

1. SYNONYMS

CFR: Cocaine

CAS #: Base: 50-36-2
Hydrochloride: 53-21-4

Other Names: (1R,2R,3S,5S)-2-Methoxycarbonyltropan-3-ylbenzoate
Methyl benzoylecgonine
Neurocaine
Benzoylmethyl ecgonine or benzoylmethylecgonine
 β -Cocaine
[1R-(exo, exo)]-3-(Benzyloxy)-8-methyl-8-azabicycol-[3.2.1]octane-2-carboxylic acid methyl ester
2- β -Carbomethoxy-3- β -benzoxytropane
3- β -Hydroxy-1- α -H,5- α -H-tropane-2- β -carboxylic acid methyl ester benzoate
Ecgonine methyl ester benzoate
Cocainium chloride
Myricaine
Cocaine muriate

2. CHEMICAL AND PHYSICAL DATA

2.1. CHEMICAL DATA

Form	Chemical Formula	Molecular Weight	Melting Point (°C)
Base	C ₁₇ H ₂₁ NO ₄	303.4	98.0
Hydrochloride	C ₁₇ H ₂₂ NO ₄ Cl	339.8	195.0

2.2. SOLUBILITY

Form	A	C	E	H	M	W

Base	FS	VS	FS	PS	FS	SS
Hydrochloride	VSS	FS	I	I	FS	FS

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
Acidified cobalt thiocyanate	Blue flaky precipitate
Household bleach	Base: floats HCl: white streamers
Scott's (works on HCl salt only)	Blue precipitate, then pink, then pink over blue
Modified Scott's	Blue precipitate, then pink, then pink over blue

3.2. CRYSTAL TESTS

REAGENT	RESULTS PRODUCED
Gold chloride	Serrated needles, long thin combs or ladders with branches, very characteristic
Platinic chloride	Delicate, feathery crystals

3.3. THIN-LAYER CHROMATOGRAPHY

Visualization

Acidified iodoplatinate spray

p-Dimethylaminobenzaldehyde (PDMAB)*

* yellow spot develops with PDMAB

COMPOUND	RELATIVE R ₁
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		System TLC13	System TLC14
acetaminophen	0.0	0.5	0.0
nicotinamide	0.1	0.5	0.0
caffeine	0.2	0.7	0.4
<u>procaine*</u>	0.6	0.8	0.4
benzocaine*	0.6	0.9	0.4
tetracaine*	0.7	0.9	0.6
lidocaine	0.9	1.0	0.9
cocaine	1.0	1.0	1.0

3.4. GAS CHROMATOGRAPHY

Method COC-GCSI

Instrument:

Gas chromatograph operated in split mode with FID

Column:

5% phenyl/95% methyl silicone 12 m x 0.2 mm x 0.33 µm film thickness

Carrier gas:

Helium at 1.0 mL/min

Temperatures:

Injector: 270°C
 Detector: 280°C
 Oven program:
 1) 175°C initial temperature for 1.0 min
 2) Ramp to 275°C at 15°C/min
 3) Hold final temperature for 3.0 min

Injection Parameters:

Split Ratio = 60:1, 1 µL injected

Samples are to be dissolved in chloroform and filtered.

COMPOUND	RRT	COMPOUND	RRT
benzoic acid	0.12	chlorpheniramine	0.78
nicotinamide	0.20	procaine	0.80
methylecgonidine	0.21	methaqualone	0.95

methylecgonine	0.27	norcocaine	0.96
benzocaine	0.32	Cocaine	1.00 (5.32 min)
ibuprofen	0.34	tetracaine	1.02
acetaminophen	0.41	tetracosane	1.14
phenacetin	0.42	codeine	1.19
amobarbital	0.45	<i>cis</i> -cinnamoylcocaine	1.20
pentobarbital	0.48	morphine	1.24
secobarbital	0.53	acetylcodeine	1.31
caffeine	0.58	<i>trans</i> -cinnamoylcocaine	1.32
diphenhydramine	0.62	O ⁶ -monoacetylmorphine	1.33
antipyrine	0.64	benzoylecgonine	1.41
lidocaine	0.64	heroin	1.44
aminopyrine	0.69	trimethoxycocaine	1.58
tropacocaine	0.73	quinidine	1.61
phenobarbital	0.72	quinine	1.62
theophylline	0.76		

Method SFL4 Screen

Instrument:

Gas chromatograph operated in split/splitless mode with FID or MS

Column:

5% diphenyl/95% dimethylpolysiloxane 30 m x 0.25mm x 0.25 µm film thickness

Carrier gas:

MS: Helium at 1.3 mL/min
FID: Hydrogen at 1.3 mL/min

Temperatures:

Injector: 250°C
FID Detector Temp: 300°C
MS Transfer Line: 280°C
Oven program:
1) 100°C initial temperature
2) Ramp to 295°C at 35°C/min
3) Hold final temperature for 6.43 min
Total run time: 12 min

Injection Parameters:Split Ratio = 100:1, 1 μ L injected

COMPOUND	RRT	COMPOUND	RRT
methyl benzoate	0.39	chlorpheniramine	0.90
benzoic acid	0.40	procaine	0.91
nicotinamide	0.53	norcocaine	0.98
anhydromethylecgonine	0.56	cocaine	1.00 (5.79 min)
tetradecane	0.57	tetracaine	1.01
methylecgonine	0.61	methyl arachidate	1.04
dimethylterephthalate	0.62	<i>cis</i> -cinnamoylcocaine	1.09
benzocaine	0.66	codeine	1.10
acetaminophen	0.71	morphine	1.13
phenacetin	0.72	acetylcodeine	1.17
caffeine	0.80	<i>trans</i> -cinnamoylcocaine	1.17
diphenhydramine	0.84	O ⁶ -monoacetylmorphine	1.18
methyl palmitate	0.85	benzoylecgonine	1.18
lidocaine	0.85	heroin	1.25
aminopyrine	0.86	quinine	1.39
theophylline	0.87	diltiazem	1.52
tropacocaine	0.89		

3.5. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY**Method COC-LCS1****Instrument:** High performance liquid chromatograph equipped with diode array**Column:** 5 μ m ODS, 150 mm x 4.6 mm**Detector:** UV, 210 nm**Flow:** 1.0 mL/min**Injection Volume:** 5.0 μ L

Buffer:

4000 mL distilled water, 10 g sodium hydroxide, 30.0 mL phosphoric acid and 8.0 mL hexylamine

Mobile Phase:

- 1) Initially, buffer: acetonitrile 98:2 for 2 min
- 2) Gradient to buffer: acetonitrile 80:20 over 12 min
- 3) Gradient to buffer: acetonitrile 60:40 over 13 min
- 4) Hold buffer: acetonitrile 60:40 for 5 min

Samples are to be dissolved in buffer: acetonitrile 90:10, sonicated, then filtered with a 0.45 µm filter.

