Laboratory work № 1. Iodometric determination of vitamin C.

Equipment and glassware:

- 3 Erlenmeyer flasks, volume 100 mL;
- Buret on 25,00 mL fastened on a ring stand;
- Pipet on 10,00 mL;
- volumetric flask V=50,00 ml
- Glass funnel of small diameter;
- Bottle with DW.

Reagents:

- Vitamin C;
- Solutions of iodine – 0.05000 M;
- Starch solution;*

Vitamin C, more properly called ascorbic acid, is an essential antioxidant needed by the human body. Iodine stains both skin and clothing so proper care is advised. If staining does occur, alcohol may remove skin stains and cleaners are available for fabric stains. Vitamin C, or ascorbic acid, is a water soluble antioxidant that plays a vital role in protecting the body from infection and disease. It is not synthesised by the human body and therefore must be acquired from dietary sources – primarily fruits and vegetables.

Principle Iodometric determination of ascorbic acid involves ascorbic acid redox titration with iodine solution using starch as an indicator. As the iodine is added during titration the ascorbic acid is oxidized to dehydroascorbic acid while the iodine is reduced to iodide anions. The end point of titration is determined by the first excess of iodine in the reaction medium that reacts with starch, forming a starch-iodine complex with an intense dark blue-violet colour.

***Preparation of Starch Solution**

Material Required: Starch (arrowroot): 1.0 g.

Procedure : Weigh 1.0 g starch in a glass in a glass pestle-mortar and triturate thoroughly with 10 ml of cold DW. Boil separately 200 ml of DW in a beaker and add the starch paste to it with vigorous stirring. The resulting mixture is boiled gently for a further period of 30 minutes till a transluscent and thin liquid having an uniform consistency is obtained.

Note: 1) The prepared solution of starch undergoes rapid deterioration, hence it is always desired to use freshly prepared solution every day,

2) It is now more or less believed that the iodine is held as an 'absorption complex' within the helical chain of the macromolecule β-amylose *i.e.*, a component of most starches. However, another component, α-amylose, is undesirable because it produces a red-colouration with iodine which is not readily reversible, and 3) 'Soluble Starch' comprises principally of β-amylose, with the α-fraction having been removed. Always, it is a practice to prepare indicator-solutions from this product exclusively.

Procedure:

1.1. Preparation of analyzed solution

1. Weight ascorbic acid on technical balance with 0,1 g accuracy.

3. Weight empty volumetric flask (50,00 ml) on analytical balance. Transfer the vitamin C into volumetric flask and weight. (To carry taken mass of vitamin C in a volumetric

flask through a dry filtering funnel). Weight volumetric flask with vitamin C on analytical balance. **m=_____g**

4. Add 20-30 ml of distilled water to volumetric flask, dissolve ascorbic acid (mix solution carefully).

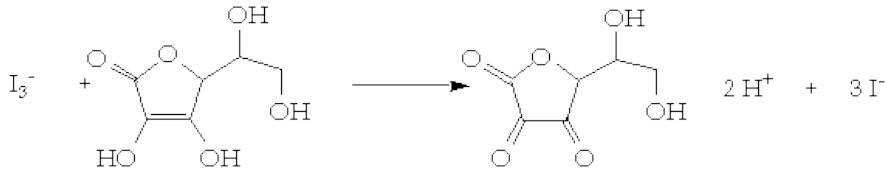
5. Bring the level of liquid in a flask to the mark;

1.2. Titration procedure:

1. Before the beginning of work to wash carefully all glassware as usual.
2. To wash buret by iodine solution.
3. To wash pipet by working solution.
4. Using funnel to fill a buret by iodine solution and obtain absence of air bubbles in the tag of buret.
5. To take off funnel and show out the level of liquid in a buret to the zero mark.
6. Pipette 3 times 10-ml aliquot of prepared solution of ascorbic acid into 100 ml Erlenmeyer flask.
7. Titrate one sample solution with iodine solution until the solution becomes ***pale yellow***.
8. Introduce 1.5 ml of starch indicator to 2 and 3 erlenmeyer flasks, and titrate with constant stirring to the appearance of the blue colour.
9. Read the burette mark.
10. To repeat titration of a new portion of working solution.

№ of titration	Volume of I_2 used for titration, mL	average volume, ml
1.		
2.		_____
3.		

11. Calculate mass of vitamin C accordance to equivalents law.



m =

The results you present to teacher.