

1. SYNONYMS

CFR:	Phentermine
CAS #:	Base: 122-09-8 Hydrochloride: 1197-21-3
Other Names:	Duromine Ionamin Linyl Lipopill Mirapront Adipex-p Fastin

2. CHEMICAL AND PHYSICAL DATA

2.1. CHEMICAL DATA

Form	Chemical Formula	Molecular Weight	Melting Point (°C)
Base	C ₁₀ H ₁₅ N	149.2	Liquid at room temperature
Hydrochloride	C ₁₀ H ₁₅ N·HCl	185.7	198

2.2. SOLUBILITY

Form	A	C	E	H	M	W
Base	***	S	S	***	S	SS
Hydrochloride	***	VS	VSS	***	VS	VS

A = acetone, C = chloroform, E = ether, H = hexane, M = methanol and W = water, VS = very soluble, FS = freely soluble, S = soluble, PS = sparingly soluble, SS = slightly soluble, VSS = very slightly soluble and I = insoluble

3. SCREENING TECHNIQUES

3.1. COLOR TESTS

REAGENT	COLOR PRODUCED
Marquis	Orange

3.2. CRYSTAL TESTS

REAGENT	CRYSTALS FORMED
Bismuth iodide in H ₂ SO ₄	Red rods, with drying rods and dendritic clusters
Gold chloride in H ₃ PO ₄	Long serrated blades often spearheaded and some plates
Platinic chloride in H ₃ PO ₄	Yellow plates, square cut or elongated hexagons, low birefringence

3.3. THIN LAYER CHROMATOGRAPHY

Visualization

Acidified iodoplatinate spray

COMPOUND	Relative R _f	
	System TLC 5	System TLC 6
amphetamine	0.9	0.2
ephedrine	0.6	0.1
methamphetamine	0.6	0.4
phentermine	1.0	1.0
phenylpropanolamine	0.9	0.1
pseudoephedrine	0.7	0.1

3.4. GAS CHROMATOGRAPHY

Method PHEN-GCS1

Instrument:	Gas Chromatograph operated in split mode with FID
Column:	5% phenyl/95% methyl silicone 10 m x 0.32 mm x 1.5 µm film thickness
Carrier Gas:	Hydrogen at 35 cm/sec
Temperature:	Injector: 280°C Detector: 280°C Oven Program: 1) 120°C initial temperature for 2.0 min 2) Ramp to 280°C at 25°C/min 3) Hold final temperature for 1.5 min
Injection Parameters:	Split Ratio = 100:1, 1 µL injected

Samples are to be dissolved in 4:1 chloroform: methanol and filtered.

COMPOUND	RRT
dimethylsulfone	0.26
amphetamine	0.58
phentermine	1.00 (1.58 min)
methamphetamine	1.10
ephedrine	2.06
cocaine	4.52
heroin	5.42

3.5. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

Method PHEN-LCS1

Instrument:	High performance liquid chromatograph equipped with diode array
Column:	5 µm ODS, 4.6 mm x 150 mm at 35°C

Detector:	UV, 207 nm
Flow:	1.0 mL/min
Injection Volume:	3 µL
Buffer:	4000 mL water, 22.5 mL phosphoric acid adjusted to pH 2.3 with triethanolamine
Mobile Phase:	Buffer: acetonitrile 84:16

Samples are to be dissolved in methanol then filtered with a 0.45-micron filter.

COMPOUND	RRT	COMPOUND	RRT
dimethylsulfone	0.48	methamphetamine	0.87
pseudoephedrine	0.56	phentermine	1.00 (5.45 min)
amphetamine	0.73		

4. SEPARATION TECHNIQUES

Phentermine is most commonly seen in tablet form with only tablet binders present and can be separated by doing solvent washes. Several adulterants can be isolated from phentermine by the use of solvent washes. For example, caffeine is soluble 1 in 7 of chloroform, while phentermine is very soluble in chloroform.

5. QUANTITATIVE PROCEDURES

5.1. GAS CHROMATOGRAPHY

Method PHEN-GCQ1

Internal Standard Stock Solution:
0.20 mg/mL dimethylphthalate in methanol.

Standard Solution Preparation:
Accurately weigh and prepare a standard solution of phentermine hydrochloride at approximately 0.5 mg/mL using the internal standard stock solution.

