

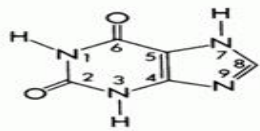


(Purine alkaloids)

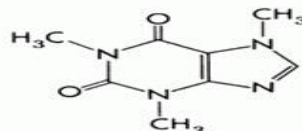
- Purines nucleus is a heterocyclic nucleus consisting of pyrimidine ring fused to 5-membered imidazole ring known as xanthine.
- Purines unlike other alkaloids don't give positive results with the general tests of alkaloids , instead muroxide test is used in its identification.

• **Purines are present as methylated compounds, which are:**

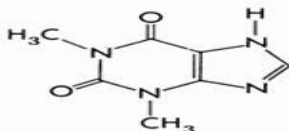
- 1. Caffeine (1, 3,7- tri methyl xanthine).
- 2. Theophylline (1,3-di methyl xanthine).
- 3. Theobromine (3,7- di methyl xanthine).



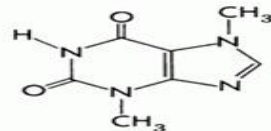
XANTHINE



CAFFEINE



THEOPHYLLINE



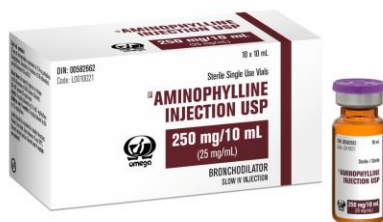
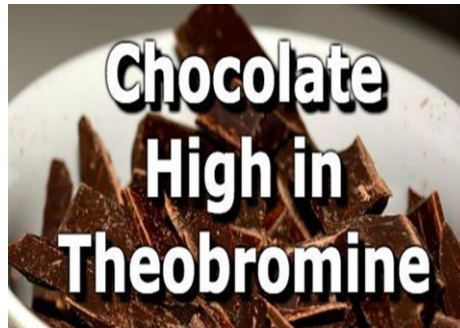
THEOBROMINE

• **Generally the pharmacological activities of these methylated compounds are:**

- Stimulation of the CNS.
- Diuretic effects.
- Increase gastric acid secretion.
- Relaxation of the bronchial smooth muscle (theophylline).
- Positive inotropic and chronotropic effect on the heart.

• **The most important plants in this group are :**

- **Coffee** (*Coffea arabica* of the family Rubiaceae): Contain about 1-2 % of caffeine.
- **Tea** (*Camellia sinensis* of the family Theaceae): Contain about 1-4 % of caffeine.
- **Cola** (*Cola nitida* of the family Sterculiaceae): Contain about 3.5 % of caffeine.

