

EXPERIMENT NO- 8

TO EXTRACT CAFFEINE FROM TEA POWDER AND IDENTIFY BY THIN LAYER CHROMATOGRAPHY METHOD (TLC).

AIM OF THE EXPERIMENT:

To extract Caffeine from Tea powder and identify by Thin Layer Chromatography Method (TLC).

Requirements:

1. Chemicals: Methanol, ethanol, Isopropyl alcohol, n-butyl alcohol, Iso butyl alcohol, silica gel.
2. Apparatus: Beaker, Stirrer, Measuring Cylinder, glass plate

Theory:

Caffeine is 1,3,7- trimethylxanthine purine base obtained from powder of leaves of plants like coffee, tea, cocoa and *Thea sinensis* leaves (Theaceae family). It provides a dietary source of biologically active compounds considered to be beneficial to human health. Green tea extract contains polyphenols and caffeine. Caffeine is a heterocyclic (i.e., has atoms other than carbon in a ring) amine found in many plant materials including tealeaves, coffee beans, kola nuts, cocoa beans, and guarana seeds. Compounds found in nature are referred to as "natural products" and amine natural products are called alkaloids. Hence, caffeine is an alkaloid. Many alkaloids, including caffeine, have pharmacological effects. Some other examples are morphine, codeine, cocaine, and nicotine.

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EXTRACTION PROCEDURE:

The coarse powder of tea leaves is extracted with boiling water with occasional stirring and filtered while hot.

2. The warm extract is treated with lead acetate to precipitate tannins and filtered.
3. The excess lead acetate is precipitated as lead sulphate on the addition of dil. Sulphuric acid.
4. Filter the solution and add charcoal to remove colouring matter.
5. Filter again. Take this filtrate in separating funnel extract with three portion of chloroform with shaking.
6. Separate and combine the chloroform layers and evaporate to precipitate white crystals of caffeine.

Calculation

$$\% \text{ yield} = \frac{\text{Practical yield}}{\text{Theoretical yield}} \times 100$$

$$= \frac{0.822}{1.0} \times 100 = 82.2\%$$

$$R_f \text{ value} = \frac{\text{Distance travelled by solute}}{\text{Distance travelled by solvent}}$$

$$= \frac{3.4}{4.7} \approx 0.72$$

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7. Recrystallise the crystals with alcohol and dried and calculate the percentage yield.

IDENTIFICATION BY TLC :

Caffeine is identified by thin layer chromatography by using silica gel as stationary phase and Ethyl acetate: methanol: water (100:13.5:10) as mobile phase. After drying the TLC plate,

Caffeine was detected under visible light, at 0.23 Rf value by spraying dragendroff reagent (dark brown colour).

Result:-

The percentage yield of caffeine from tea powder was found to be 6.548%.
The Rf value of extract of caffeine from tea powder was found to be 0.72



Signature of Faculty

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