Sample Preparation:
Accurately weigh an amount of sample into a volumetric flask and dilute with internal standard stock solution. If necessary, dilute the sample so the final concentration approximates the standard concentration or falls within the linear range.

Instrument: Gas Chromatograph operated in split mode with FID

Column: 5% phenyl/95% methyl silicone 10m x 0.32mm x 0.52µm film thickness

Carrier gas: Helium at 1.0 mL/min

Temperatures: Injector: 280°C
 Detector: 280°C
 Oven Program:
 1) 100°C initial temperature for 0.8 min
 2) Ramp to 200°C at 25°C/min
 3) Hold final temperature for 1.8 min

Injection Parameters: Split Ratio = 20:1, 1 µL injected

Typical Retention Time: Phentermine: 0.8 min
 Dimethylphthalate: 1.90 min

Linear Range: 0.1 to 1.5 mg/mL

Repeatability: RSD less than 1.2%

Correlation Coefficient: 0.9996

Accuracy: Error less than 5%

COMPOUND	RRT
phentermine	1.00 (0.80 min)
dimethylphthalate	2.37

5.2. CAPILLARY ELECTROPHORESIS

Method PHEN-CEQ1

Internal Standard Stock Solution:

0.2 mg/mL thiamine hydrochloride in 0.01 N HCl.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of phentermine at approximately 0.2 mg/mL using the internal standard stock solution.

Sample Preparation:

Accurately weigh an amount of sample into a volumetric flask and dilute with internal standard stock solution.

If necessary dilute the sample so the final concentration approximates the standard concentration or falls within the linear range. Filter sample with 0.45-micron filter.

Mode:	Free Zone
Column:	65 cm x 50 µm fused silica capillary
Run Buffer:	100 mM lithium phosphate buffer, pH 2.3 (Prepared by titrating 100 mM phosphoric acid with LiOH to pH 2.3)
Detector:	UV, 207 nm
Voltage:	30 kV
Temperature:	15°C air cooled
Injection:	5 s hydrodynamic at 50 mbar/sec
Run Time:	10 min
Rinse Time:	2.5 min
Linear Range:	0.366 - 1.85 mg/mL
Repeatability:	RSD of area less than 2.1%
Correlation Coefficient:	0.9998
Accuracy:	Error less than 5%

COMPOUND	RRT
thiamine	0.78
phentermine	1.00 (6.65 min)

6. QUALITATIVE DATA

See spectra on the following pages for [FT-IR](#), [Mass Spectrometry](#), [Nuclear Magnetic Resonance](#), and [Vapor Phase IR](#).

7. REFERENCES

Fulton, Charles C., Modern Microcrystal Test for Drugs, Wiley-Interscience.

