

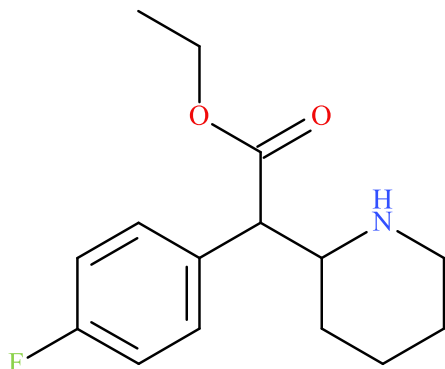
4F-Ethylphenidate

Sample Type: **Seized Material**

Latest Revision: **May 7, 2020**

Date Received: **November 22, 2019**

Date of Report: **May 7, 2020**



1. GENERAL INFORMATION

IUPAC Name:	Ethyl 2-(4-fluorophenyl)-2-(2-piperidyl)acetate
InChI String:	InChI=1S/C15H20FNO2/c1-2-19-15(18)14(13-5-3-4-10-17-13)11-6-8-12(16)9-7-11/h6-9,13-14,17H,2-5,10H2,1H3
CFR:	Not Scheduled (04/2020)
CAS#	Not Available
Synonyms:	4-fluoro ethylphenidate, 4F-EPH
Source:	Department of Homeland Security
Appearance:	White Solid Material

Important Note: All identifications were made based on evaluation of analytical data (GC-MS, LC-QTOF-MS, and NMR), as no standard reference material was available at the time of testing. Delay between date of receipt and date of report may be due to the requirement of complex analytical testing for confirmation.

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2. CHEMICAL AND PHYSICAL DATA

2.1 CHEMICAL DATA

Form	Chemical Formula	Molecular Weight	Molecular Ion [M ⁺]	Exact Mass [M+H] ⁺
Base	C ₁₅ H ₂₀ FNO ₂	265.3	265	266.1551

3. BRIEF DESCRIPTION

4F-Ethylphenidate is classified as a novel stimulant and analogue of methylphenidate (Ritalin). Novel stimulants have been reported to cause effects similar to amphetamine. Novel stimulants have caused adverse events, including deaths, as described in the literature. Structurally similar analogues of methylphenidate include ethylphenidate, 4-fluoromethylphenidate, and 3,4-dichloromethylphenidate. Methylphenidate is a Schedule II substance in the United States while 4F-ethylphenidate is not explicitly scheduled.

4. ADDITIONAL RESOURCES

<http://swgdrug.org/Monographs/4-Fluoroethylphenidate.pdf>

https://www.policija.si/apps/nfl_response_web/0_Analytical_Reports_final/4-fluoroethylphenidate-ID-1602005_report01.pdf

https://www.policija.si/apps/nfl_response_web/0_Analytical_Reports_final/4F-EPH-ID-1563-16-report200616.pdf

5. QUALITATIVE DATA

5.1 GAS CHROMATOGRAPHY MASS SPECTROMETRY (GC-MS)

Testing Performed At: NMS Labs (Willow Grove, PA)

Sample Preparation: Acid/Base extraction

Instrument: Agilent 5975 Series GC/MSD System

Column: Zebtron™ Inferno™ ZB-35HT (15 m x 250 μm x 0.25 μm)

Carrier Gas: Helium (Flow: 1 mL/min)