COMPOUND	RRT	COMPOUND	RRT
isonicotinamide	0.14	tropacocaine	0.91
nicotinamide	0.15	benzoyl ecgonine	0.93
morphine	0.24	antipyrine	0.98
phenylpropanolamine	0.25	cocaine	1.00 (11.79 min)
ephedrine	0.30	acetylcodeine	1.02
aminopyrine	0.32	heroin	1.07
procaine	0.35	phencyclidine	1.28
amphetamine	0.38	aspirin	1.39
methamphetamine	0.43	diazepam	1.46
codeine	0.45	<i>trans</i> -cinnamoylcocaine	1.47
methylenedioxyamphetamine	0.49	phenobarbital	1.53
methylenedioxy-methamphetamine	0.53	tetracaine	1.54
lidocaine	0.55	phenacetin	1.56
quinine	0.57	diphenhydramine	1.57
O ⁶ -monoacetylmorphine	0.63	phenyl-2-propanone	1.59
acetaminophen	0.65	benzocaine	1.66
strychnine	0.80	amobarbital	1.96
caffeine	0.84	methaqualone	2.00
barbital	0.87	secobarbital	2.13

4. SEPARATION TECHNIQUES

Several adulterants can be isolated from cocaine by the use of solvent washes. For example, nicotinamide and acetaminophen are soluble in acetone while cocaine hydrochloride is only slightly soluble. Benzocaine is soluble in ether and cocaine hydrochloride is not. Procaine hydrochloride is only slightly soluble in chloroform while cocaine hydrochloride is very soluble.

5. QUANTITATIVE PROCEDURES

5.1. GAS CHROMATOGRAPHY

Method COC-GCQ1

Internal Standard Stock Solution:

0.6 mg/mL tetracosane in chloroform.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine (hydrochloride or base) at approximately 0.6 mg/mL using above 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.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

5% phenyl/95% methyl silicone 30 m x 0.32 mm x 0.25 μ m film thickness

Carrier gas:

Helium at 2.0 mL/min

Temperatures:

Injector: 280°C
Detector: 280°C
Oven program: 250°C isothermal

Injection Parameters:

Split Ratio = 50:1, 1 μ L injected

Typical Retention Time:

Cocaine: 2.79 min
Tetracosane: 3.36 min

Linear Range:

Base: 0.1 - 1.5 mg/mL
Hydrochloride: 0.1 - 1.8 mg/mL

Repeatability:

Base: RSD less than 0.3%
Hydrochloride: RSD less than 0.4%

Correlation Coefficient:

Base: 0.999
Hydrochloride: 0.999

Accuracy:

Base: Error less than 5%

Hydrochloride: Error less than 5%

COMPOUND	RRT	COMPOUND	RRT
nicotinamide	0.40	cocaine	1.0 (2.79 min)
benzocaine	0.49	tetracaine	1.0
caffeine	0.56	tetracosane	1.4
lidocaine	0.61	codeine	1.5
procaine	0.73		

Method COC-GCQ2**Internal Standard Stock Solution:**

0.6 mg/mL tetracosane in chloroform.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine (hydrochloride or base) at approximately 0.5 mg/mL using above 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.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

100% methyl siloxane 12 m x 0.20 mm x 0.33 µm film thickness

Carrier gas:

Helium at 1.0 mL/min

Temperatures:

Injector: 270°C

Detector: 280°C

Oven program: 230°C isothermal

Injection Parameters:

Split Ratio = 40:1, 1 µL injected

Typical Retention Time:

Cocaine: 2.18 min

Tetracosane: 3.52 min

Linear Range:

Base: 0.1 - 1.3 mg/mL

Hydrochloride: 0.1 - 1.4 mg/mL

Repeatability:

Base: RSD less than 0.6%

Hydrochloride: RSD less than 1.5%

Correlation Coefficient:

Base: 0.999
Hydrochloride: 0.999

Accuracy:

Base: Error less than 5%
Hydrochloride: Error less than 5%

COMPOUND	RRT	COMPOUND	RRT
nicotinamide	0.45	cocaine	1.0 (2.18 min)
benzocaine	0.49	tetracaine	1.01
caffeine	0.61	tetracosane	1.61
lidocaine	0.63	codeine	1.69
procaine	0.75		

Method COC-GCQ3

Internal Standard Stock Solution:

0.6 mg/mL tetracosane in chloroform.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine (hydrochloride or base) at approximately 0.6 mg/mL using above 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.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

5% phenyl/95% methyl silicone 12 m x 0.20 mm x 0.33 µm film thickness

Carrier gas:

Helium at 1.0 mL/min

Temperatures:

Injector: 270°C
Detector: 280°C
Oven program: 250°C isothermal

Injection Parameters:

Split Ratio = 60:1, 1 µL injected

Typical Retention Time:

Cocaine: 1.56 min

Tetracosane: 1.96 min

Linear Range:

Base: 0.1 - 2.0 mg/mL
Hydrochloride: 0.05 - 2.0 mg/mL

Repeatability:

Base: RSD less than 0.5%
Hydrochloride: RSD less than 1.6%

Correlation Coefficient:

Base: 0.999
Hydrochloride: 0.999

Accuracy:

Base: Error less than 5%
Hydrochloride: Error less than 5%

Method COC-GCQ4

Internal Standard Stock Solution:

4.8 mg/mL eicosane in chloroform. This solution will be diluted 2 mL to 10 mL for a final eicosane concentration of 0.96 mg/mL.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine hydrochloride at approximately 1.7 mg/mL using chloroform and above internal standard stock solution diluted 2 mL to 10 mL.

