

Experiment No-08

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

References: 1) Baghel 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, page No-45-46.

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

Requirements Apparatus | Glassware: a) Beaker

b) Measuring cylinder

c) Burette

d) pipette

e) Glass rod

f) Volumetric flask

g) conical flask

h) Burette stand

Chemicals | Materials: a) Potassium permanganate

b) Oxalic acid

c) Sulphuric acid.

Theory: Titration involving permanganate oxidation is a special case of oxidising oxidimetry in which a solution of KMnO_4 solution is used as an oxidant. The ability of KMnO_4 solution to oxidise is due to the conversion of the KMnO_4 ion to Mn^{2+} in acidic solution and to MnO_2 in alkaline.

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

Procedure: 1) 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 100ml with distilled water.

2) Preparation of 0.1N potassium permanganate:

3.3 g of potassium permanganate was weighed accurately and dissolved in 100ml of distilled water to get 0.1N KMnO_4 solution.

Standardization of potassium permanganate:

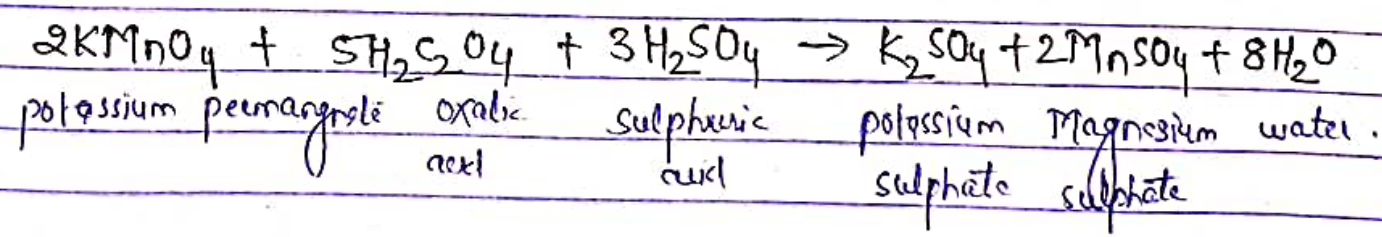
- 1) All the glasswares were cleaned thoroughly and dried.
- 2) Burette was rinsed with distilled water and then pre-rinsed with a small portion of potassium permanganate solution before fill it up for the titration.
was filled.
- 3) Fill the burette with 0.1N potassium permanganate solution.
- 4) The burette was mounted on burette stand.
- 5) 10 ml of 0.1N 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 $70^\circ C$.
- 8) The content was ~~cooled~~ allowed to cool down upto $40^\circ C$.
- 9) The content was then titrated against 0.1N $KMnO_4$ contained 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 times to get concordant reading.
- 13) The readings 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: -



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	10 ml	0 ml		
02	10 ml	0 ml		
03	10 ml	0 ml		

calculation - The normality of KMnO_4 was calculated by the formula:

$$V_1 N_1 = V_2 N_2$$

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 $\text{KMnO}_4 = ?$

$$N_2 = \frac{V_1 N_1}{V_2}$$

$$N_2 = \frac{10 \times 0.1}{V_2} = N$$