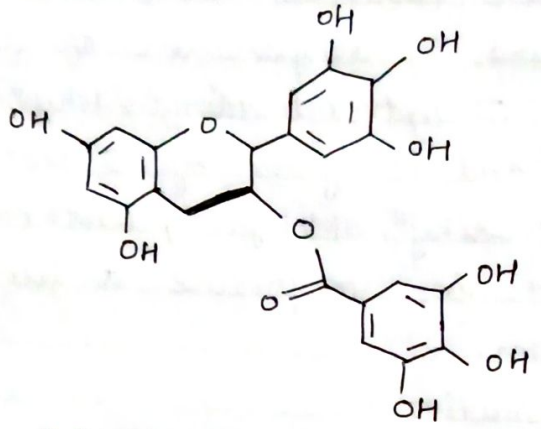
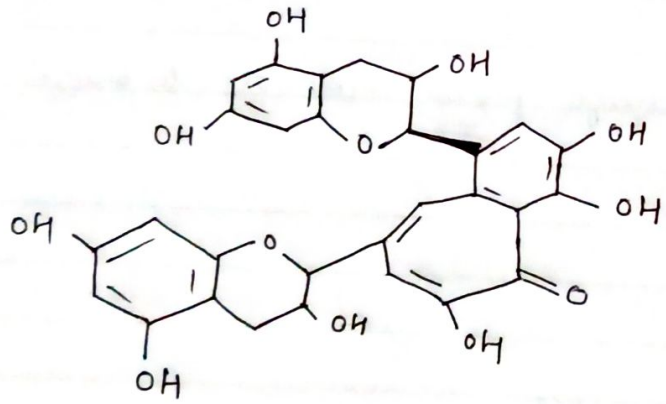


Epigallocatechin gallate (EGCG)

Green Tea component



Theaflavin

Black Tea component

Date 10.01.2022

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Aim: Extraction of Caffeine from tea leaves.

Apparatus Required: Beaker, standard flask, filter paper, bunsen burner, water bath, separation funnel.

Chemicals Required: Tea leaves, lead Acetate, chloroform, Sodium Sulphate.

Principles: Caffeine is an example of a class of compounds known as alkaloids, which usually contain C, H, N and O and are weak bases. Many products such as tea, coffee, chocolate contain caffeine. Caffeine is structurally similar to adenosine, a chemical of the central nervous system that promotes sleep. It stimulates signals that tell your body that it is time to rest and activates the responses necessary to engage in full and sustained sleep. In brain, caffeine appears as adenosine and binds to adenosine receptor sites. As a result, the brain doesn't detect adenosine and nerve activity doesn't slow down. Instead, caffeine increases brain activity, making us less sensitive to body's natural rhythms of weakfulness and sleep. with regular consumption, your CNS develops a dependency on the substance.

In the experiment, we extract the caffeine by boiling tea leaves. The difference in solubility of caffeine as compared to other molecules is used to extract caffeine in organic solvent. We also remove tannins and other materials and then the crude caffeine is purified by sublimation using the cold finger apparatus.

Teacher's Signature

Observations and calculations

Amount of crude caffeine obtained = 1.67g

Amount of purified caffeine obtained = 1.22g

$$\text{Percentage purity} = \frac{\text{weight of purified compound}}{\text{weight of crude compound}} \times 100$$

$$= \frac{1.22}{1.67} \times 100 = 73.05\ \%.$$

Date _____

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Procedure :

1) Take 100 ml distilled water in a 250 ml conical flask.
2) Add 10g of tea leaves and boil it roughly for 10 minutes.
3) Filter the mixture carefully in hot condition to get tea extract.
4) To this extract, add 10 ml of 10% lead acetate and mix it thoroughly. You will see a quick precipitation.
5) Filter the mixture to obtain the aqueous extract.
6) Transfer the extract to a 125 ml separating funnel and add 20 ml of chloroform or dichloromethane. Shake it well and separate the organic layer. The organic solvent creates pressure during shaking. To release the pressure, open the lid before you shake the mixture again. Collect the organic layer in a 250 ml beaker.
7) Repeat the extraction with additional 15 ml portions of organic solvent.
8) Combine all the organic extracts and dry with sodium sulphate. Filter and remove the solvent by evaporation.

Results :

1) Caffeine was extracted from tea leaves.
2) Obtained compound was purified using sublimation.
3) Percentage purity = 73.05%

~~Observations~~ Precautions :

1) Don't inhale chloroform vapours.
2) Handle glassware with care.

Teacher's Signature _____