PHARMACOPEIA ANALYSIS OF CAFFEINE
ISOLATION OF CAFFEINE
QUANTIFICATION OF CAFFEINE USING COLORIMETRIC METHOD

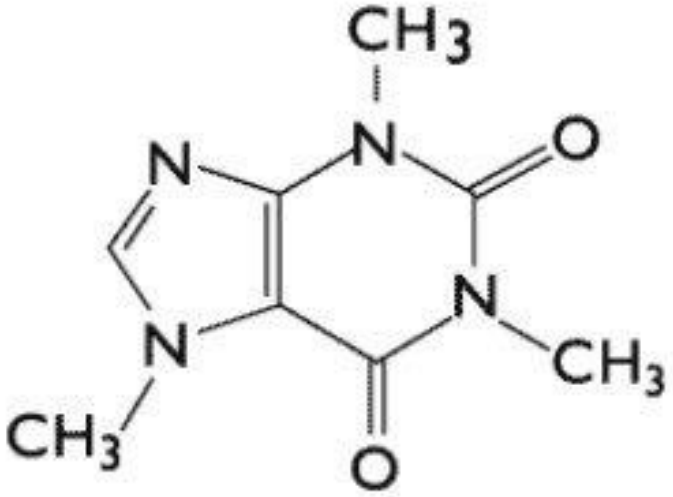
PHARMACOGNOSY-III PRACTICE
(2020)

- Pharmacopoeia: A book published usually under the jurisdiction of the government and containing a list of drugs, their formulas, and methods for making medicinal preparations, requirements and tests for their strength and purity, and other related information. (European Pharmacopoeia, Turkish Pharmacopoeia-Adaptadion of European Pharmacopoeia etc)

- Pharmacopoeia Analysis: It is an analysis to determine whether the active substances or excipients used in pharmaceutical preparations comply with the standards reported in the pharmacopoeia.

Experiments

- Description
- Solubility
- Identification reactions
- Foreign alkaloids



1,3,7-trimethylxanthantine

COFFEINUM (TF 1974)

DESCRIPTION

- White
- Crystal structure
- Bitter

SOLUBILITY

- Water
- Ethanol
- Ether
- Chloroform

IDENTIFICATION REACTIONS

Identification Reaction A

Murexide Test

Caffeine+ HCl + $KClO_3$ (1ml) (≈0.1 g) → Evaporate to dryness (in water bath)

↓

The capsules are exposed to NH_3 vapour.

↓

Purple color is formed.

← This color disappears with the addition of alkali

Identification Reaction B

The solution in water forms a white precipitate with 10% solution of tannic acid in water.

Identification Reaction C

The solution in water does not precipitate with iodine TS. Caffeine is converted to enol form by addition of dilute HCl, reacts with iodine and brown precipitate occurs. With the addition of NaOH, caffeine turns into keto form and the precipitate disappears.

