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Diploma in Pharmacy 1st Year
Pharmaceutical Chemistry
Experiment

To prepare and standardize sodium hydroxide solution.

Aim:

To prepare and standardize sodium hydroxide solution.

Reference :

‘ Dr. Gupta G.D. , Dr. Sharma Shailish , Kaur Baljeet ’ “Practical Manual of Pharmaceutical Chemistry” Published by Nirali Prakashan, Page no 25 - 28

Requirements:

Apparatus Required: Burette, pipette (10 ml), conical flask, beaker, volumetric flask (1000 ml), funnel, glass rod.

Chemicals Required: 0.1 M sodium hydroxide solution, 0.1 M oxalic acid solution, Phenolphthalein indicator, distilled water.

Theory:

Sodium hydroxide is a strong base which has molecular weight 40 gm/mol. It is hydroxide in nature and hence cannot be weighed properly. Oxalic acid is a weak acid and has molecular weight 126 gm/mol and is a primary standard. Sodium hydroxide can be standardized by titrating with oxalic acid sodium. This titration is an example of acidimetry in which base is titrated with an acid. The following reaction takes place in this titration:

$$H_2C_2O_4 + 2NaOH \longrightarrow 2COONa + 2H_2O$$

Procedure:

1. **Preparation of 0.1 M sodium hydroxide solution:** Weight accurately 4 gm of sodium hydroxide pellets and put it into a 250 ml beaker. Add approximately 150 ml of distilled water in it and stir it to dissolve the pellets. Pour this solution to a volumetric flask (1000 ml) and make up the volume. Shake well to mix properly.
2. **Preparation of 0.1 M oxalic acid solution:** Weight accurately 12.6 gm of oxalic acid and put it into a beaker (250 ml). Add approximately 150 ml of distilled water and stir it to make clear solution. Transfer this solution to a volumetric flask (1000 ml) and make up the volume. Shake well to mix properly.
3. **Titration:** Rinse and fill the burette with 0.1 M sodium hydroxide solution with the help of funnel. Pipette our 10 ml of 0.1 M oxalic acid solution into a clean and dry conical flask and add 2-3 drops of phenolphthalein indicator to it. Shake it to mix the contents. Titrate the contents of conical flask with 0.1 M sodium hydroxide solution until permanent pink colour is obtained. Repeat the titration and take three concordant reading. Calculate molarity of 0.1 M sodium hydroxide solution.

Observation :

Standardization of 1 M Hydroxide Solution :

Sr. No.	Volume of Oxalic Acid Taken (ml)	Burette Reading (ml)		Volume of NaOH used (ml)
		Initial	Final	
1	10	0	8	8
2	10	8	20	12
3	10	20	30	10

Average Volume of NaOH used (V_1) = 8 ml
Average Volume of Oxalic acid taken (V_2) = 10 ml

Calculations:

The Molarity of Given 1 m Sodium hydroxide solution is calculated by using the following formula :

$$\frac{M1V1}{n1} = \frac{M2V2}{n2}$$

M1 = Molarity of NaOH

V1 = Volume of NaOH 8ml

n1 = 1

M2 = Molarity of Oxalic acid = 1 m

V2 = Volume of Oxalic acid = 10 ml

n2 = 1

$$M1 = \frac{n1M2V2}{n2V1}$$

$$= \frac{1*1*10}{1*8}$$

$$= \frac{10}{8} \quad = 1.25\ M$$

Result: The exact molarity of given sodium hydroxide solution is 1.25 M

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