Sample Preparation:

Accurately weigh an amount of sample into a volumetric flask. Dilute the sample with chloroform and/or internal standard stock solution diluted 2 mL to 10 mL. If necessary, dilute the sample so the final concentration approximates the standard concentration making sure the final dilution contains the internal standard stock solution diluted 2 mL to 10 mL

Instrument:

Gas chromatograph operated in split mode with FID

Column:

5% phenyl/95% methyl silicone 12.5 m x 0.20 mm x 0.33 µm film thickness

Carrier gas:

Helium at 0.5 mL/min

Temperatures:

Injector: 270°C
Detector: 285°C
Oven program:
1) 215°C initial temperature for 9.0 min
2) Ramp to 260°C at 2°C /min
3) Hold final temperature for 2.0 min

Injection Parameters:

Split Ratio = 100:1, 1 µL injected

Typical Retention Time: Cocaine: 8.0 min
Eicosane: 3.7 min

Linear Range: 0.18 - 3.6 mg/mL

Repeatability: RSD less than 1.6%

Correlation Coefficient: 0.9999

Accuracy: Error less than 0.4%

COMPOUND	RRT	COMPOUND	RRT
phenylpropanolamine	0.14	caffeine	0.36
ephedrine	0.15	lidocaine	0.40
nicotinamide	0.15	aminopyrine	0.45
dimethylterephthalate	0.17	eicosane	0.47
benzocaine	0.20	cocaine	1.00 (8.0 min)
ibuprofen	0.21	tetracaine	1.01
acetaminophen	0.24		

Method SFL4cocaine1,3

Internal Standard Stock Solution:

1.00 mg/mL tetraphenylethylene (TPE) in methylene chloride.

Standard Solution Preparation:

Prepare a standard solution of cocaine within the linearity ranges listed below.

Sample Preparation:

Accurately weight an amount of sample into a volumetric flask so that the final cocaine concentration is approximately equivalent to that of the standard solution. Dilute to volume using the internal standard stock solution.

Method Considerations:

Baseline separation of cocaine and tetracaine must be observed in order to use this method.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

100% dimethylpolysiloxane gum, 30 m x 0.25 mm x 0.25 µm film thickness

Carrier gas: Hydrogen at 1.1 mL/min

Temperatures: Injector: 270°C
 Detector: 250°C
 Oven program: 260°C isothermal

Injection Parameters: Split Ratio = 100:1, 1 µL injected

Typical Retention Time: Cocaine: 2.3 min
 TPE: 3.3 min

Linear Range: Base: 0.19 – 11.3 mg/mL
 Hydrochloride: 0.11 – 10.0 mg/mL

Repeatability: Base: RSD less than 3%
 Hydrochloride: RSD less than 3%

Correlation Coefficient: Base: 0.9999
 Hydrochloride: 0.9998

Accuracy: Base: Error less than 3%
 Hydrochloride: Error less than 3%

COMPOUND	RRT	COMPOUND	RRT
phenylpropanolamine	0.55	diphenhydramine	0.72
dimethylterephthalate	0.57	procaine	0.80
benzocaine	0.58	cocaine	1.00 (2.3 min)
ibuprofen	0.59	tetracaine	1.02
caffeine	0.68	TPE	1.45
lidocaine	0.72		

Method SFL4cocaine2,4

Internal Standard Stock Solution:

1.00 mg/mL tetraphenylethylene (TPE) in methylene chloride.

Standard Solution Preparation:

Prepare a standard solution of cocaine within the linear ranges described below for cocaine.

Sample Preparation:

Accurately weight an amount of sample into an appropriately sized volumetric flask so that the final cocaine

concentration is approximately equivalent to that of the standard solution. Dilute to volume using the internal standard stock solution.

Method Considerations:

Baseline separation of cocaine and tetracaine must be observed in order to use this method.

Instrument: Gas chromatograph operated in split mode with FID

Column: 95% dimethyl-/5% diphenylpolysiloxane gum, 30 m x 0.25 mm x 0.25 µm film thickness

Carrier gas: Hydrogen at 2.5 mL/min

Temperatures: Injector: 265°C
Detector: 275°C
Oven program: 260°C isothermal

Injection Parameters: Split Ratio = 100:1, 1 µL injected

Typical Retention Time: Cocaine: 2.3 min
TPE: 3.5 min

Linear Range: Base: 0.32 – 10.5 mg/mL
Hydrochloride: 0.5 – 5.0 mg/mL

Repeatability: Base: RSD less than 3%
Hydrochloride: RSD less than 1%

Correlation Coefficient: Base: 0.9997
Hydrochloride: 0.9997

Accuracy: Base: Error less than 3%
Hydrochloride: Error less than 5%

COMPOUND	RRT	COMPOUND	RRT
phenylpropanolamine	0.55	diphenhydramine	0.72
benzocaine	0.58	procaine	0.80
ibuprofen	0.59	cocaine	1.00 (1.45 min)
caffeine	0.68	tetracaine	1.02
lidocaine	0.72	TPE	1.45

Method SFL4cocaine6,12

Internal Standard Stock Solution:

1.00 mg/mL tetraphenylethylene (TPE) in methylene chloride.

Standard Solution Preparation:

Prepare a standard solution of cocaine within the linearity ranges listed below.

Sample Preparation:

Accurately weight an amount of sample into an appropriately sized volumetric flask so that the final cocaine concentration is approximately equivalent to that of the standard solution. Dilute to volume using the internal standard stock solution.

Method Considerations:

Cocaine can be accurately quantitated in the presence of tetracaine using this method.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

50% dimethyl/50% diphenylpolysiloxane gum, 30 m x 0.25 mm x 0.25 μ m film thickness

Carrier gas:

Hydrogen at 1.4 mL/min

Temperatures:

Injector: 250°C
Detector: 275°C
Oven program: 275°C isothermal

Injection Parameters:

Split Ratio = 100:1, 1 μ L injected

Typical Retention Time:

Cocaine: 2.5 min
TPE: 4.3 min

Linear Range:

Base: 0.36-4.08 mg/mL
Hydrochloride: 0.2-5.3 mg/mL

Repeatability:

Base: RSD less than 1%
Hydrochloride: RSD less than 1%

Correlation Coefficient:

Base: 0.9997
Hydrochloride: 0.9992

Accuracy:

Base: Error less than 5%
Hydrochloride: Error less than 5%

COMPOUND	RRT	COMPOUND	RRT
phenylpropanolamine	0.41	caffeine	0.65
dimethylterephthalate	0.43	procaine	0.74

benzocaine	0.44	cocaine	1.00 (2.3 min)
ibuprofen	0.48	tetracaine	0.88
lidocaine	0.57	TPE	1.66
diphenhydramine	0.57		

Method SFLA cocaine^{7,8}

Internal Standard Stock Solution:

1.00 mg/ml tetraphenylethylene (TPE) in methylene chloride.