Temperatures: Injection Port: 265 °C

Transfer Line: 300 °C

MS Source: 230 °C

MS Quad: 150 °C

Oven Program: 60 °C for 0.5 min, 35 °C/min to 340 °C for 6.5 min

Injection Parameters: Injection Type: Splitless

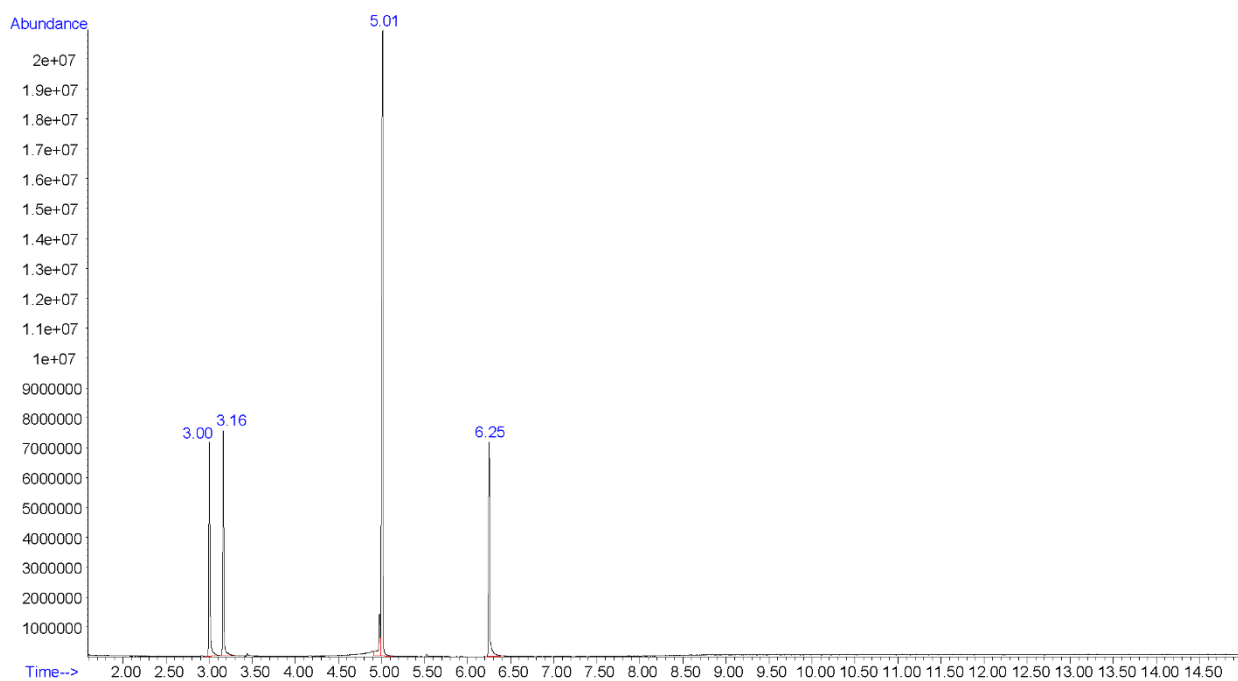
Injection Volume: 1 µL

MS Parameters: Mass Scan Range: 40-550 m/z

Threshold: 250

