Purine Alkaloids

Lab.6

6-3-2024

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Purine Bases

- Purines nucleus is a heterocyclic nucleus consisting of pyrimidine ring fused to 5-membered imidazole ring known as xanthine.
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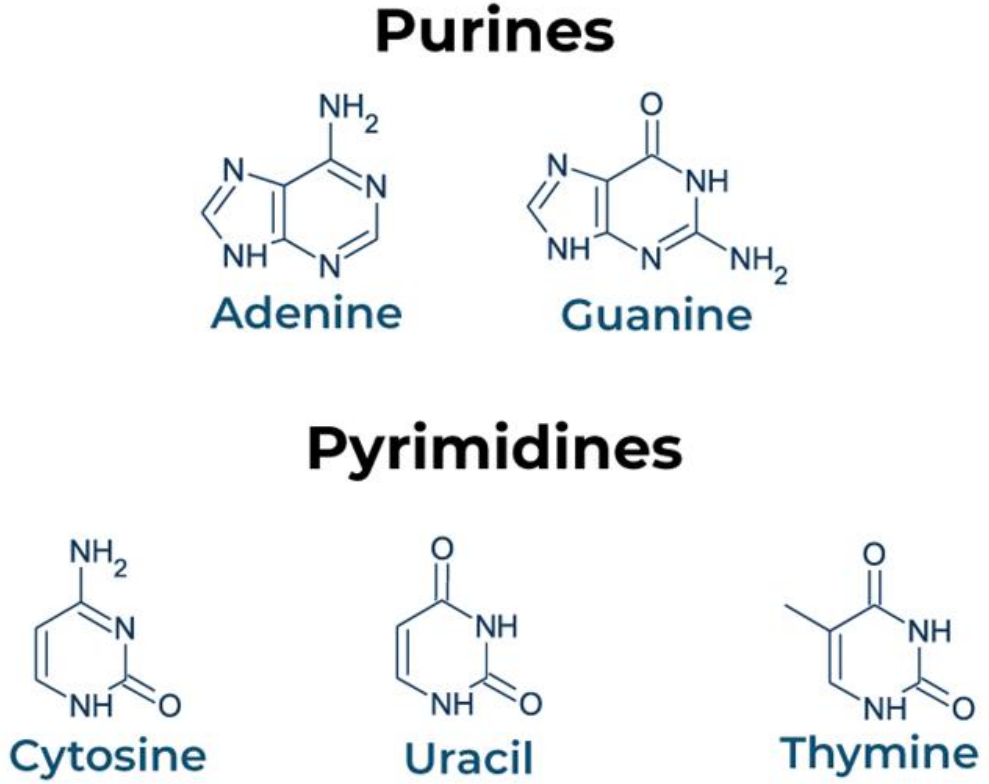
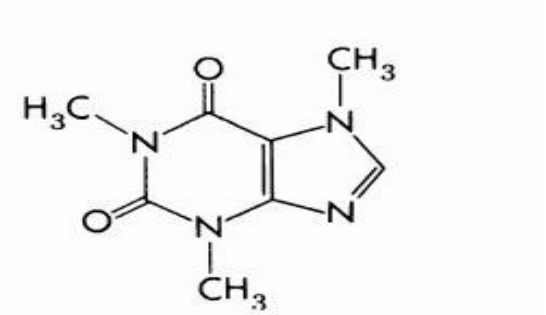
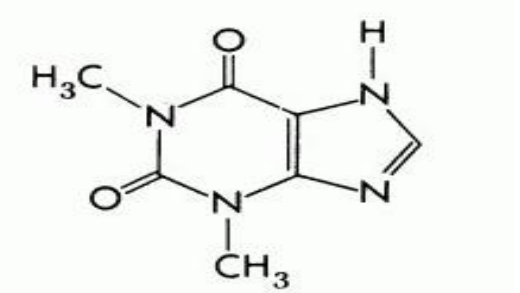


Purines are present as methylated compounds which are:

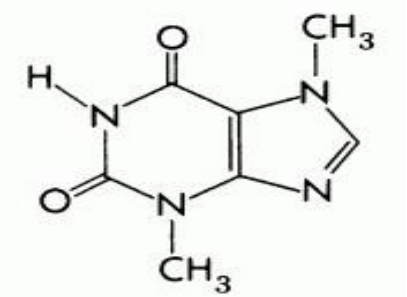
- 1. Caffeine (1, 3,7- tri methyl xanthine).
- 2. Theophylline (1,3-di methyl xanthine).
- 3. Theobromine (3,7- di methyl xanthine).



CAFFEINE



THEOPHYLLINE



THEOBROMINE

The pharmacological activities of these methylated compounds are:

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

The most important plants in this group are :



- 1. Coffee (Coffea arabica of the family Rubiaceae).

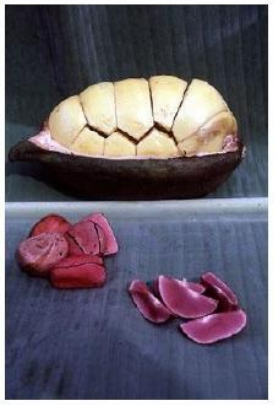
Contain about 1-2 % of caffeine.



- 2. Tea (Camellia sinensis of the family Theaceae).
- Contain about 1-4 % of caffeine.









- 3. Cola (Cola nitida of the family Sterculiaceae).
- Contain about 3.5 % of caffeine.