Standard Solution Preparation:

Prepare a standard solution of cocaine within the linearity ranges listed below.

Sample Preparation:

Accurately weight an amount of sample into an appropriately sized volumetric flask so that the final cocaine concentration is approximately equivalent to that of the standard solution. Dilute to volume using the internal standard stock solution.

Method Considerations:

This method cannot be used to quantitate cocaine in the presence of tetracaine.

Instrument:

Gas chromatograph operated in split mode with FID

Column:

95% dimethyl-/5% diphenylpolysiloxane gum, 15 m x 0.25 mm x 0.25 µm film thickness

Carrier gas:

Hydrogen at 3.7 mL/min

Temperatures:

Injector: 250°C
 Detector: 275°C
 Oven program: 275°C isothermal

Injection Parameters:

Split Ratio = 100:1, 1 µL injected

Typical Retention Time:

Cocaine: 2.5 min
 TPE: 4.3 min

Linear Range:

Base: 0.6-5.69 mg/mL
 Hydrochloride: 0.5-7.72 mg/mL

Repeatability:

Base: RSD less than 1%
 Hydrochloride: RSD less than 1%

Correlation Coefficient:

Base: 0.9997

Hydrochloride: 0.9992

Accuracy:

Base: Error less than 5%

Hydrochloride: Error less than 5%

COMPOUND	RRT	COMPOUND	RRT
phenylpropanolamine	0.41	caffeine	0.65
dimethylterephthalate	0.43	procaine	0.74
benzocaine	0.44	cocaine	1.00 (2.3 min)
ibuprofen	0.48	tetracaine	0.88
lidocaine	0.57	TPE	1.66
diphenhydramine	0.57		

5.2. HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

Method COC-LCQ1

Internal Standard Stock Solution:

0.3 mg/mL strychnine in mobile phase.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine (hydrochloride or base) at approximately 0.3 mg/mL using 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. Filter sample with 0.45 µm filter.

Instrument: High performance liquid chromatograph equipped with diode array

Column: 5 µm ODS, 150 mm x 4.6 mm

Detector: UV, 235 nm

Flow: 1.00 mL/min

Injection Volume: 5.0 µL

Buffer: 4000 mL distilled water, 10 g sodium hydroxide, 30.0 mL phosphoric acid and 8.0 mL hexylamine

Mobile Phase: Buffer: acetonitrile 80:20

Typical Retention Time: Cocaine: 3.68 min
Strychnine: 2.36 min

Linear Range: 0.062 - 1.5 mg/mL

Repeatability: RSD less than 0.3%

Correlation Coefficient: 0.999

Accuracy: Base: Error less than 2.5%
Hydrochloride: Error less than 3.5%

COMPOUND	RRT	COMPOUND	RRT
nicotinamide	0.38	heroin	0.78
phenylpropanolamine	0.44	cocaine	1.0 (3.68 min)
ephedrine	0.46	aspirin	1.2
procaine	0.48	tetracaine	2.1
acetaminophen	0.55	benzocaine	2.4
lidocaine	0.62		

Method SFL4coc10,11

Standard Solution Preparation:

Prepare a standard solution of cocaine within the linearity range listed below. Filter the solution with a 0.45 µm polypropylene filter.

Sample Preparation:

Accurately weigh an amount of sample into an appropriately sized volumetric flask so that the final concentration of cocaine is approximately equivalent to that of the standard solution. Dilute to volume with HPLC-grade methanol. Filter the solution with a 0.45 µm polypropylene filter.

Instrument: High performance liquid chromatograph equipped with UV/Vis detector

Column: 5 µm ODS, 150 mm x 4.6 mm

Detector: UV, 245 nm (BW 4nm) and Reference 450 nm (BW 100 nm)

Temperature:	30°C
Flow Rate:	1.0 mL/min
Injection Volume:	2.0 µL
Buffer:	pH 2.5 phosphate buffer
Mobile Phase:	50% buffer, 50% methanol l
Typical Retention Time:	2.54 min
Linear Range:	Base: 0.56 – 4.5 mg/mL Hydrochloride: 0.35 – 3.74 mg/mL
Repeatability:	Base: RSD less than 1% Hydrochloride: RSD less than 1%
Correlation Coefficient:	Base: 0.9990 Hydrochloride: 0.9999
Accuracy:	Base: Error less than 4% Hydrochloride: Error less than 4%

COMPOUND	RRT	COMPOUND	RRT
cocaine	1.00 (2.5 min)	tetracaine	1.6

5.3. CAPILLARY ELECTROPHORESIS

Method COC-CEQ1

Internal Standard Stock Solution:

0.3 mg/mL naphazoline in 100 mM sodium phosphate at pH of 4.5.

Standard Solution Preparation:

Accurately weigh and prepare a standard solution of cocaine hydrochloride or cocaine base at approximately 0.3 mg/mL using above 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.

