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Diploma in Pharmacy 1st Year

Pharmaceutical Chemistry

Experiment

To prepare and standardise potassium permanganate standard solution

Aim:

To prepare and standardise potassium permanganate standard solution

Reference :

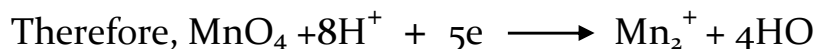
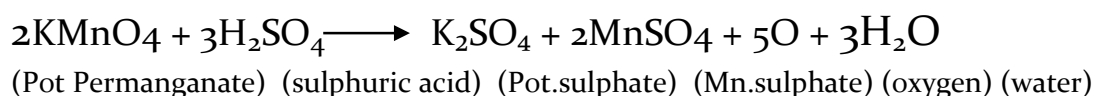
‘ Dr. Gupta G.D. , Dr. Sharma Shailish , Kaur Baljeet ’ “Practical Manual of Pharmaceutical Chemistry” Published by Nirali Prakashan, Page no 29 - 32

Apparatus and Material Required :

Watch glass, beaker 250 ml, glass wool, funnels, cleaned and calibrated volumetric flask-1000 ml, pipette, burette, conical flask, electronic balance, Potassium permanganate, oxalic acid and cone sulphuric acid.

Theory:

Potassium permanganate is an oxidising agent Under the right storage conditions, it can keep its concentration for a long time. Permanganate reactivates quickly in solution. It also serves as a self-indicator, as its little excess gives the solution a unique pink colour. It isn't a mandatory requirement. The ability to oxidise potassium permanganate solution is owing to the conversion of the MnO_4^- ion to MnO_2^+ in acidic solution, MnO_4^+ in alkaline solution, and MnO_2 in neutral solution. The MnO_4^- ion is decreased as a result of the processes below.



Equivalent Weight = Molecular weight/No. of electron transferred = $158/5 = 31.6 = 32$

Procedure:

Preparation of Potassium Permanganate Solution

- 1) 3.2g of KMnO_4 should be weighed on a watch glass.
- 2) The contents should be transferred to 250 ml beaker containing cold distilled water and stirred completely.
- 3) The crystals should be broken down with the help of glass rod to affect the solution.
- 4) The solution should be poured via a small plug of glass wool supported in a funnel into a 1000 ml volumetric flask.
- 5) More distilled water should be added to the beaker.
- 6) The above procedure should be repeated till all the potassium permanganate gets dissolved.
- 7) The volume should be maintained and shake well so as to affect continuous mixing.
- 8) The flask should be kept with the stopper for 24 hr and then filter through asbestos.
- 9) Potassium permanganate should be used to decompose the organic matter present in the distilled water resulting in the formation of MnO_2 during 24 hr.
- 10) The filtrate solution should be kept in dark glass bottle.
- 11) The solution should be standardised 24 hr after its preparation.

Standardisation of Potassium Permanganate Solution

- 1) Standard sodium oxalate should be dried at $105-110^\circ\text{C}$ for 2 hr.
- 2) It should be allowed to cool in a covered vessel in a desiccator.
- 3) 6.7g of above pure sodium oxalate should be weighed accurately and transferred into 1000ml volumetric flask containing 500 ml of water.
- 4) The volume should be maintained with the distilled water.
- 5) 20 ml of this solution should be poured into a conical flask and 5ml of conc. H_2SO_4 should be added along the side of the flask.
- 6) The contents should be heated upto 70°C .
- 7) It should be titrated against potassium permanganate solution from the burette until a faint pink colour last for 30 second upon shaking the flask.
- 8) The procedure should be repeated until 3 concordant reading will be obtained

Observation Table

Sl.No.	Volume of Sodium Oxalate Solution taken (ml)	Burette Reading of KMnO ₄		Average Volume of KMnO ₄ used
		IR	FR	
1)	20 ml	0.0	19.5	
2)	20 ml	0.0	19.6	19.5
3)	20 ml	0.0	19.5	

Calculation

$$N_1V_1 = N_2V_2$$

Where,

N_1 = Normality of (COONa)₂

N_2 = Normality of KMnO₄

V_1 = Volume of (COONa)₂

V_2 = Volume of KMnO₄

N_1 0.1N = Normality of Oxalic acid Solution, N_2 =?= Normality of KMnO₄

V_1 = 20ml = Volume of Oxalic acid Solution, V_2 = 19.5ml = Volume of KMnO₄,

$$N_2 = N_1 V_1 / V_2$$

$$N_2 = 20\text{ml} \times 0.1 / 19.5$$

$$N_2 = 0.102\text{N}$$

Result: The strength of the given solution of potassium permanganate is 0.102 N.

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Amir Khan

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