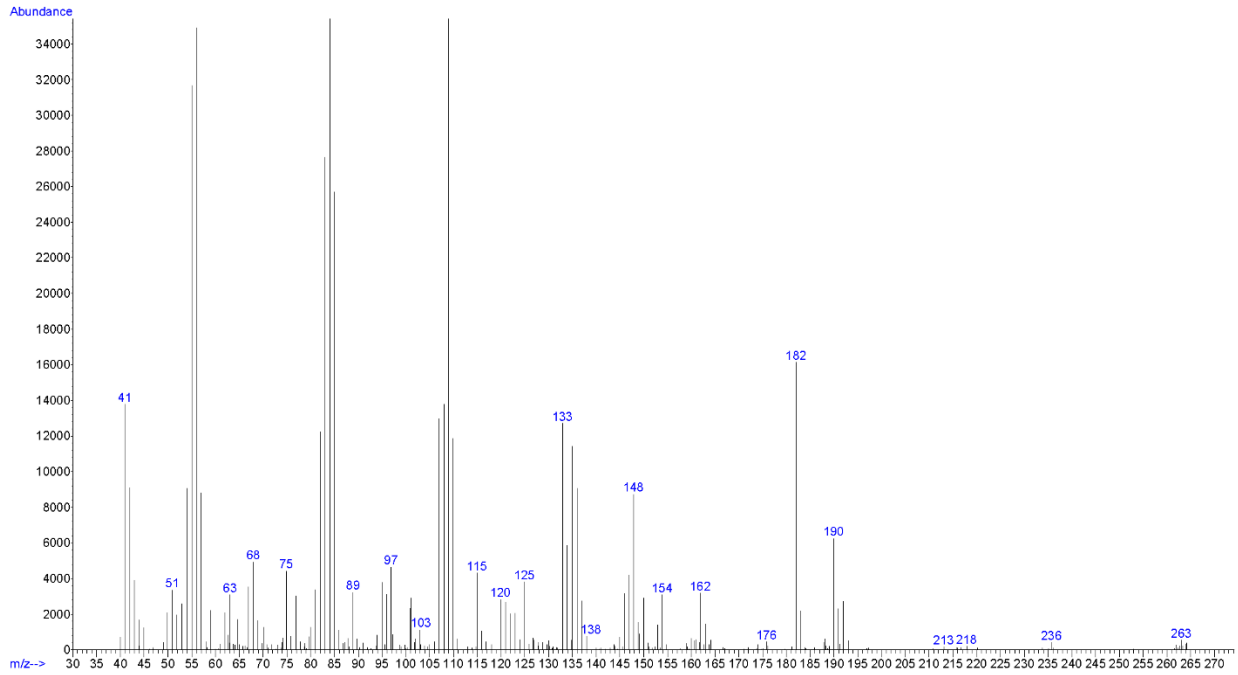
Retention Time: 5.01 min

Chromatogram: 4F-Ethylphenidate



*Additional peaks present in chromatogram: not a controlled substance (3.00 min),
internal standard (3.16 min), and internal standard (6.25 min)*

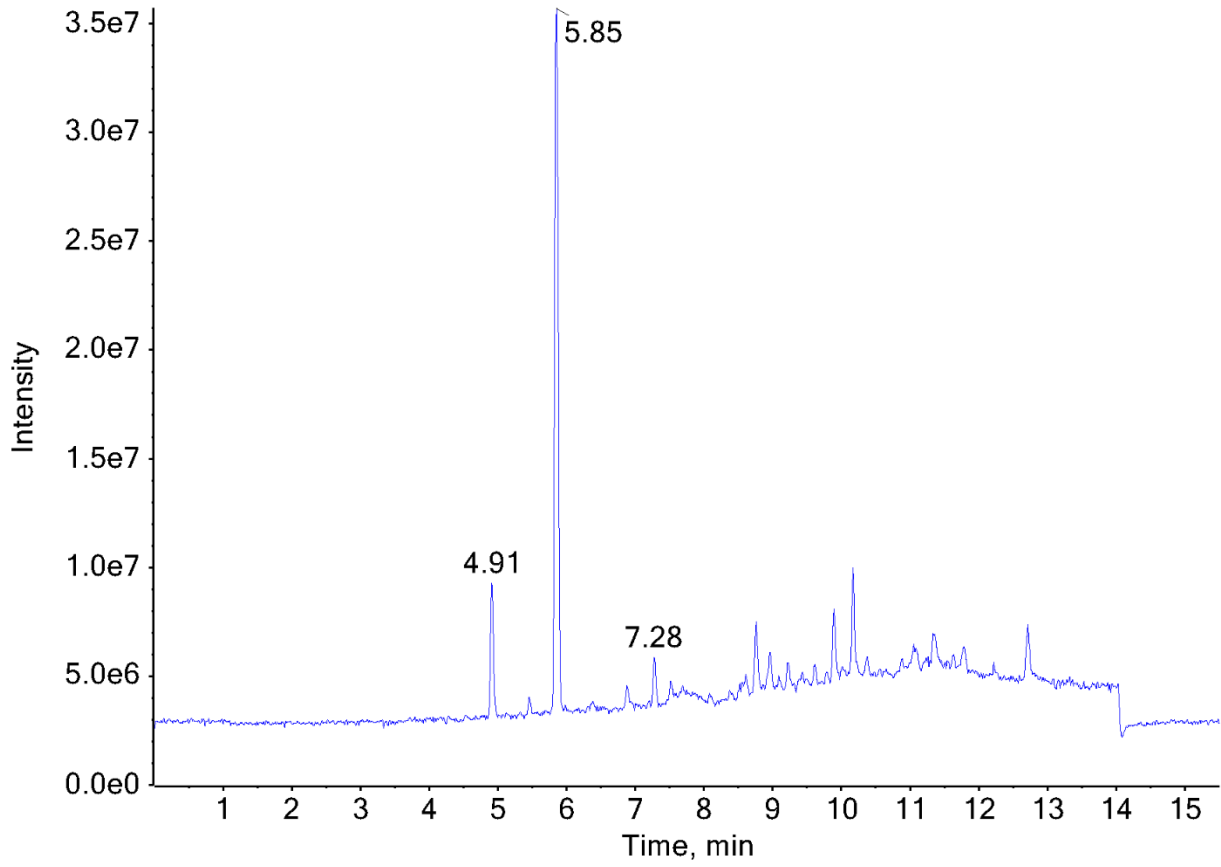
EI (70 eV) Mass Spectrum (Top) and 10x (Bottom): 4F-Ethylphenidate