Mode: Free zone

Column: 37 cm x 50 µm fused silica capillary

Run Buffer: 200 mM sodium phosphate buffer, pH 4.5

Detector: UV, 230 nm

Voltage: 20 kV

Temperature: 30°C liquid cooled

Injection: 2 s hydrodynamic

Run Time: 5 min

Rinse Time: 1 min

Typical Retention Time: Cocaine: 3.19 min
Naphazoline: 2.80 min

Linear Range: 0.025 - 0.6 mg/mL

Repeatability: RSD less than 2.0%

Correlation Coefficient: 0.999

Accuracy: Error less than 5%

COMPOUND	RMT	COMPOUND	RMT
amphetamine	0.79	<i>trans</i> -cinnamoylcocaine	1.11
methamphetamine	0.83	codeine	1.12
naphazoline	0.88	morphine	1.15
phenylpropanolamine	0.89	acetylcodeine	1.18
pseudoephedrine	0.90	O ⁶ -monoacetylmorphine	1.19
ephedrine	0.91	papaverine	1.21
diphenhydramine	0.92	heroin	1.23
procaine	0.95	noscapine	1.26
quinine	0.97	nicotinamide	>3.0
cocaine	1.00 (3.19 min)	acetaminophen	>3.0

lidocaine	1.04	caffeine	>3.0
thebaine	1.05	benzocaine	>3.0
<i>cis</i> -cinnamoylcocaine	1.06	phenacetin	>3.0
tetracaine	1.09	benzoylecgonine	>3.0
hydromorphone	1.09	aspirin	>3.0

6. QUALITATIVE DATA

6.1. ULTRAVIOLET SPECTROPHOTOMETRY

SOLVENT	MAXIMUM ABSORBANCE (NM)
Aqueous Acid	233, 275

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

7. REFERENCES

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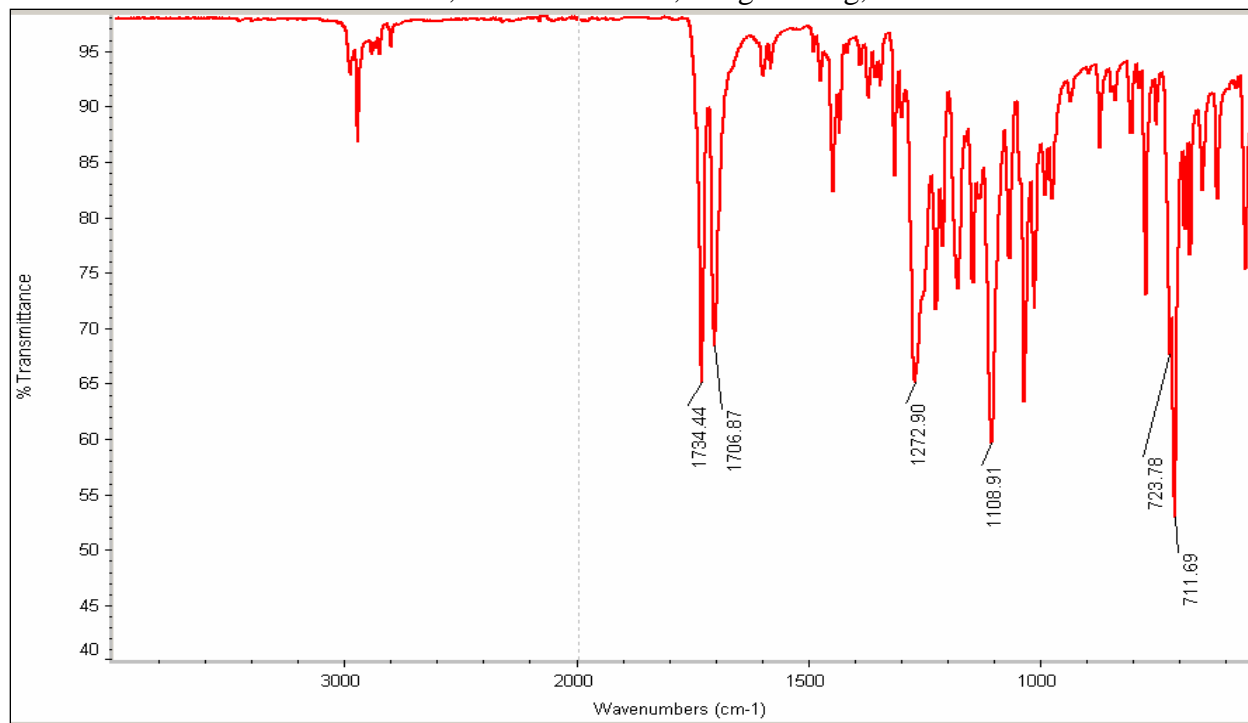
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8. ADDITIONAL RESOURCES

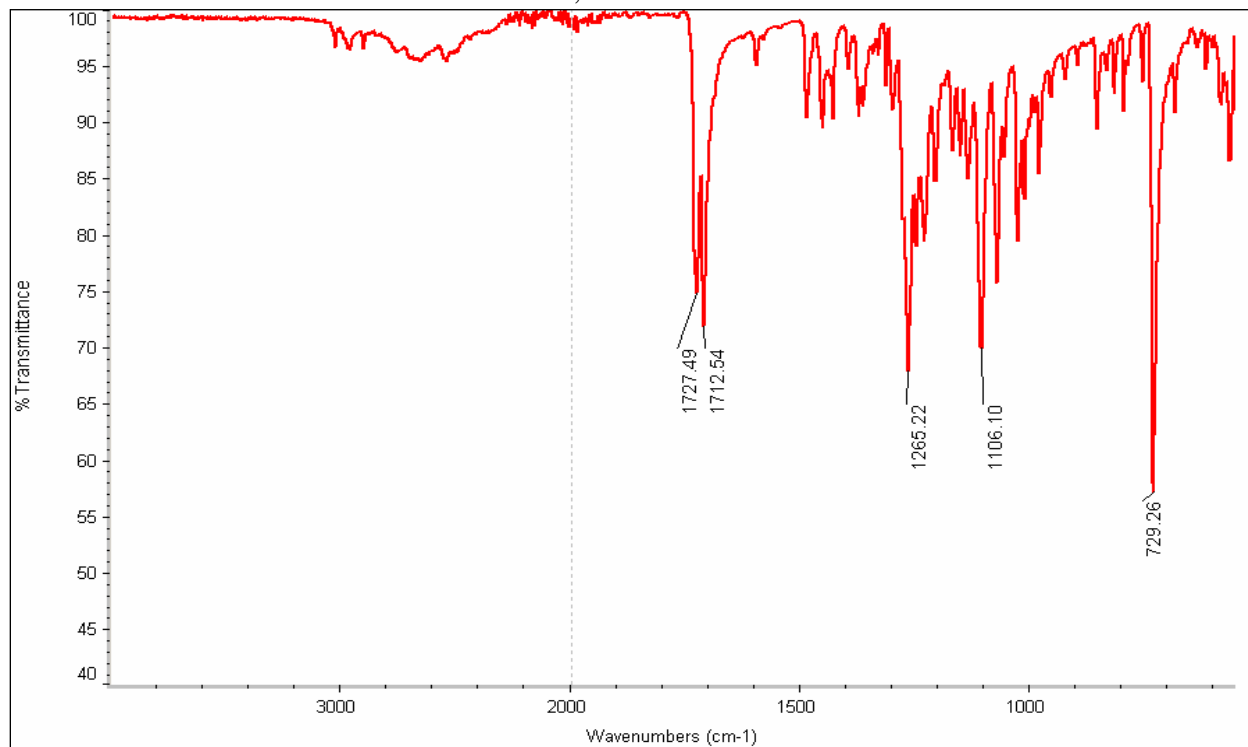
[Forendex](#)