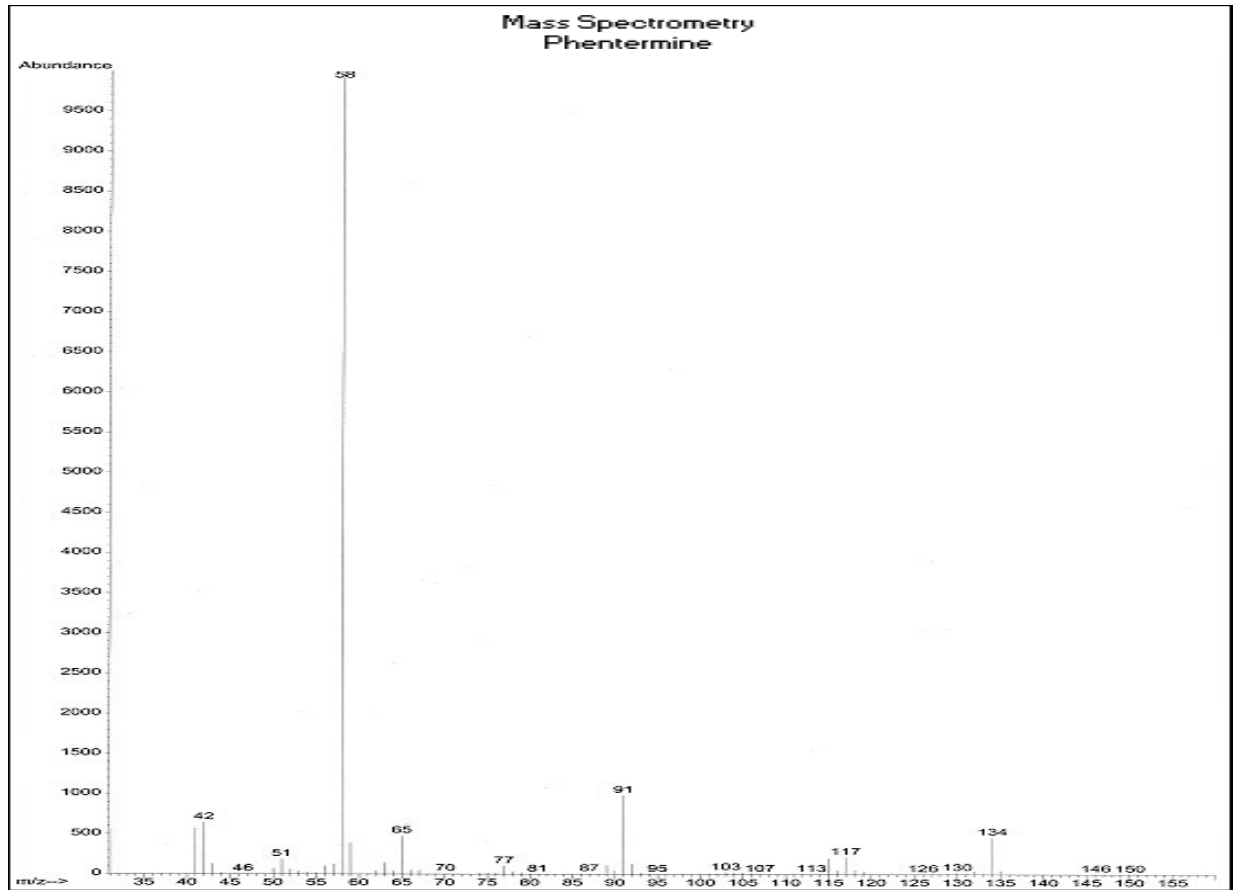
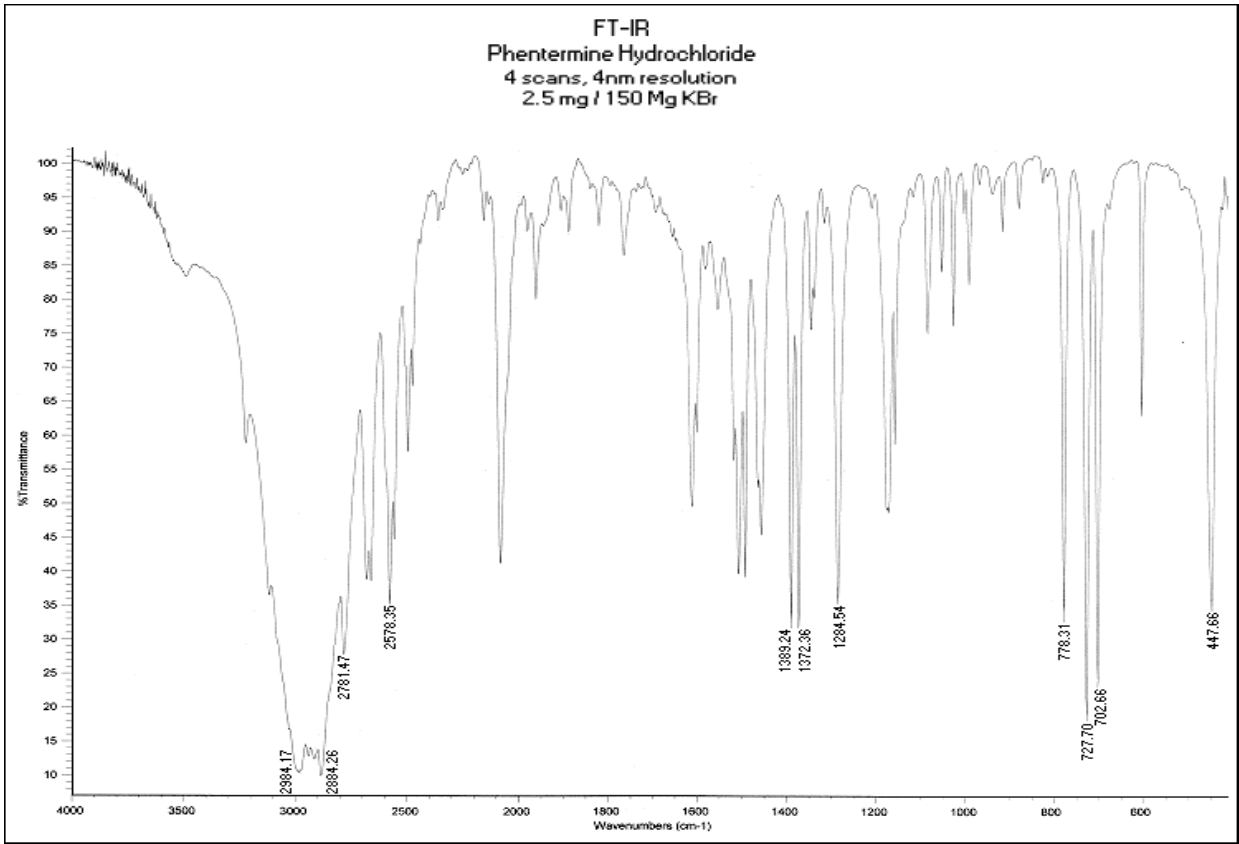
Moffat A. C., Sr. Ed., Clarke's Isolation and Identification of Drugs, The Pharmaceutical Press, London, Second Edition, 1996.