5.2 LIQUID CHROMATOGRAPHY QUADRUPOLE TIME OF FLIGHT MASS SPECTROMETRY (LC-QTOF)

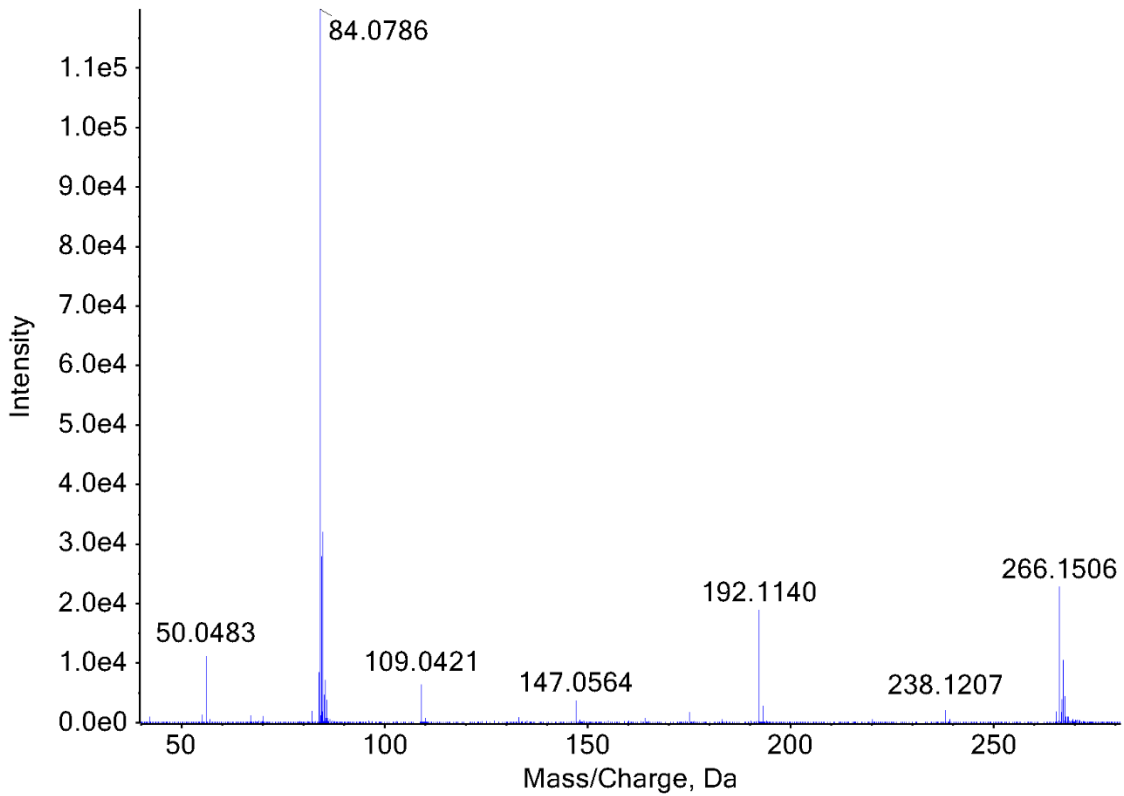
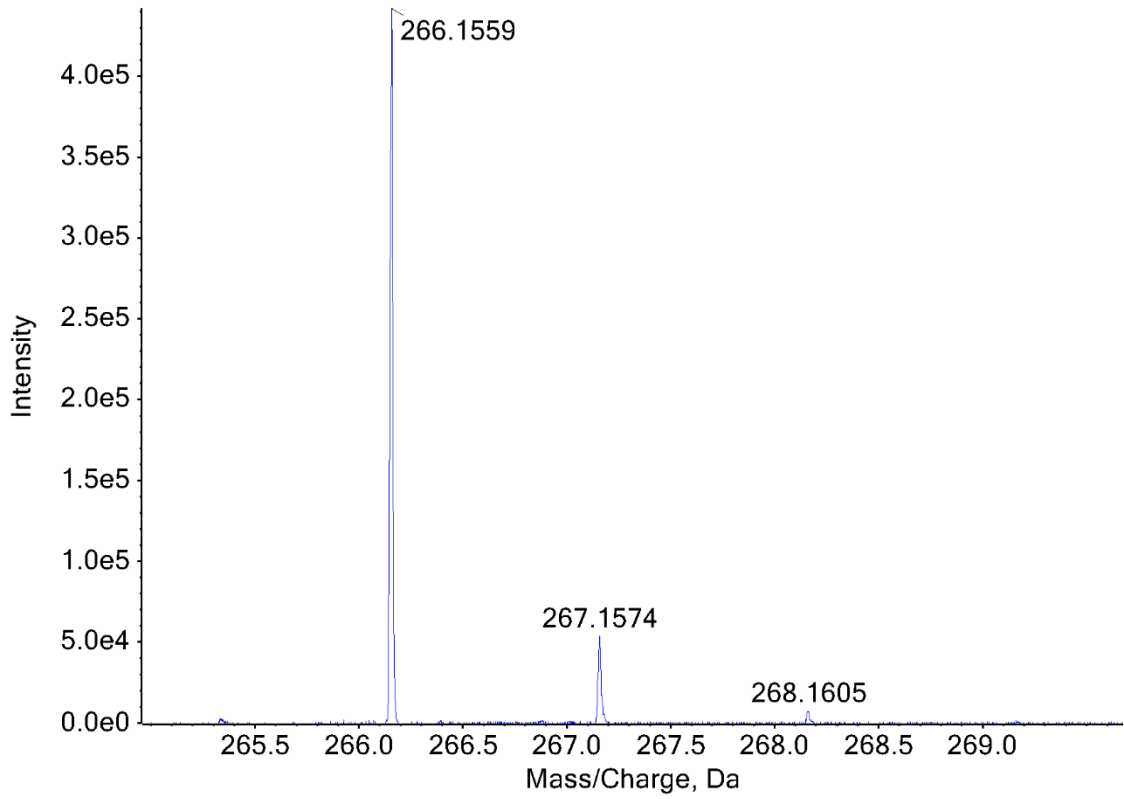
Testing Performed At:	The Center for Forensic Science Research and Education at the Fredric Rieders Family Foundation (Willow Grove, PA)
Sample Preparation:	1:100 dilution of acid/base extract in mobile phase
Instrument:	Sciex TripleTOF® 5600+, Shimadzu Nexera XR UHPLC
Column:	Phenomenex® Kinetex C18 (50 mm x 3.0 mm, 2.6 µm)
Mobile Phase:	A: Ammonium formate (10 mM, pH 3.0) B: Methanol/acetonitrile (50:50) Flow rate: 0.4 mL/min
Gradient:	Initial: 95A:5B; 5A:95B over 13 min; 95A:5B at 15.5 min
Temperatures:	Autosampler: 15 °C Column Oven: 30 °C Source Heater: 600 °C
Injection Parameters:	Injection Volume: 10 µL
QTOF Parameters:	TOF MS Scan Range: 100-510 Da Precursor Isolation: SWATH® acquisition (27 windows) Fragmentation: Collision Energy Spread (35±15 eV) MS/MS Scan Range: 50-510 Da
Retention Time:	5.85 min