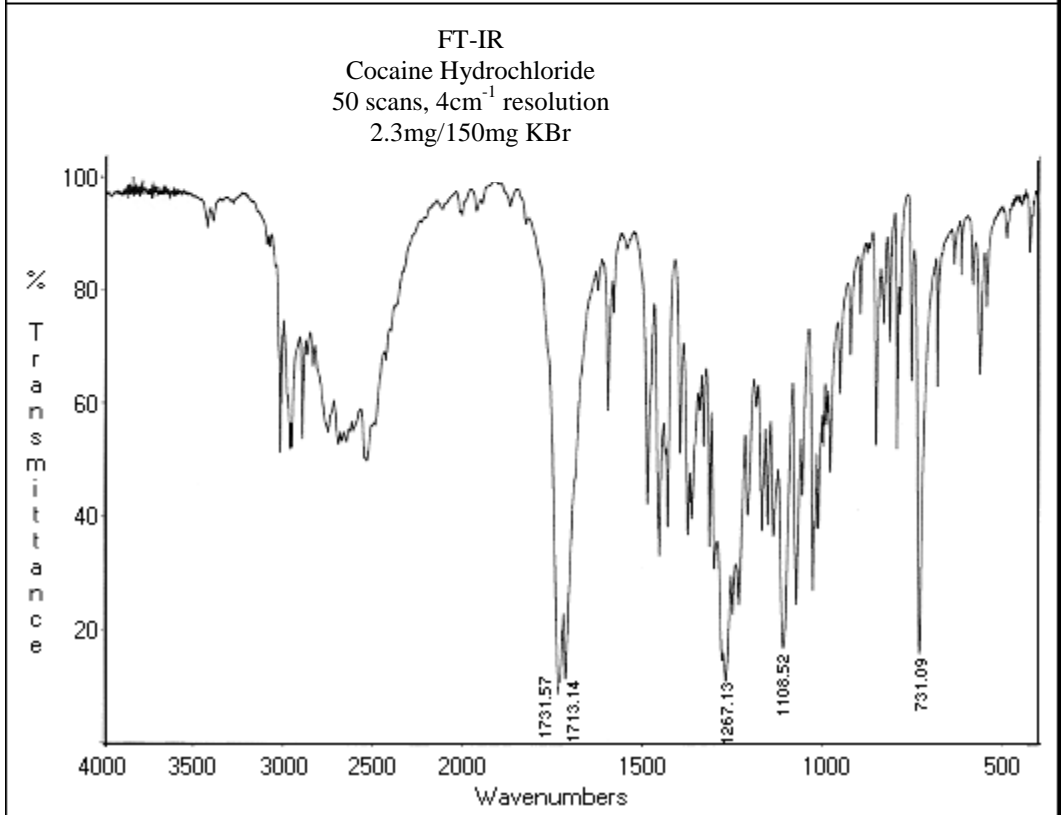
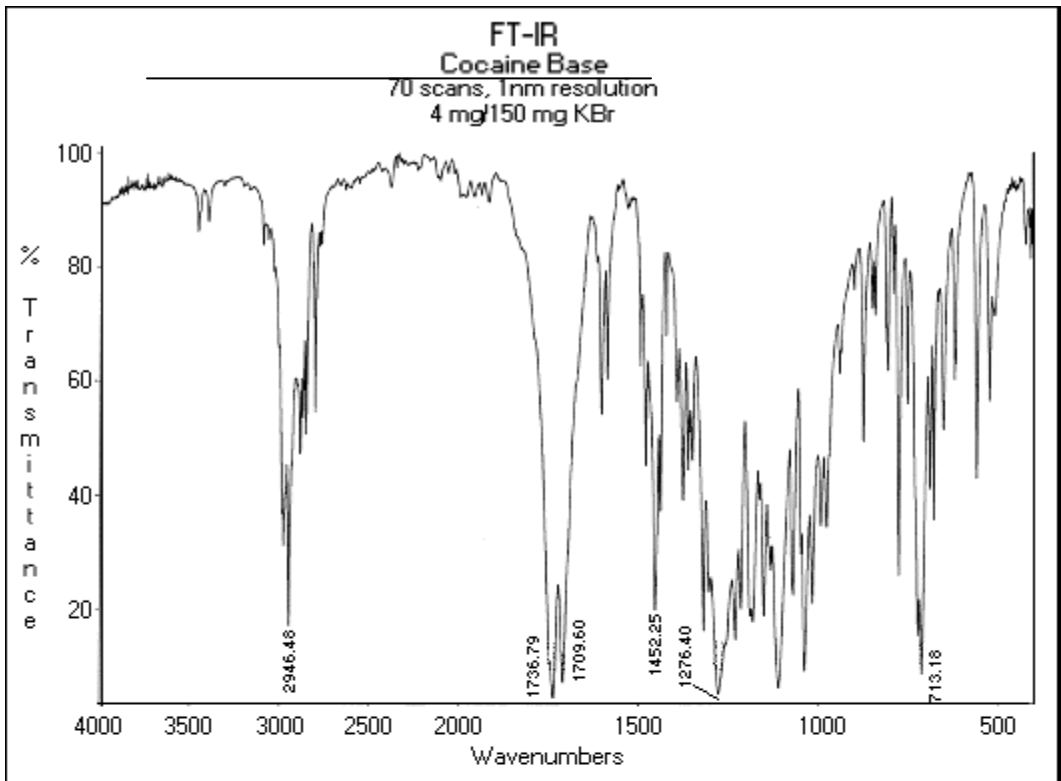
[Wikipedia](#)

