DETERMINATION OF TOTAL ALKALOID CONTENT IN CORTEX CHINAE (TITRIMETRIC)

PHARMACOGNOSY-III PRACTICE
2020

Methods for the determination of active substances in drugs:

- Gravimetric
- Titrimetric
- Volumetric
- Colorimetric
- Chromatographic (HPLC, GC)
- Spectrophotometric
- Polarimetric

Plant Name: Cinchona succirubra (Rubiaceae)

Drug Name: Cortex Chinae

Alkaloid mixture (quinine-quinidine, cinchonine-cinchonidine)

The total alkaloid content is estimated as quinine and cinchonine.

The alkaloids generally exist in the plant as salts of acids and sometimes as bound with tannins.

Alkaloid extraction is carried out by two methods:

1)Using water or aqueous alcohol containing dilute acid

2) Using organic solvent in alkaline medium

Experimental procedure

Quinic and quinotannic acid

25% formic asit (2 ml)
+water (15 ml)

extract in the water bath for 30 minutes with continuous stirring using erlenmeyer flask with cap

↓ cool

+ chloroform (15 ml)
+ ether (60 ml)
+30% NaOH (5 ml)

↓ Shake for 1 min

+ Gum tragacanth(2 g)

↓ Shake vigorously for 1 min

take the ether phase at the top

The ether phase is evaporated in distillation apparatus until 1-2 ml remains.

↓

Residue

↓

+ ethanol (10 ml)
+ boiled water (10 ml)
+ methyl red (10 drops)

↓

Titration up to red colour with 0.1 N HCl
(A ml 0.1 N HCl)

Methyl red is a pH indicator; it is red in pH under 4.4, yellow in pH over 6.2

CALCULATION

1l   1N HCl   36.5 g

1l   0.1N HCl   3.65 g

1ml   0.1N HCl   **0.00365 g**

$MA_{quinine\ =\ quinidine}$ = 324.40 g

$MA_{chinchonine=chinchonidine}$ = + 294.40 g /2

Accepted as average molecular weight for alkaloids in the drug

309.4 g

1 molecule HCl reacts with 1 molecule of alkaloid

36.5 g of HCl reacts with   309.4 g of alkaloid

0.00365 g of HCl reacts   30.94 mg of alkaloid

1 ml 0.1 N HCl is equivalent to   30.94 mg of alkaloid

A ml 0.1 N HCl is equivalent to   X mg of alkaloid

$$X \text{ mg} = X.10^{-3} \text{ g}$$

1,25.. g drog $X.10^{-3}$ g of alkaloid

100 g drog   B g of alkaloid

B = % alkaloid content