



Centurion
UNIVERSITY
*Shaping Lives...
Empowering Communities...*

IODIMETRY, IODOMETRY

BY, LIPSA SAMAL

ASST. PROF (PA & QA), SPLS, CUTM



Centurion
UNIVERSITY

Shaping Lives...

Empowering Communities...

Iodimetric and iodometric titrations constitute another class of oxidation-reduction titrations wherein either iodine solutions are employed directly for the assay or an equivalent amount of iodine is liberated indirectly from the reaction mixture and then assayed.

- **IODIMETRY is a procedure based on the following reversible reaction : $2\text{I}^- \rightleftharpoons \text{I}_2 + 2\text{e}^-$ Hence, it can be utilized for the quantitative estimation of reducing agents like arsenites (H_3AsO_3) and thiosulphates ($\text{Na}_2\text{S}_2\text{O}_3$) by employing a standard solution of iodine**



Centurion
UNIVERSITY

Shaping Lives...

Empowering Communities...

- **IODOMETRY** is an indirect procedure based on the aforesaid reversible reaction whereby the assay of oxidizing agents, for instance : ‘available chlorine’ in bleaching powder, cupric and ferric salts may be carried out by reducing them with an excess potassium iodide thereby liberating an equivalent quantity of iodine which can be estimated using a standard solution of thiosulphate.



Centurion
UNIVERSITY

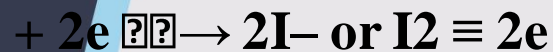
Shaping Lives,
Empowering Communities

IODIMETRIC ASSAYS

IODIMETRIC ASSAYS In such estimations, the pharmaceutical substances can be measured either directly or back titration of excess iodine with sodium thiosulphate solution.

Preparation of 0.1 Iodine Solution

- Theory** : Iodine in aqueous solution acts as an oxidizing agent which forms the basis of assay methods involving direct titration with iodine. Thus, we have : I_2



or 126.9 g $I_2 \equiv 1000$ ml N or 12.69 g $I_2 \equiv 1000$ ml 0.1 N

or 3.17 g $I_2 \equiv 250$ ml 0.1 N

Materials Required : Iodine : 3.2 g ; potassium iodide : 7.5 g.



Centurion
UNIVERSITY

Shaping Lives...

Empowering Communities

- **Procedure** : Weigh accurately 3.2 g of crushed iodine crystals on a watch glass and transfer to a beaker containing potassium iodide (7.5 g) and water (10 ml). Dissolve the contents of the beaker with the help of a glass rod and frequent swirling. Transfer the contents of the beaker quantitatively to a 250 ml volumetric flask and make up the volume with DW.
- **Explanation** : Iodine is sparingly soluble in water but undergoes rapid dissolution in the presence of potassium iodide due to the formation of the corresponding triiodide ion to solubilize iodine in aqueous KI solution, and in iodometry act as reducing agent, the excess KI helps in retaining liberated I_2 in solution through interaction with KI.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

IODOMETRY

Preparation of a 0.1 M Sodium Thiosulfate Solution

Dissolve about 25 g of sodium thiosulfate pentahydrate crystals in 1 liter of distilled water. Add about 0.2 g of sodium carbonate as a preservative. Shake to ensure complete dissolution and mixing.

Standardization of a 0.1 M Sodium Thiosulfate:

- 1. Weigh three pieces of clean copper wire or foil using about 0.20 to 0.25 g each and place them in 250-mL Erlenmeyer flasks.**
- 2. Add to each flask 5 mL of 6 M nitric acid and dissolve the copper by warming the solution on a hot plate. one at a time.**



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

After the copper has dissolved, add 25 mL of water and boil the solution for a few minutes.

- 4. Add 5 mL of urea solution (1 g in 20 mL of water) and continue boiling for another minute (Note 1).**
- 5. Cool the solution and neutralize the excess acid with 4 M ammonia in the hood. Use a dropper to add the ammonia carefully until a pale blue precipitate of copper(II) hydroxide is obtained. This is somewhat like a titration.**
- 6. Add 5 mL of glacial acetic acid to dissolve the precipitate. Cool the solution if it is warm.**
- 7. To the first sample, add 3 g of potassium iodide, cover the flask with a watch glass, and allow to stand for 2 min.**



Centurion
UNIVERSITY

Shaping Lives...

Empowering Centurions...

- 8. Then titrate with thiosulfate solution until the brownish color of iodine is almost gone or a light tan or "mustard" color (Grey Poupon, not French's) is obtained .**
- 9. Add 5 mL of starch solution and 2 g of sodium thiocyanate**
- 10. Swirl the flask for about 15 seconds and complete the titration, adding thiosulfate dropwise.**
- 11. At the end point the bluish-gray color of the solution disappears and the precipitate appears white, or slightly gray, when allowed to settle**
- 12. Treat the second and third samples in the same manner and titrate with thiosulfate.**
- 13. Calculate the molarity of the thiosulfate solution.**



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

THANK YOU