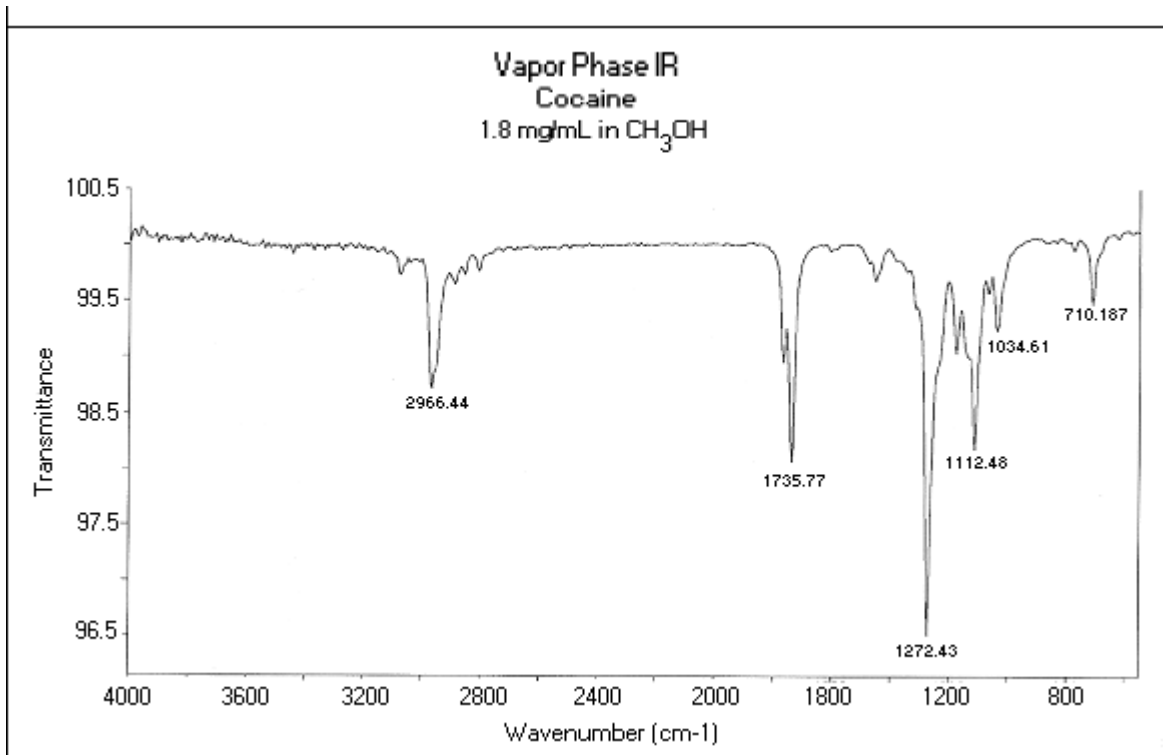
FTIR: Cocaine Base
70 scans, 4cm⁻¹ resolution, 4 mg/150 mg, KBr



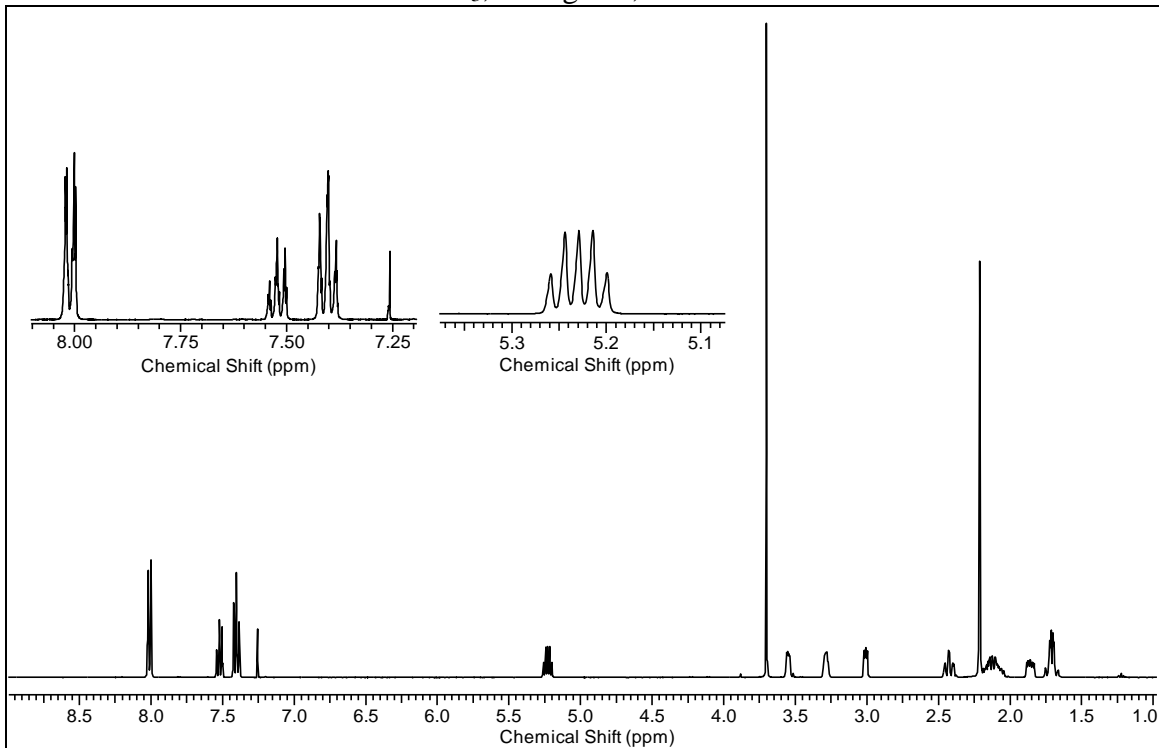
FTIR (3-bounce ATR): Cocaine HCl Lot #ENA-308
16 scans, 4 cm⁻¹ resolution



