Chemical Reaction: The standardization depends upon the reactions expressed as follows:

Practical - 8

Date: ..../...../.....

Aim: To prepare and standardize 0.02M Potassium permanganate standard solution.

Reference:……

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Requirements:

Apparatus/Equipment required:…….…….....

Chemical required:…….…….....

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Principle

Potassium permanganate often contains a small proportion of manganese dioxide; volumetric solutions must be made up approximately and then standardized. The intense colour of the solution makes difficult the detection of undissolved solid. The use of heat in the preparation of potassium permanganate solutions is also undesirable, since traces of other contaminants on the glass vessels used can catalyze its decomposition.

Potassium permanganate may be standardized with either sodium oxalate or oxalic acid. The former is preferred because it is readily available to higher standard of purity (99.95%) and unlike oxalic acid, it is available in the anhydrous state.

Procedure:

PREPARATION OF 0.02 M POTASSIUM PERMANGANATE SOLUTIONS:

Dissolve 3.2 gm of potassium permanganate in 1000 ml of water, heat on a water bath for 1 hour; allow standing for 2 days and filtering through glass wool. Store protected from light.

STANDARDISATION PROCEDURE:

METHOD A: With SODIUM OXALATE:

Weigh out sodium oxalate (6.7 gm) accurately into a liter graduated flask, dissolve in water and make up to the volume. Pipette out 20 ml of this solution add concentrated sulphuric acid about (5 ml) and warm to about 70 degree. Add the potassium permanganate solution from the burette. The first few drop results in a pink color persisting for about 20 seconds. Wait until the color disappears and then continue the titration. Formation of a brown color during the titration is caused by insufficient acid, by using too high a temperature or by the use of dirty flask. The end point is reached when a faint pink color persists for about 30 seconds upon the shaking the flask. 1ml of 0.02M potassium permanganate is equivalent to 0.0067 gm of sodium oxalate.

METHOD B: with SODIUM THIO SULPHATE:

PREPARATION OF 0.1M SODIUM THIOSULPHATE:

Dissolve 25 gm of sodium thiosulfate and 2.0 gm of sodium carbonate in CO_2 free water and dilute to 1000 ml with the same solvent. Standardize the solution in the following manner:

STANDARDISATION PROCEDURE:

Dissolve 0.200 gm of potassium bromated, weighed accurately, in sufficient water to produce 250.0 ml. To 50.0 ml of this solution add 2 gm of potassium iodide and 3 ml of 2M HCL and titrate with the sodium thiosulphate solution using starch solution added towards the end of the titration as the indicator until the blue color is discharged.

1ml of 0.1M sodium thiosulphate is equivalent to 0.002784 gm of $KBrO_3$.

STANDARDISATION OF $KMnO_4$ PROCEDURE:

To 25.0 ml of the solution in a glass-stoppered flask add 2gm of potassium iodide, followed by 10 ml of 1M sulphuric acid. Titrate the liberated iodine with 0.1M sodium thiosulphate, using 3 ml of starch solution, added towards the end of the titration, as indicator. Perform a blank determination and make necessary correction.

1ml of 0.1M sodium thiosulphate is equivalent to 0.003161 g of $KMnO_4$.

Result:……

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Questions Bank

1. Write the chemical formula of sodium thiosulphate.
2. What are the titrant, titrate and analyte?
3. What are the pharmaceutical importance of $KMnO_4$?
4. Write the chemical formula of sodium oxalate.
5. What are the methods available for balancing redox reaction?
6. Write the chemical formula of potassium permanganate.
7. What is oxidation state of manganese in potassium permanganate?
8. Why we use the starch solution in this titration?
9. Write the note on glass wool filter.
10. What is the meaning of blank titration?