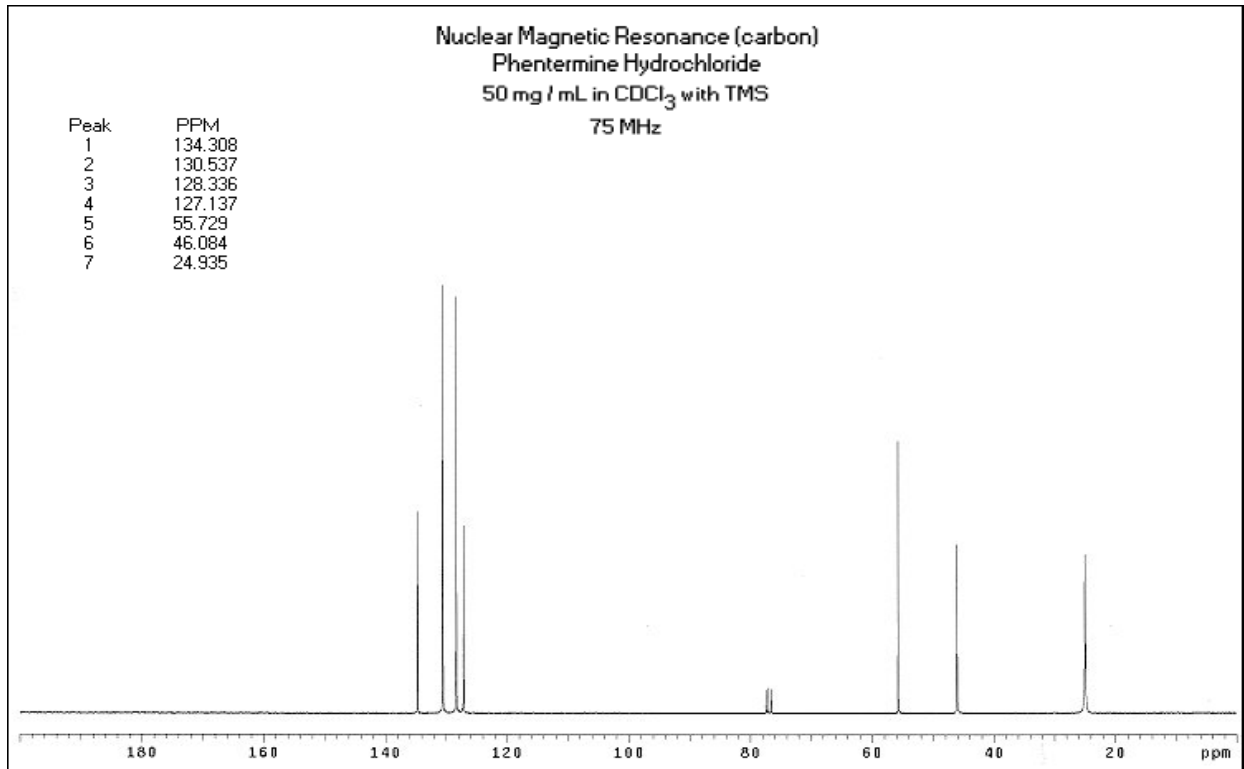
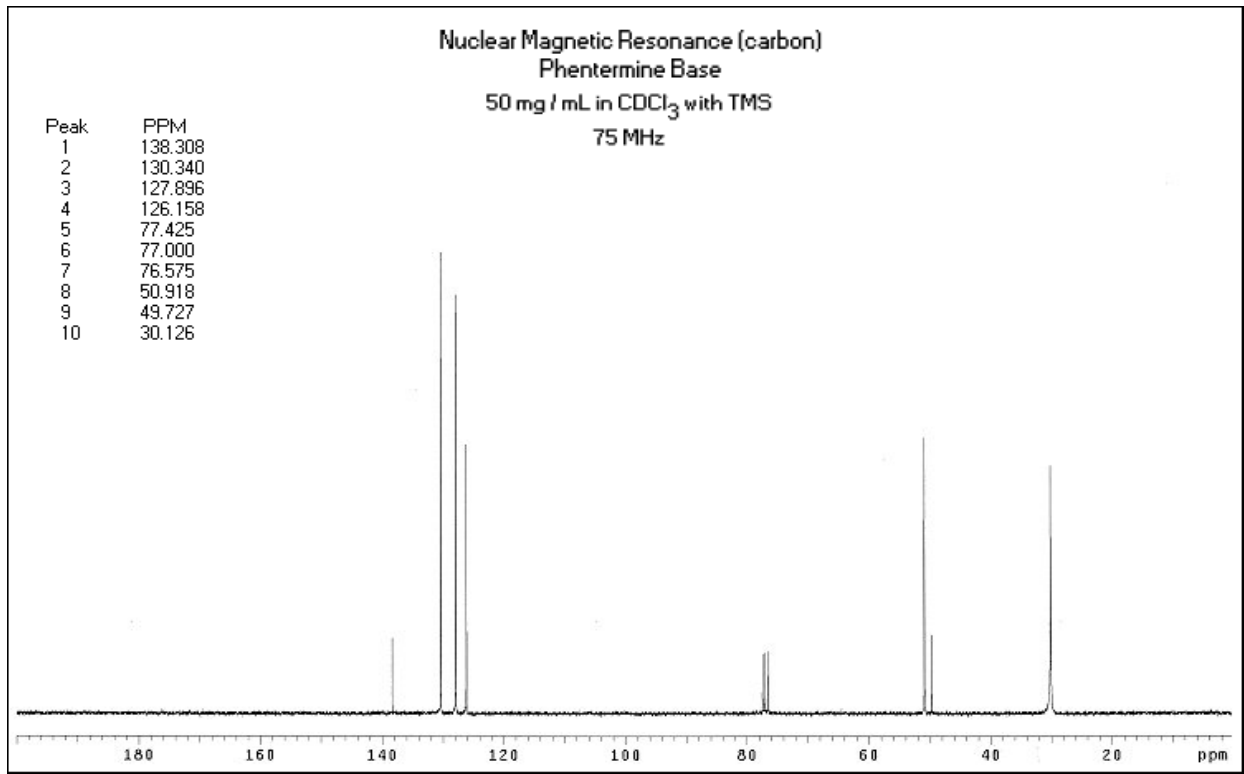
Martha Windholz, Budavari, S., The Merck Index, 10th Edition, Merck and Co., Inc., 1983, p. 1047.

