ALKALOID IDENTIFICATION REACTIONS 1-2

Alkaloids

- Alkaloids are naturally occurring organic substances, which contain atom/atoms of nitrogen.They have strong biological activities.
- Alkaloids are solid crystalline substances, colourless, odourless, with bitter taste.
- Salts of alkaloids are soluble in water and slightly soluble in organic solvents. Knowledge of the solubility of alkaloids and their salts is of considerable pharmaceutical importance.

- **Alkaloids present rarely free in plants.**

- **Pigments are color substances in plants. They may mask the reaction due to their colors. To prevent this, a pigment-free extract should be prepared.**

- **Alkaloids are obtained from the plants by two methods:**

1. **Extraction with organic solvent in alkaline pH.**
2. **Extraction with acidic alcohol.**

Identification and Quantification of Alkaloids

1. **Special recognition reactions are used in the determination of alkaloids.**
2. **Following methods are used to identificate alkaloids:**
   - Gravimetric Method
   - Volumetric Method
   - **Titrimetric Method***
   - **Chromatographic Method**
   - Biological Method
   - **Spectroscopic Method***

Major Alkaloid Reagents

Reagents	Chemical composition	Results
DRAGENDORFF	Solution of potassium bismuth iodide	Gives red-orange color + precipitate in H_2SO_4 solution.
MAYER	Potassium mercury-iodide solution	Gives yellowish white precipitate in alkaline or acidic solution.

Alkaloid Recognition Reactions-1

Experimental Procedure :

DRUG: Cortex Chinae (Rubiaceae)

% 70 ethanol containing %6 H_2SO_4

↓ **Boiling (erlenmayer, gas burner)**

Cooled, precipitate

↓ **filtration through cotton**

Filtrate

- → **Flask 1 + DRAGENDORFF**
- → **Flask 2 + MAYER**
- → **Remaining liquid part**

If the solution precipitate, presence of alkaloids is suspected and the experiment is continued.
Proteins, pigments and other nitrogenous compounds in plants can also give (+) results.
Proteins, pigments, other nitrogenous compounds; unlike alkaloids, it dissolves in chloroform phase.

The remaining liquid is taken into the separatory funnel.

↓

Solution pH is made alkaline with 25% Na_2CO_3.
+ Chloroform

↓

(without shaking)

Chloroform phase

↓

Taken to the separatory funnel.

↓

+10% acetic acid

(Acid medium for the reaction of the reagent)

↓

Extraction

↙ ↘

The acetic acid phase is divided into 3 part

The chloroform phase is discarded.

Acetic acid phase

MAYER

DRAGENDORFF

CONTROL

If there is precipitation or blur, there are alkaloids.

Special Color Reaction for Opium Alkaloids

DRUG: Opium (Papaveraceae)

+ % 10 Na_2CO_3

↓ Boiling

Cooled

↓ filtration through cotton

the filtrate is taken to the separating funnel

+ Choloroform

↓ 2 times Extraction

Chloroform phases are taken, combined
and
divided into 3 capsules

The chloroform phases in the capsules are evaporated to dryness on the WATER BATH (without carbonization).

Capsule 1	Capsule 2	Capsule 3
↓	↓	↓
+ Marquis R.	Conc. H_2SO_4 + $FeCl_3$	Conc.H_2SO_4 + Conc. HNO_3
↓	↓	↓
Purple-red	Brunette Green	Red
↓	↓	↓
MORPHINE	CODEINE	NARCOTINE

Marquis R.:

conc. H_2SO_4 + Formol