10:00pm
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Experiment No-08

Object: To prepare and standardize 0.1N potassium permanganate using standard solution of oxalic acid

References: 1) Bagul Uttam Singh, Singh Deeksha, Singh Atamjit, Practical Book for Pharmaceutical chemistry and Analysis, Pee. Vee Books, First edition, 2017 page No-44-46.

2) Rao G. Devala, Practical pharmaceutical Analysis, Birla Publication Pvt, Ltd. 3rd edition 2010-11, page No-45-46.

3) Kasture AV., Mahadik K.R., Wadodkar S.G. More HN Pharmaceutical Analysis, volume-I, Nirali Prakashan, 12th edition, February 2006, page No-115-116.

Requirements: a) Apparatus | Glasswares: a) Beaker
b) Measuring cylinder
c) Burette
d) pipette
e) Glass rod
f) volumetric flask
g) conical flask
h) Burette stand

a) chemicals | Materials: a) Potassium pumanganate
b) Oxalic acid
c) Sulphuric acid.

Theory: Titration involving permanganate oxidation is a special case of oxidimetry in which a solution of $KMnO_4$ is used as an oxidant. The ability of $KMnO_4$ solution to oxidise is due to the conversion of the MnO_4^- ion to Mn^{++} in acidic solution and to MnO_2 in alkaline.

Potassium permanganate acts as strong oxidising agent in acidic medium that oxidises oxalic acid into carbon dioxide known strength of oxalic acid is titrated directly with potassium permanganate, end point can be detected with appearance of permanent pink colour, potassium permanganate acts as itself indicator.

Procedure: i) Preparation of 0.1N oxalic acid:

6.3 g of oxalic acid was weighed accurately and dissolved in sufficient amount of distilled water. After dissolution oxalic acid, the final volume was made upto 1000ml with distilled water.

ii) Preparation of 0.1N Potassium permanganate:

3.3 g of potassium permanganate was weighed accurately and dissolved in 1000ml of distilled water to get 0.1N $KMnO_4$ solution.

Standardization of potassium permanganate:

1) All the glasswares were cleaned thoroughly and dried.
2) Burette was rinsed with distilled water and then pre-rinsed with a small portion of potassium permanganate solution before fill it up for the titration.
was filled
3) Fill the burette with 0.1 N potassium permanganate solution.
4) The burette was mounted on burette stand.
5) 10 ml of 0.1 N oxalic acid was pipetted out and transferred to a conical flask.
6) 10 ml of dilute H_2SO_4 was added to the above solution.
7) The content of the flask was heated to warm at 70°c.
8) The content was ~~cooled~~ allowed to cool down upto 40°c.
9) The content was then titrated against 0.1 N $KMnO_4$ contain in burette.
10) The endpoint was indicated by permanent pink colour (colour persists for more than 30 sec..)

11) The burette reading was recorded.

12) The titration was repeated for three time to get concordant reading.

13) The readings are were arranged into tabular form.

14) Normality of potassium permanganate was calculated.

Result: 0.1N potassium permanganate had been prepared and standardized using standard solution of oxalic acid

The exact normality of potassium permanganate was found to be _____.

Chemical Reaction:-

$$2KMnO_4 + 5H_2C_2O_4 + 3H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O$$

potassium permanganate | oxalic acid | sulphuric acid | potassium sulphate | Magnesium sulphate | water.

Observation table: Titration of 0.1N oxalic acid with $KMnO_4$

S.No.	Volume of 0.1N oxalic acid (ml)	Burette Reading		Volume of potassium permanganate run down
		Initial (ml)	Final (ml)	
01	10ml	0ml		
02	10ml	0ml		
03.	10ml	0ml		

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Calculation - The normality of $KMnO_4$ was calculated by the formula:

$$V_1N_1 = V_2N_2$$

where, V_1 = volume of 0.1N oxalic acid = 10ml
N_1 = Normality of oxalic acid = 0.1N
V_2 = volume of $KMnO_4$ = Average burette reading
N_2 = Normality of $KMnO_4$ = ?

$$N_2 = \frac{V_1N_1}{V_2}$$

$$N_2 = \frac{10 \times 0.1}{\quad} = \quad N$$