8. ADDITIONAL RESOURCES

[Forendex](#)

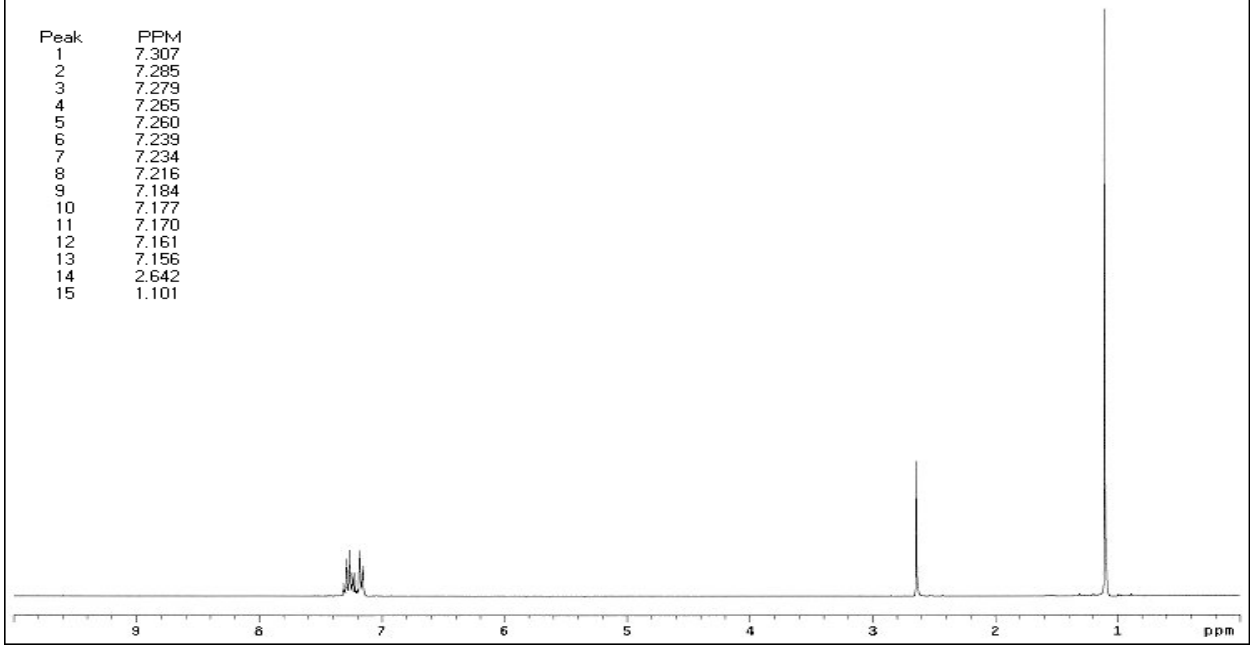
[Wikipedia](#)





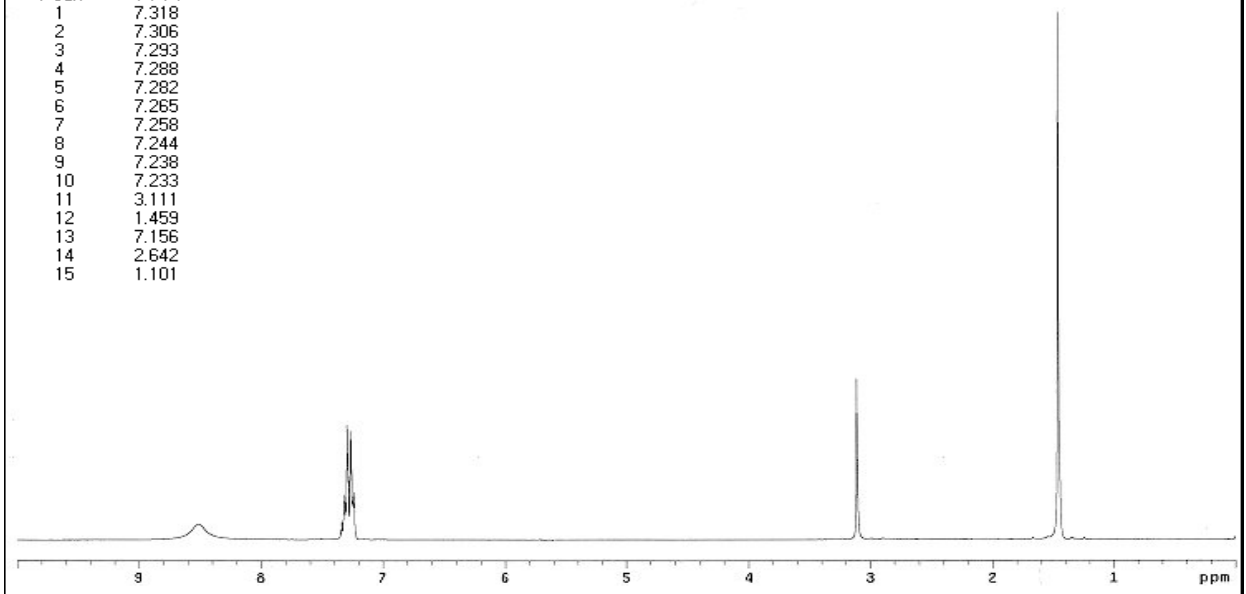
Nuclear Magnetic Resonance (proton)
Phentermine Base
10 mg / mL in CDCl₃ with TMS
300 MHz