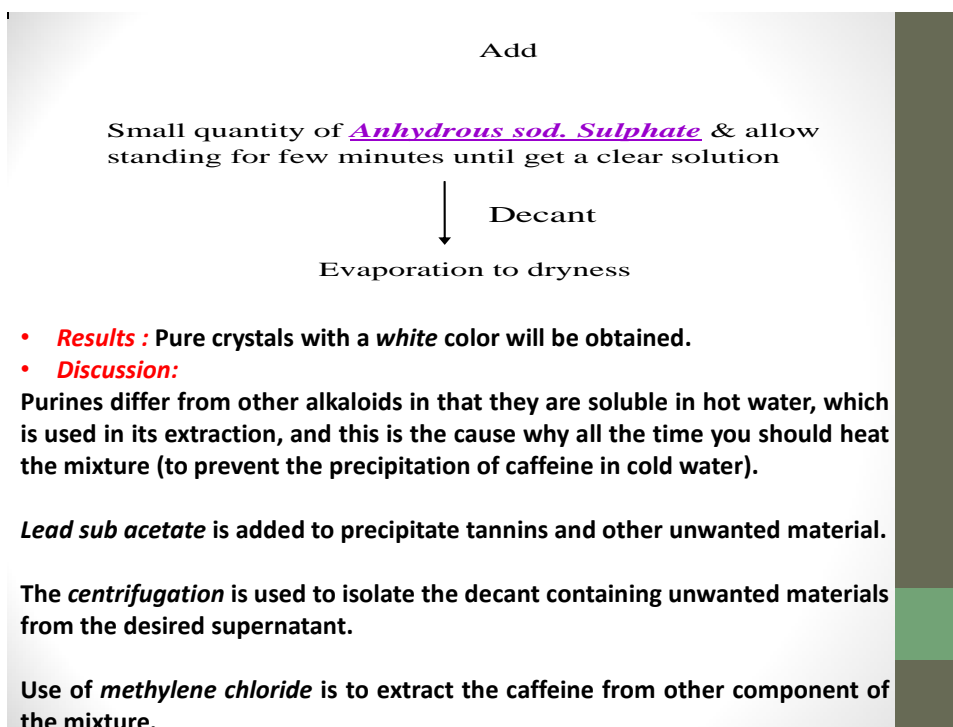
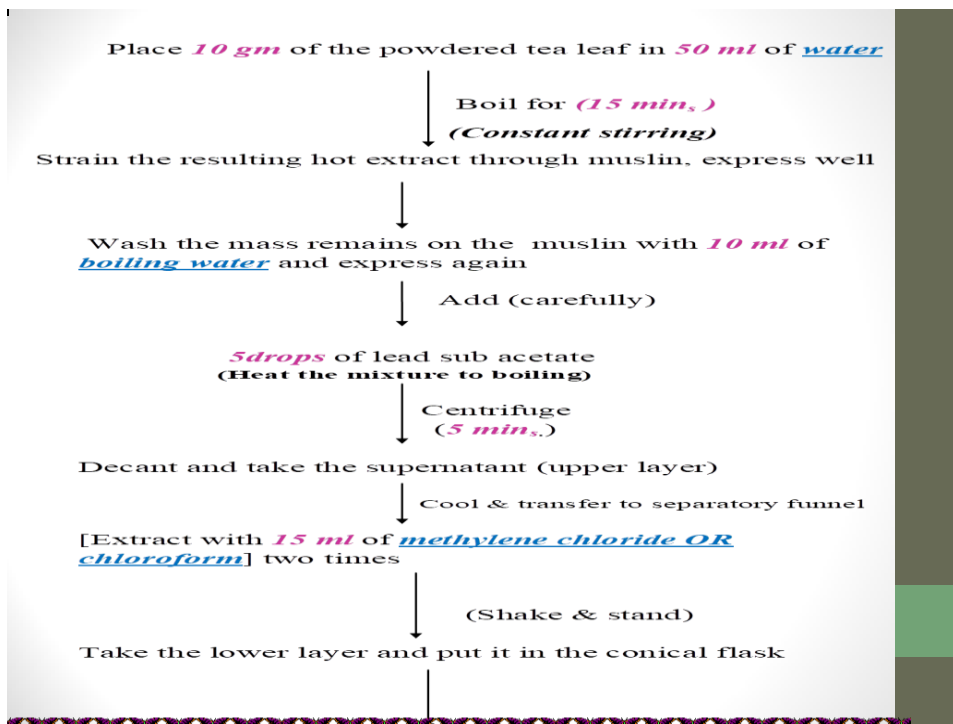


Isolation of The Caffeine From Tea

- **1. Extraction:**
- **Aim:** to isolate caffeine from tea leaves.
- **Equipments:**
 1. Large beaker & two medium size beakers.
 2. Two conical flasks.
 3. Centrifuge tubes & Centrifuge.
 4. Separatory funnel.
 5. Water bath.
 6. Muslin.
 7. Conical flask.
- **Reagents:**
 1. Sulphuric acid.
 2. Basic Lead acetate.
 3. Chloroform or methylene chloride.
 4. Hot 60 OC ethanol.

2. Procedure:

- **Method of extraction:** decoction.
- **Plant used:** *Camellia sinensis*
- **Part used:** dry leaves.



- **Quantitative and Qualitative Analysis of caffeine Crystals :**
- **Quantitative Analysis:** This is done by weighing the crystals of caffeine alkaloid.
- **Qualitative Analysis:**
- **1- The Specific Chemical Tests :**
- **The Murexide Test:**
- **Aim:** to identify the caffeine alkaloid (purine alkaloids) from other alkaloids.
- **Equipments and Reagents:**
- Porcelain dish.
- Water bath.
- Potassium chlorate ($KClO_3$).
- Conc .HCl.
- Ammonia vapor.
- **Procedure:**
- Take few crystals of ***caffeine alkaloid*** in porcelain dish and add small amount of ***potassium chlorate ($KClO_3$)***, then add ***2 drops of conc. HCl*** . Evaporate to dryness, then expose to ***ammonia vapor or add few drops of ammonium hydroxide solution*** .
- **Result:**
- **Purpule** color is produced with caffeine and other purine derivatives .
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Positive result for murexide test

• The Identification of purine (caffeine) Alkaloids By Chromatography

• **By the use of thin layer chromatography (T.L.C)**

- The stationary phase = *Silica gel GF₂₅₄*.
- The mobile phase = *ethyl acetate : Acetic acid (95:5)* Or *Acetone: Water: Ammonia (90:7:3)*.
- The standard compound = *caffeine*
- Mechanism of separation = *Adsorption*.
- Developing = *Ascending*.
- Detection: by UV instrument.

• **Procedure:**

- Prepare mobile phase, and place it in the glass jar.
- Cover the jar with glass lid and allow standing for *45 minutes* before use.
- Apply the sample and the standard spots on the silica gel plates, on the base line by the use of capillary tube.
- Put the silica gel plate in the glass jar and allow the mobile phase to rise to about *two-third* the plate.
- Remove the plate from the jar, dry and identified by U.V. 245 ,366 nm. Then calculate Rf values.

