

LABORATORY SERVICES BUREAU

Document: Controlled Substances Analysis Manual

Policy Number:
1535

Revision:
6

Subject: CS-SOP-24 Codeine

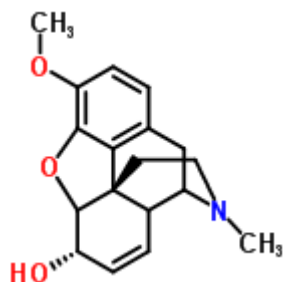
Approved:
Bell, Erica

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1. CODEINE

A. Structure, Empirical Formula, Molecular Weight



Codeine
 $C_{18}H_{21}NO_3$
MW 299.4

B. Synonyms: Methymorphine, morphine methyl ether

C. Trade Names: Codimal® PH syrup, Tylenol® with Codeine, Soma® with Codeine, Robitussin A-C® syrup, Robitussin-DAC syrup, Pediacof®, etc.

D. Drug Action: Narcotic analgesic

E. Common pharmaceutical/street forms: Tablets, capsules, cough syrups and suspensions for oral ingestion. It is most common in combination with acetaminophen and aspirin but is also available in combination with butalbital, carisoprodol, caffeine, guaifenesin, and promethazine hydrochloride. Codeine is present in opium in concentrations of 0.7-2.5%.

F. Solubility:

- (1) Free base: Chloroform, ethanol, methanol, slightly soluble in boiling water, insoluble in cold water and diethyl ether
- (2) Phosphate salt: Water, slightly soluble methanol, chloroform, and diethyl ether
- (3) Sulfate salt: Water, slightly soluble in methanol, insoluble in chloroform and diethyl ether

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G. Extraction:

- (1) Acid/base extraction for samples combined with acetaminophen or aspirin
 - (a) Determine amount of sample required for extraction based on the concentration of codeine in the sample.
 - (b) Grind tablet or remove liquid and place in a test tube.
 - (c) Add 0.2 N sulfuric acid.
 - (d) Extract with chloroform two times, discarding the chloroform, (bottom layer). If emulsions occur, the sample may be centrifuged.
 - (e) Basify the aqueous solution with 10% sodium hydroxide. Verify that the pH is basic.
 - (f) Extract with chloroform. If emulsions occur, the sample may be centrifuged.
 - (g) Remove the chloroform layer and place into a clean well.
 - (h) Repeat steps (f) and (g), combining the chloroform extracts.
 - (i) Evaporate the chloroform and reconstitute with C15 methanol.
- (2) Dry extraction for samples that do not contain acetaminophen or aspirin
 - (a) Dissolve in C15 methanol.
 - (b) Filter to remove any insoluble material if necessary.

H. Chemical indicator tests:

- (1) Marquis: Purple
- (2) Liebermann's: Black
- (3) Froehde's: Yellow-green
- (4) Mecke's: Blue/green

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- I. TLC:
 - (1) Mobile Phase:
 - (a) System 1: Chloroform:methanol (90:10)
 - (b) System 2: Methanol:conc. ammonium hydroxide (100:1.5)
 - (2) Locator: Acidified iodoplatinate, Dragendorff reagent, Marquis reagent
- J. GC/MS: Analyze using "Drugs1" program.
- K. Comments: Used for pain relief and as a cough suppressant.
- L. Report as: Codeine, a narcotic drug.
- M. References:
 - (1) Analytical Profiles of Narcotic Analgesics, CND Analytical, Inc., Auburn, AL, 1991.