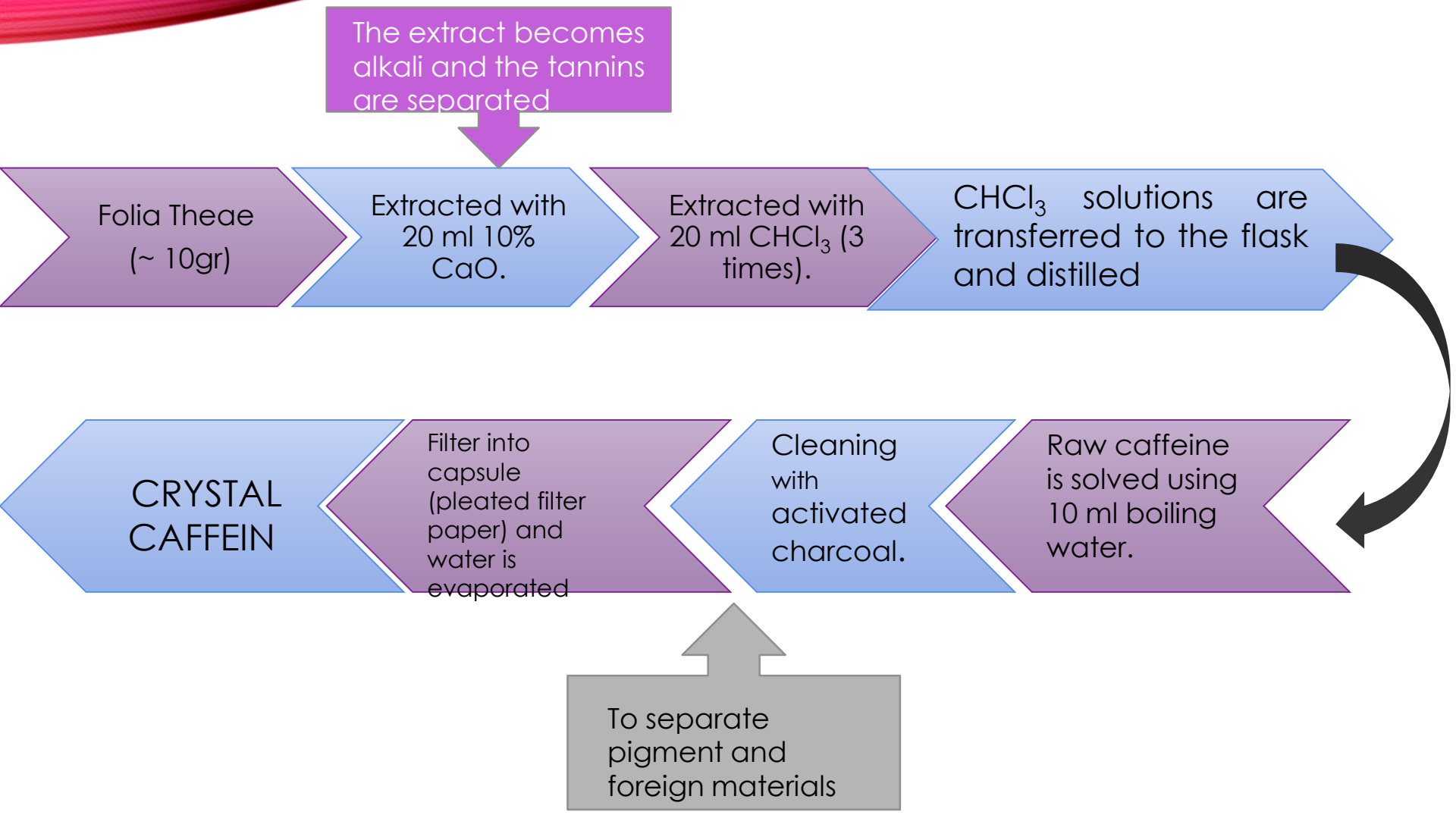
Reaction

When heated with 2 parts of water, it gives a solution which is neutral to the turnusole and becomes clear when cooled.