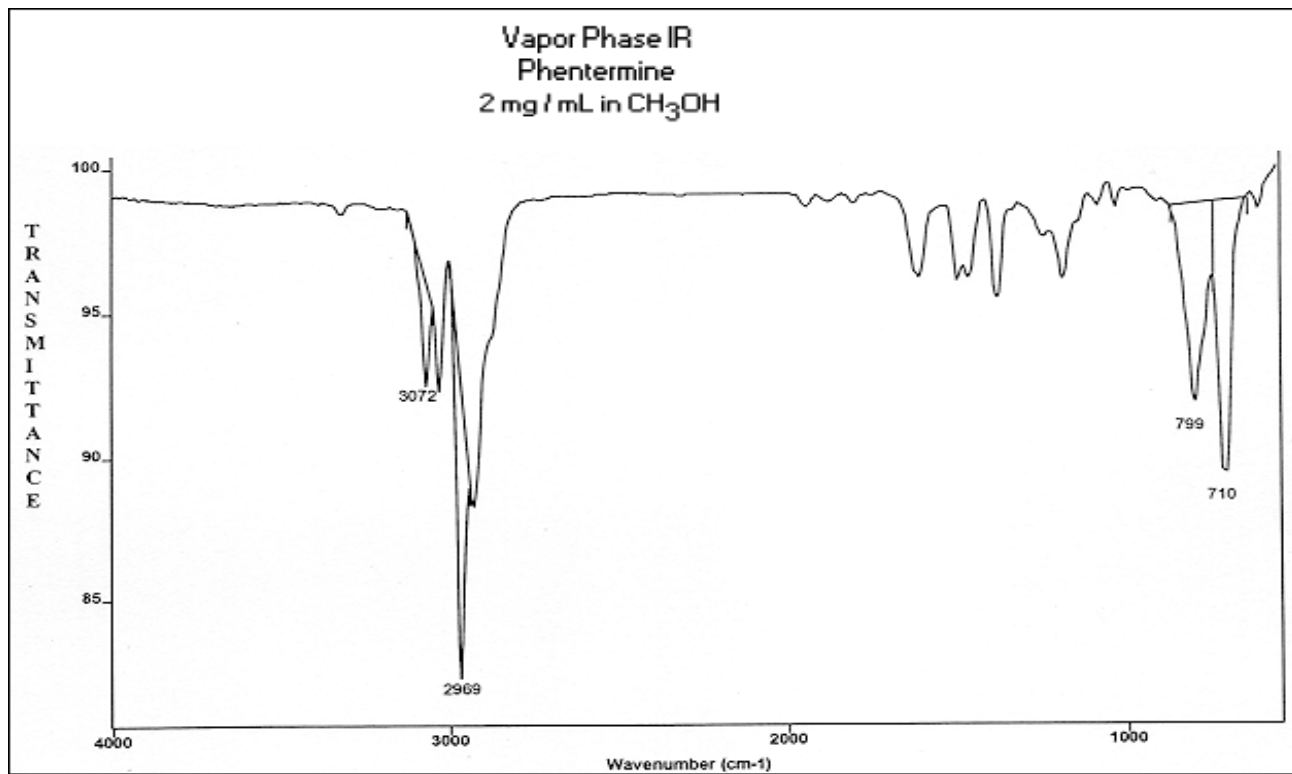
Peak	PPM
1	7.307
2	7.285
3	7.279
4	7.265
5	7.260
6	7.239
7	7.234
8	7.216
9	7.184
10	7.177
11	7.170
12	7.161
13	7.156
14	2.642
15	1.101



Nuclear Magnetic Resonance (proton)
Phentermine Hydrochloride
10 mg / mL in CDCl₃ with TMS
300 MHz

Peak	PPM
1	7.318
2	7.306
3	7.293
4	7.288
5	7.282
6	7.265
7	7.258
8	7.244
9	7.238
10	7.233
11	3.111
12	1.459
13	7.156
14	2.642
15	1.101





***No Data Available