Chromatogram: 4F-Ethylphenidate

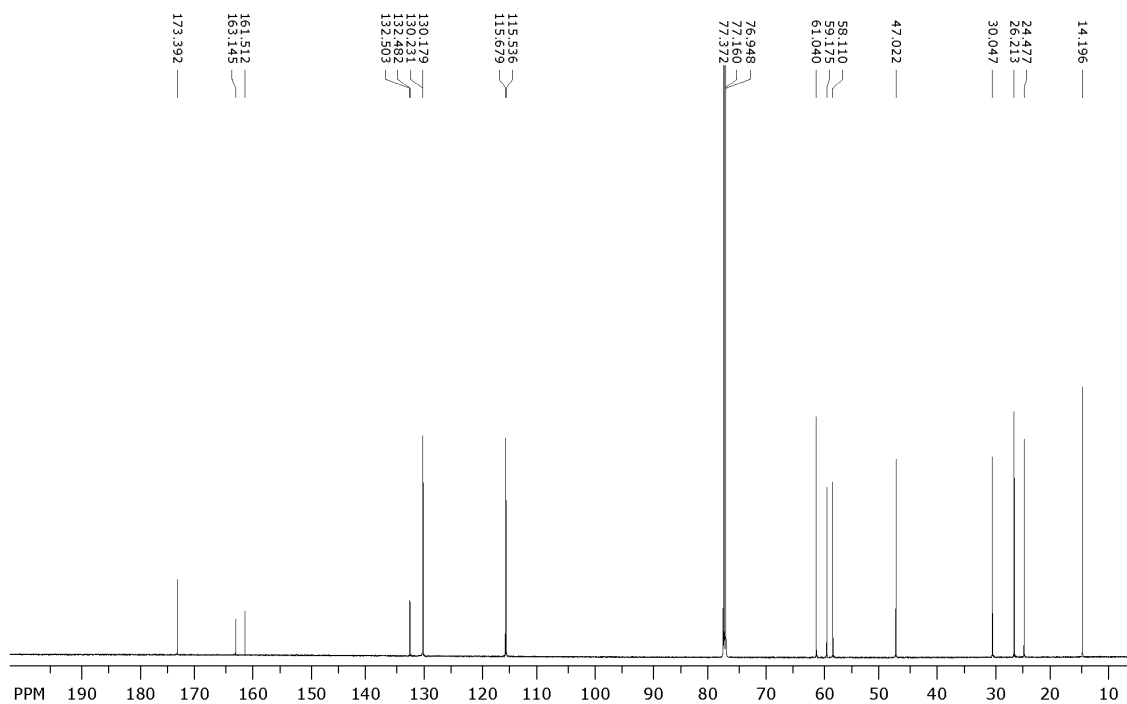


Additional peaks present in chromatogram: internal standards (4.91 min and 7.28 min)

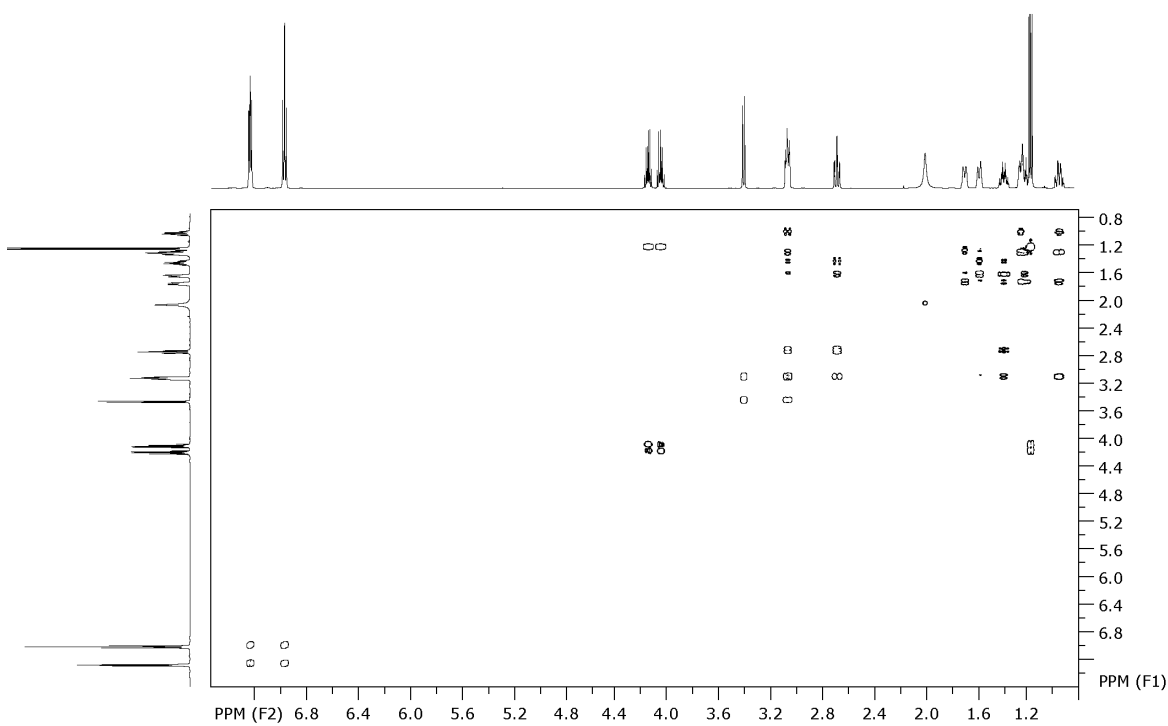
TOF MS (Top) and MS/MS (Bottom) Spectra: 4F-Ethylphenidate