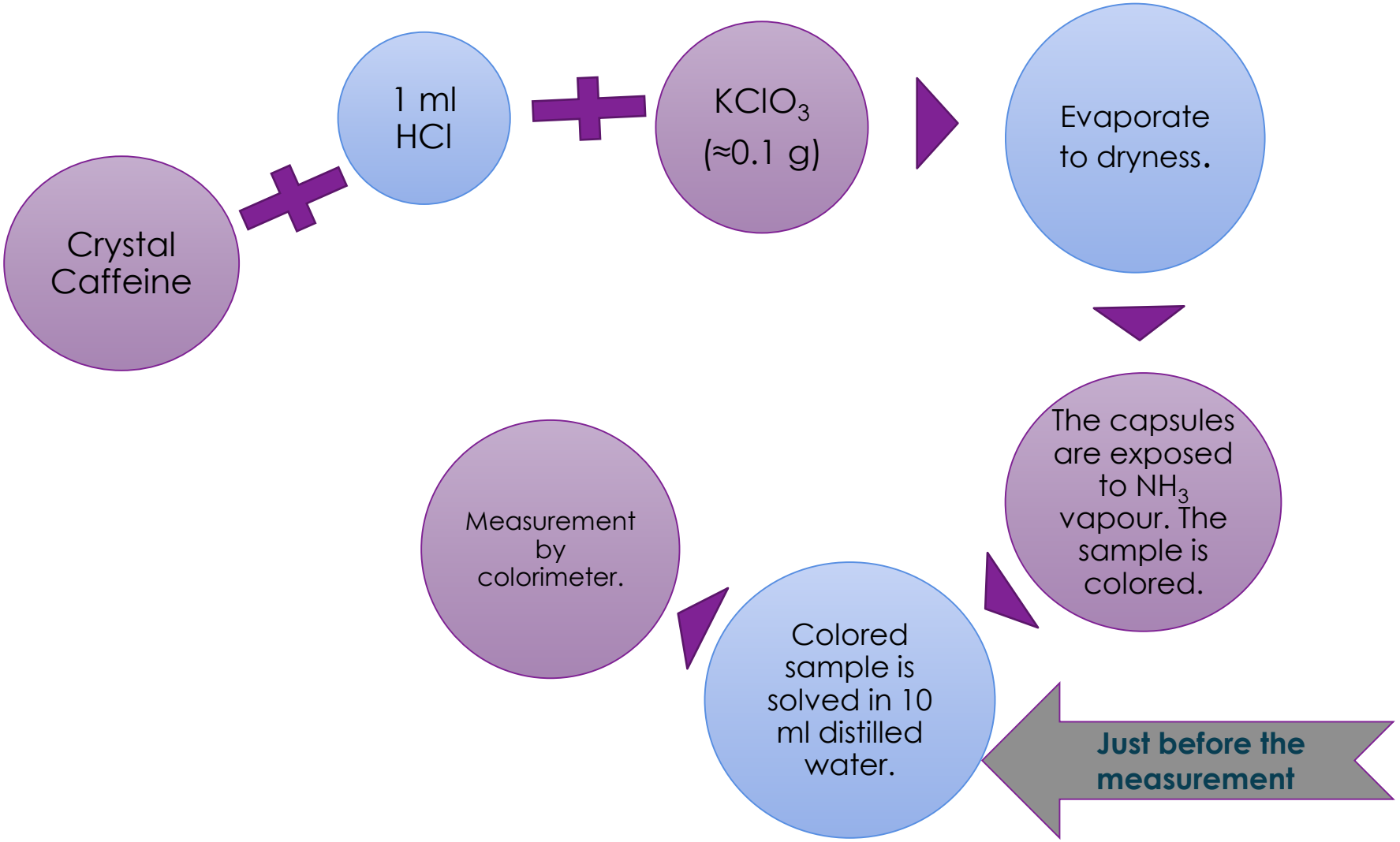
Foreign alkaloids

The saturated solution in water does not form precipitate with Mayer's reagent (K-Mercury iodide).