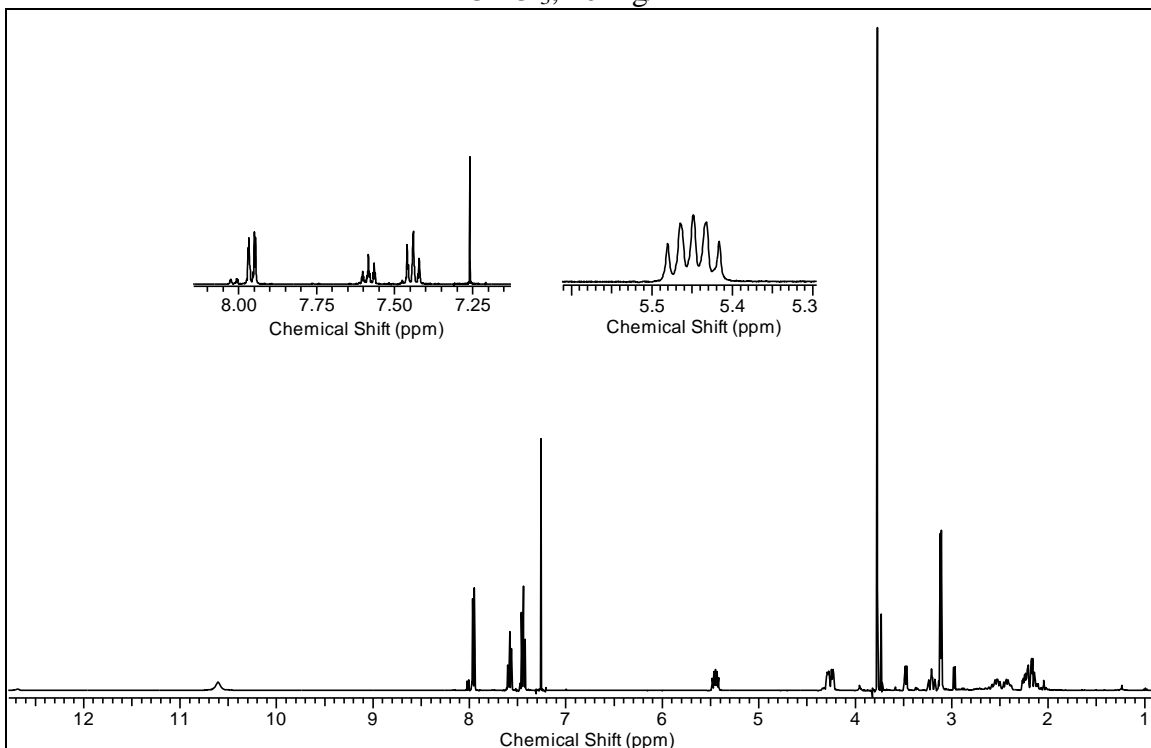




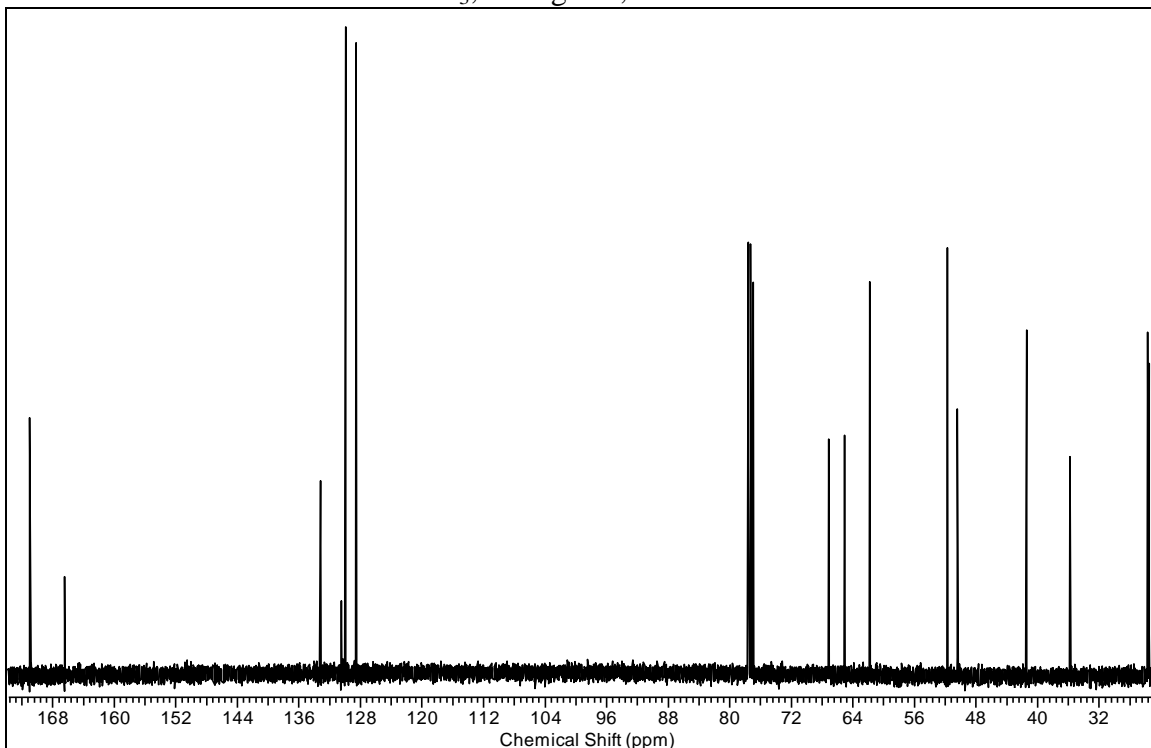
Nuclear Magnetic Resonance (Proton): Cocaine Base Lot # ENA-077
CDCl₃, 50 mg/mL, 400 MHz



Nuclear Magnetic Resonance (Proton): Cocaine Hydrochloride Lot #ENA-308
CDCl₃, 10 mg/mL



Nuclear Magnetic Resonance (¹³C): Cocaine Base Lot # ENA-077
CDCl₃, 50 mg/mL, 100.6 MHz



Nuclear Magnetic Resonance (^{13}C): Cocaine Hydrochloride Lot # ENA-308
 CDCl_3 , saturated, 100.6 MHz

