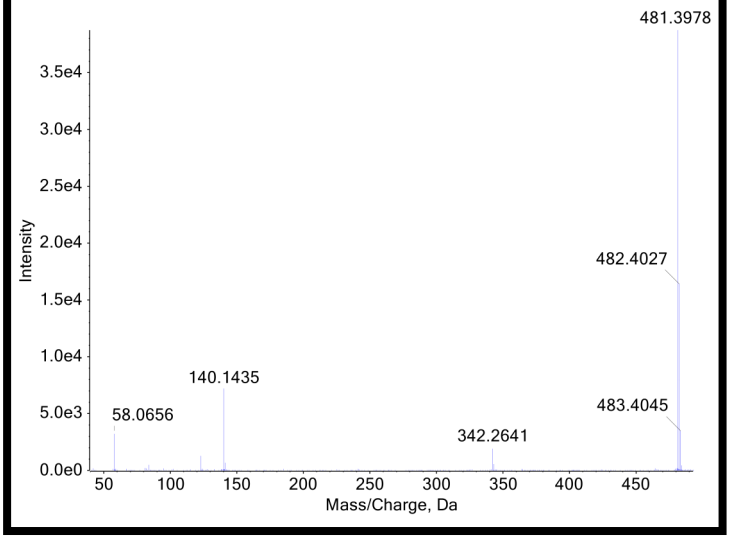
LC-QTOF-MS: $[M+H]^+$ TOF-MS
Precursor Ion Mass Spectrum



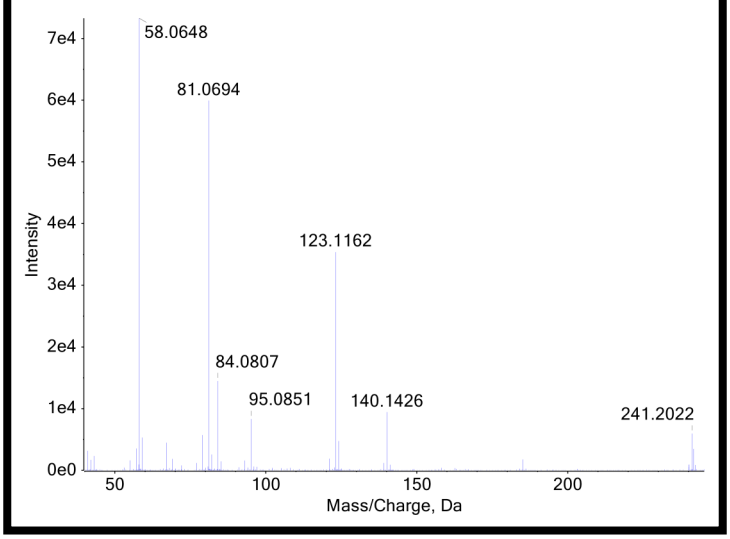
LC-QTOF-MS: $[M+2H]^{2+}$ TOF-MS
Precursor Ion Mass Spectrum



LC-QTOF-MS: $[M+H]^+$ TOF-MS/MS
Product Ion Mass Spectrum



LC-QTOF-MS: $[M+2H]^{2+}$ TOF-MS/MS
Product Ion Mass Spectrum



Confirmation Using Drug Standard: *Reference material (Batch: S27I049) was provided by Sigma-Aldrich (St. Louis, MO, USA). The analyte was confirmed to be BTMPS based on retention time (sample: 6.29 min vs. standard: 6.27 min) and mass spectral data comparisons.*

Fourier-Transform Infrared (FTIR) Spectroscopy

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

Sample Preparation: No sample preparation
(reference material from Sigma-Aldrich S27I049)

Instrument: Thermo Scientific Nicolet iS5 FTIR

Methods: FTIR Method Details & Monographs