

C142 (Experiment no.)

ROLL NO. -----

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EXTRACTION OF CAFFEINE FROM TEALEAVES

AIM - TO extract Caffeine –an alkaloid, from Tea leaves

Theory

Caffeine(1,3,7-trimethylxanthine) is an example of alkaloids, a natural product, generally produced by plants. These compounds usually contain C,H, O and N and some weak bases. In this experiment , you will extract caffeine from tea leaves using dichloromethane. Here we take advantage of the same principles we used in the thin layer chromatography , especially “ like dissolves like”. Methylenechloride is a liquid but it is not like water so they form two layers just like vinegar and oil. The caffeine molecules dissolve in methylenechloride layer. The two layers then can be separated, and the methylenechloride , which has a very low boiling point can be evaporated in the hood , leaving a residue of caffeine.

Materials Required:

Tealeaves, sodium carbonate, methylenechloride, sodium sulphate, Beakers (100ml) funnel, glass rod whatmann filter paper no.40, hotplate

Procedure

1. Add 5g of tealeaves to 50ml of boiling water. Allow to stand for 10 minutes with occasional stirring.
2. Decant the solution and keep it.
3. Repeat extraction twice with 25ml of boiling water each time. combine all the solutions (tea extract) and boil for 15 minutes.
4. Cool the solution to room temperature.

5. Add 2g of sodium carbonate so as to precipitate most of the tannins. This will react with some of the coffee extract and make them extremely water soluble. Swirl the mixture until all the sodium carbonate dissolves.
6. Add 25ml of methylene chloride (CH_2Cl_2), and vigorously swirl the mixture for 10 minutes. Do not shake the mixture as an emulsion will form.
7. Allow the mixture to stand and separate into two layers, a dark aqueous top layer and clear organic bottom layer.
8. Separate the organic layer (lower layer) using separating funnel and extract the aqueous layer with two additional 15 ml of dichloromethane.
9. Collect all the organic layers in 50ml Erlenmeyer flask. To this solution add a scoop of anhydrous Na_2SO_4 in order to remove the last traces of water.
10. Transfer the dried solution to a 50ml beaker and evaporate the dichloromethane on a warm hot plate kept in fume hood. When a fraction of milliliter of liquid is left, remove the beaker from the hotplate. Allow the beaker to stand in the hood for a minute or two. The heat remaining in the glass will cause the last amount of ethylenechloride to evaporate and produce a solid residue of crude caffeine.
11. Weigh the crude caffeine and calculate the yield.

Yield=-----