

History for the Cocaine SOP

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Approval

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Cocaine

Standard Operating Procedures

1.0.0 Background

Cocaine is one of many related alkaloids that can be extracted from the coca plant (*Erythroxylon coca*). Cocaine is a DEA controlled substance and can be identified using several different analytical techniques. General information about cocaine can be found in, "Erythroxylon Coca" a lecture by J.T. Maher 1976, DEA "Cocaine" by C. Van Dyke & R. Byck, Scientific American Vol. 246 number 3, 1982. "Topics in the Chemistry of Cocaine" by H.L. Schlesinger, Bulletin on Narcotics, Vol. XXXVII, No. 1, 1985 "Drug Identification Bible", 4th Edition, 1999.

2.0.0 Scope

The following analytical procedures are used to confirm the presence of cocaine in samples. Whenever possible, two different tests, and two different sampling events will be employed in confirming the presence of controlled substances. One of the tests must provide structural information, i.e. either MS, NMR, or FTIR.

3.0.0 Equipment and Reagents

The following pieces of equipment can be used in any combination to identify the analytes of interest.

3.1.0 A GC/MS and appropriate analytical software. Reference GC/MS SOP.

3.2.0 FTIR and appropriate analytical software. Reference FTIR SOP.

3.3.0 Polarizing microscope and reagents. Reference General Drug SOP.

4.0.0 Color Spot Tests

Cobalt thiocyanate is the most common spot test for cocaine. The base form of cocaine will not react with the cobalt thiocyanate. If the base form is suspected then a drop of HCl must be added to the sample. If cocaine is present then the turquoise precipitate will form.

Recipes for this reagent can be found in "Clarke's Isolation and Identification of Drugs" 2nd Edition, 1986.

5.0.0 GC/MS Sample Preparation and Analysis

5.1.0 Sample preparation.

5.1.1 Samples and standards are extracted directly using reagent grade solvent.

5.1.2 Samples and standards are dissolved in water, or weak acid, and then made basic with Na₂CO₃ or other strong base. Finally the solution is extracted using petroleum ether or hexane.

5.2.0 GC/MS analysis. The retention time of the sample should be within 0.04 minutes of a valid MS scan from the daily standard. ****NOTE**** The GC/MS is sensitive

to cocaine and care must be given to not overload the column and detector.

6.0.0 FTIR Sample Preparation Methods

- 6.1.0 Pick and Stick. Under a microscope cocaine appears as flat, mica like crystals. The cocaine can be separated from the cutting agent, added to KBr, and then formed into a pellet. This technique will often yield an IR pure spectra.
- 6.2.0 Cobalt Thiocyanate Derivative. To the sample add 2mls of the cobalt thiocyanate spot test reagent. Add 0.5 ml of concentrated HCl and mix well. Extract with chloroform and dry through Na₂SO₄ onto KBr. Let the chloroform evaporate and then make a pellet. Analyze and compare with a standard that was prepared the same way.
Reference: Naylor, Phillips, McCurdy, and Koers "A Simple Procedure for the Separation and Identification of Cocaine", Midwest Assoc. of Forensic Scientists Spring 1975 Meeting.
- 6.3.0 Direct. Grind some of the sample with KBr, and form a pellet.
- 6.4.0 Basic extraction and cleanup. Dissolve sample in water or weak acid. Make basic. Extract with appropriate non-polar solvent, and dry through Na₂SO₄. Bubble HCl through extract and filter precipitate. Let dry and then mix with KBr, grind, and form a pellet.
- 6.5.0 Extract with chloroform, or methylene chloride, filter, and then recrystallize.

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