ISOLATION OF CAFFEINE

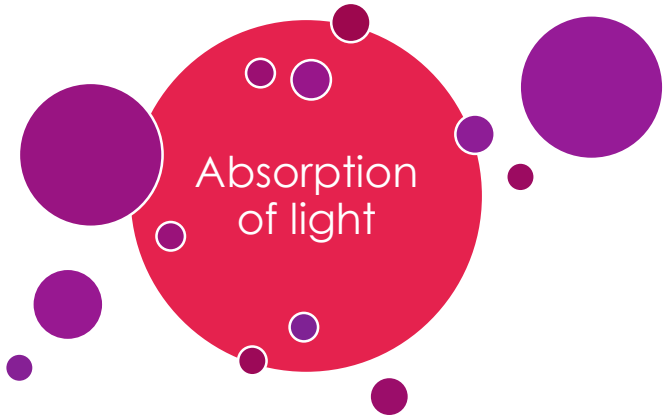


QUANTIFICATION OF CAFFEINE USING COLORIMETRIC METHOD

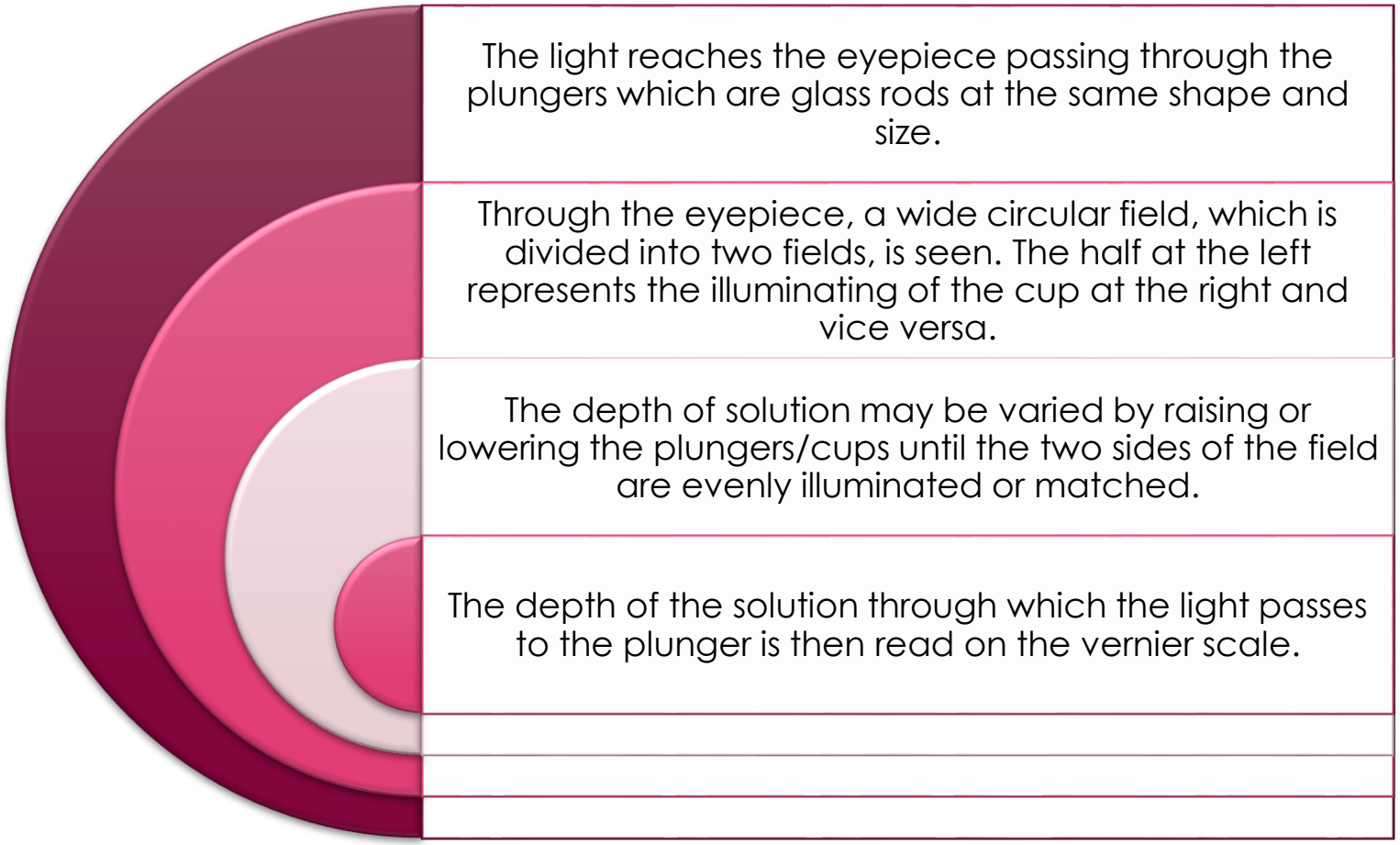


COLORIMETRIC METHOD

To determine the concentration of a colored substance by comparison to a standard solution at a specific concentration is called colorimetry. The device used for this purpose is called colorimeter.



MEASUREMENT



Lambert-Beer law is used for the calculation. Matching the illuminating of two fields means matching the absorbances.

$$A_1 = A_2$$

$$\varepsilon \times I_n \times c_n = \varepsilon \times I_s \times c_s$$

ε= Absorption coefficient ($cm^{-1} \cdot g^{-1} \cdot L$)

I = Depth of the solution (cm)

c = Concentration (g/L)

$$I_n \times c_n = I_s \times c_s$$

$$C_n = \frac{I_s \times c_s}{I_n}$$

CALCULATION

The color intensities of the sample and the standard solutions are compared to calculate the percentage of alkaloids.

c_s: 0.1 g/L
l_n ve l_s: the value read on the vernier scale

10,.. g drug	**c_n g caffeine**
100	**?**

THE ISSUES TO BE CONSIDERED FOR USING COLORIMETRIC METHOD

- Solutions should be clear and freshly prepared.
- The solution should be colourfull or coloured before the measurement.
- The color tone of the solutions should not be too light or too dark.
- Cups and plungers should be clean.