Isolation of The Caffeine From Tea:

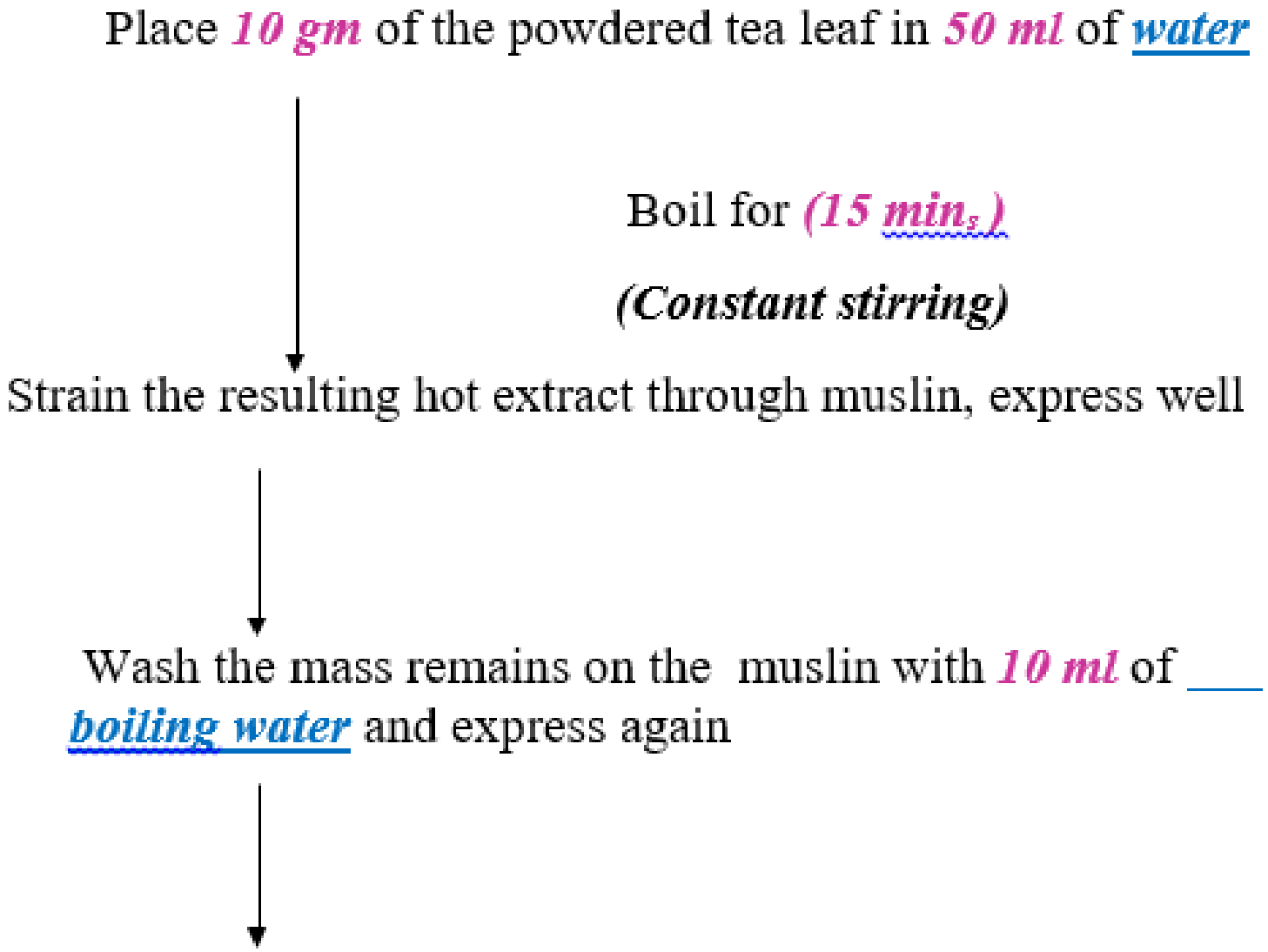
- **1.Extraction:**
- Aim: isolatation caffeine from tea leaves.
- **Equipment:**
- Large beaker & two medium size beakers.
- Two conical flasks.
- Centrifuge tubes & Centrifuge.
- Separatory funnel.
- Water bath.
- Muslin.
- Conical flask.

Reagents:

- Sulphuric acid.
- Basic Lead acetate.
- Chloroform or methylene chloride.
- Hot 60 0C ethanol.

2. Procedure:

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



2. Procedure:

Add (carefully)

5drops of lead sub acetate
(Heat the mixture to boiling)

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Centrifuge
(***5 min.***)

Decant and take the supernatant (upper layer)

↓

Cool & transfer to separatory funnel

[Extract with ***15 ml*** of ***methylene chloride OR chloroform***] two times

↓

(Shake & stand)

Take the lower layer and put it in the conical flask

↓

Add

Small quantity of ***Anhydrous sod. Sulphate*** & allow standing for few minutes until get a clear solution

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Decant

Evaporation to dryness

1. Results :

- Pure crystals with a white color will be obtained.



2. Discussion:

- 1. Purines differ from other alkaloids in that they are soluble in hot water, which is used in its extraction, and this is the cause why all the time you should heat the mixture (to prevent the precipitation of caffeine in cold water).
- 2. Lead sub acetate is added to precipitate tannins and other unwanted material.
- 3. The centrifugation is used to isolate the decant containing unwanted materials from the desired supernatant.
- 4. Use of methylene chloride is to extract the caffeine from other component of the mixture.