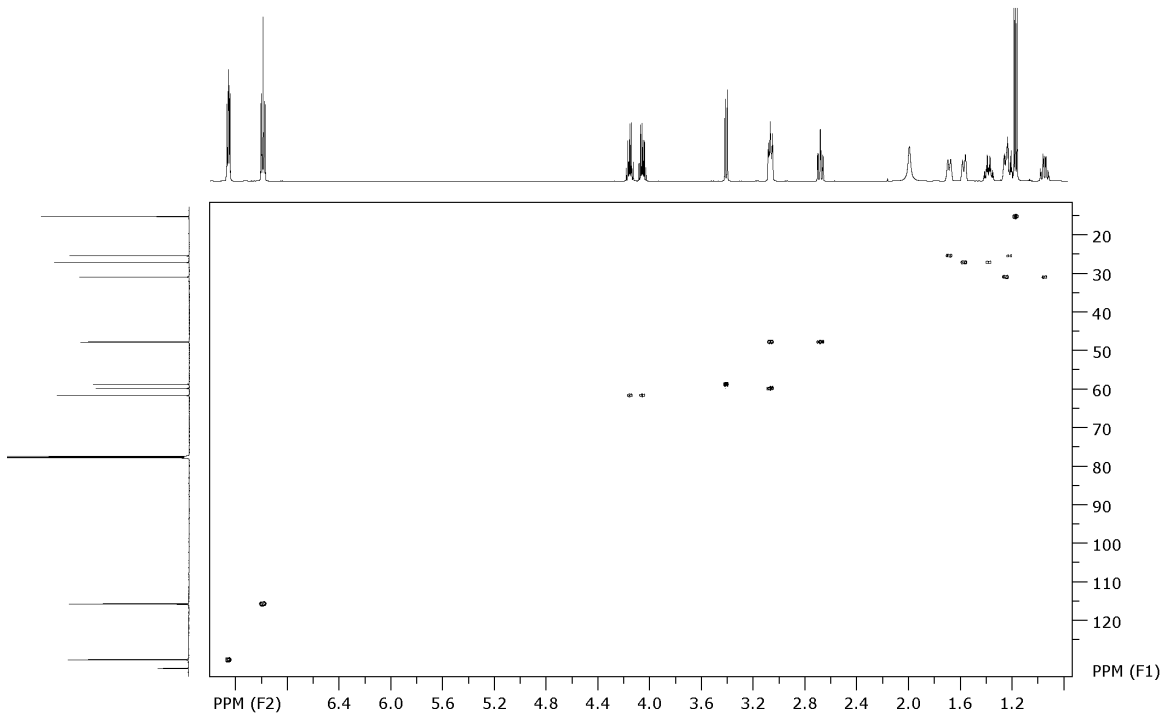
¹³C NMR: 4F-Ethylphenidate



COSY NMR: 4F-Ethylphenidate



HSQC NMR: 4F-Ethylphenidate



HMBC NMR: 4F-Ethylphenidate

