← standardization

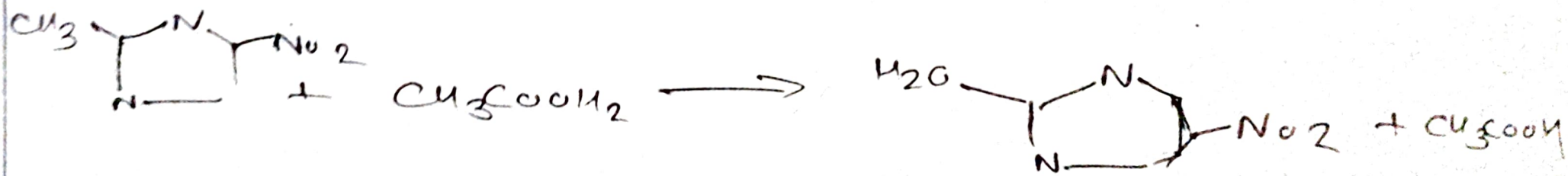
Sl no	Contents in Conical flask	Burette Reading		Indicator & end point
		Initial	final	
01	0.2g KHP + 10ml of glacial acetic acid + Indicator	0 ml	4.5 ml	Crystal Violet to emerald green

$$\text{Actual Normality} = \frac{\text{Amount of KHP taken} \times \text{Exp Normality}}{\text{titre Value} \times \text{equivalent factor}}$$

$$= \frac{0.2 \times 0.1}{4.5 \times 0.20} = 0.22 \text{ Nn}$$

Assay of metronidazole :

Chemical Reaction : $HClO_4 + CH_3COOH_2 \longrightarrow CH_3COOH_2 + ClO_4$



Aim: To determine the percentage purity of Metronidazole tablets.

Apparatus required : Volumetric flask 100ml, Burette 50mL, Conical flask 150mL, Pipette 20mL, Funnel, Measuring cylinder 50ml, Porcelain tile, Burette stand, Digital balance.

Chemicals required:

Metronidazole tablets, perchloric acid, glacial acetic acid, acetic anhydride, potassium hydrogen phthalate and crystal violet indicator.

Principle:

Substances which are too weakly basic or too weakly acidic to give sharp end points in aqueous solution can often be titrated in non-aqueous solvents. Metronidazole is a weakly basic drug, hence the percentage of metronidazole present in tablets is determined by non-aqueous titration method. In the official method, metronidazole is titrated with 0.1N perchloric acid using crystal violet solution as indicator. 0.1N perchloric acid solution is prepared by dissolving perchloric acid in glacial acetic acid. When a very strong acid such as perchloric acid is dissolved in acetic acid, the later can function as a base and combine with protons donated by perchloric acid to form as onium ions. Since the onium ion can readily donate its proton to a base, a solution of perchloric acid in glacial acetic acid functions as a strongly acidic solution. When a weak base such as metronidazole is dissolved in acetic acid, the acetic acid exerts its leveling effect and enhances the basic properties of metronidazole. Hence the weak base like metronidazole in acetic acid medium can be titrated with perchloric acid to get a sharp end point.

Procedure:

I. Preparation of 0.1N perchloric acid :

Mix 8.5 ml of perchloric acid With 500ml of giacial acetic acid and 21ml of acetic anhydride cool and add glacial acetic acid to make 1000ml. Allow the prepared solution to stand for 1 day for the excess acetic anhydride to be combined.

Sl no	Contents in Conical flask	Burette Reading		Indicator	End point
		Initial	final		
01	0.2g of metronidazole + 10ml of glacial acetic acid + indicator	0ml	5ml	Crystal Violet	Violet to emerald green
02	1ml of glacial acetic acid + indicator	5ml	5.2ml	Crystal Violet	Violet to emerald green

$$\text{Amount Present} = \frac{\text{titre Value} \times \text{equivalent factor} \times \text{Actual Normality}}{\text{expected Normality}} \times$$

$$= \frac{(5.2 - 0.2) \times 0.017 \times 0.22}{0.1} \times 2 \qquad \frac{\text{Avg tablet}}{\text{wt of tablet}}$$

$$= \frac{0.0106}{0.1} \qquad \% \text{ Purity} = \frac{\text{Amount Present}}{\text{label claim}}$$

$$= 0.0106 \times 2 \qquad = \frac{0.212}{0.4} \times 100$$

$$= \underline{0.212\,g} \qquad = \underline{53\%}$$

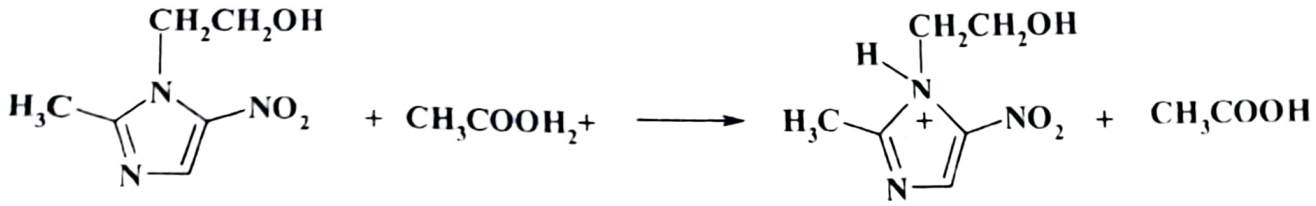
Equivalent factor:

Each ml of 0.1N perchloric acid is equivalent to 0.02042 g of potassium hydrogen phthalate.

II. Assay of metronidazole tablets:

Chemical reaction:

$$HClO_4 + CH_3COOH \longrightarrow CH_3COOH_2^+ + ClO_4^-$$



Weigh accurately 20 Metronidazole tablets and powder them using a glass mortar. Weigh accurately a quantity of the powder equivalent to about 0.2g of metronidazole. Transfer the weighed powder into a clean 150ml conical flask. Add 10 ml glacial acetic acid solution into the flask. Add two drops of crystal violet solution and titrate the solution with 0.1N perchloric acid solution until violet color changes to green.

Equivalent factor:

Each 1 mL of 0.1N perchloric acid solution is equivalent to 0.01712g of $C_6H_9N_3O_3$

Report:

1. The amount of Metronidazole present in each tablet = 0.212 g

2. The percentage purity of Metronidazole tablets = 53 % w/w of $C_6H_9N_3O_3$