

# Determination of ascorbic acid content in vitamin c tablets essay sample

[Environment](#), [Water](#)



## INTRODUCTION

To calculate the mass of the ascorbic acid and hence the mass percentage of ascorbic acid in the vitamin C tablet.

## PROCEDURES

(Refer to Lab Manual)

1. Accurately weight vitamin C (effervescent type) in a 50 ml beaker. Add about 30 ml of deionised water to dissolve the vitamin C tablet. Once the tablet has dissolved completely, transfer the solution into a 250 ml volumetric flask via a plastic filter funnel. Rinse the beaker twice with some deionised water and transfer the washings into the volumetric flask. Rinse the filter funnel as well. At this point, more water is added carefully until the bottom of the meniscus is right on the line. Stopper the flask and complete the mixing by repeated inversions with swirling and shakings in between. Keep your hand on the stopper at all times lest it falls out (or leaks)! 2. Using a 25 ml transfer pipette, transfer 25ml of the vitamin C solution into a 250ml Erlenmeyer (conical) flask. To the conical flask, add 50 ml of the water (use a 100 ml measuring cylinder), 5ml 4% (w/v) KI solution (use a 5ml measuring pipette), 2ml of 3% (v/v) CH<sub>3</sub>COOH solution (use a 2ml measuring pipette), and finally, 5 drops of starch solution.

Place a white tile underneath the flask. 3. Fill the 50ml burette with 0.01M N-bromosuccinimide (NBS). If there is any air bubbles trapped in the column, gently tap the burette to dislodge the bubbles. Check that there is no leakage before you do the titration. 4. Before titration, record the initial

burette reading. The end point is reached when 1 drop (or less) of N-bromosuccinimide causes the solution to turn a permanent yellow- green or blue color (the actual color being dependent on the concentration of the starch). Record the final burette reading. 5. Repeat the titrations 3 more times (use the same conical flask – discard the contents from the previous titration and rinse the flask with deionised water.)

## RESULTS

Experiment	Volume of the C (ml)	NBS (ml)	Burette Reading (ml) Final	Volume of Initial	Vitamin Trial
1	25	61.0	60.6	0	60.0
2	25	61.0	60.5	0	60.5
3	25	61.0	60.6	0	60.6

## CALCULATIONS

1. Calculate the mass (mg) of ascorbic acid in the 25ml of the solution used for titration. The molar mass of ascorbic acid is 176.13g $\text{mol}^{-1}$ .

$$\text{Molarity of NBS} = 0.01\text{M}$$

$$\text{Volume of NBS} = (61.0 + 60.5 + 60.6) \div 3$$

$$= 182.1 \div 3$$

$$= 60.7 \text{ cm}^{-3}$$

$$\text{Mole of NBS} = 0.01\text{mol dm}^{-3} \times 60.7 \text{ cm}^{-3} \div 1000$$

$$= 0.000607\text{mol}$$

According to the formula, 1 mole of NBS reacts with 1 mole of ascorbic acid. Therefore, 0.000607 mole of NBS react with 0.000607 mole of ascorbic acid.

$$\text{Mass of ascorbic acid} = 0.000607 \text{ mol} \times 176.13 \text{ g mol}^{-1}$$

$$= 0.1069 \text{ g}$$

$$= 106.9 \text{ mg}$$

2. Calculate the mass (mg) of ascorbic acid in the vitamin C tablet and thus the mass percentage of ascorbic acid.

$\therefore$  the mass of ascorbic acid in the 25ml of the solution is 106.9mg.  $\therefore$  the

$$\text{mass of ascorbic acid in the 250ml of the solution} = 106.9 \text{ mg} \times 10$$

$$= 1069 \text{ mg}$$

$$\text{Mass of Vitamin C} = 4.6 \text{ g}$$

$$= 4600 \text{ mg}$$

$$\text{Mass percentage of ascorbic acid} = 1069 \text{ mg} \div 4600 \text{ mg} \times 100\%$$

$$= 23.2324\%$$

## DISCUSSIONS

1. When conducting the experiment, 50ml of 0.01M of NBS is filled in the burette. To ensure that the burette is really filled with 50ml of NBS and not more or not less so that an accurate result can be obtained, the eye used to observe the reading of the NBS in the burette must be exactly in the same level as the NBS solution. Therefore, parallax error can be avoided and an accurate result can be obtained. 2. The titration is repeated 3 more times in

the experiment and the same conical flask is used to repeat the titration. After every titration, the contents are discarded and flask is rinsed with distilled water. To insure that there is no residue or other contaminants from the earlier experiments, the conical flask must wash with distilled water properly until no residues or contaminants can be seen anywhere in the conical flask. Even so, after the conical flask is properly rinsed with distilled water, the conical flask should be wiped with a clean towel to make sure that there is no distilled water and the conical flask is dry. This is because it might affect the rate of the reaction or produce an inaccurate reading which can affect the results.

3. During the experiment, the conical flask is swirled with the right hand while the left hand is used to control the amount of the NBS by opening and closing the stopcock. Sometimes, even if the burette's stopcock is closed tightly, there might be some drops of NBS still dripping out and dropping into the conical flask. This might affect the reading of the NBS in the burette. Hence, a clean and dry cloth should always be in hand to wipe out excess NBS dripping from the burette to insure accurate reading is obtained.

4. During conducting the experiment, one of the procedures involves swirling the conical flask with one hand while the other involves in opening and closing the stopcock of the burette. This procedure can affect the accuracy of the results because it involves swirling the conical flask using man power. Every student would certainly swirl the conical flask at a different rate and speed while repeating the experiments. Therefore, the rate of reaction may differ from each other and hence the accuracy might reduce. 5. When the

solution to turn a permanent yellow-green or blue colour, the end point of the experiment is reached. However, the way to determine the endpoint is not accurate because everyone has his or her own opinion on the colour change. This will eventually affect the results of the experiments.

## CONCLUSIONS

The mass of the ascorbic acid in 25ml of the solution is 106.9mg and the mass (mg) of ascorbic acid in the vitamin C tablet is 1069mg. Hence, the mass percentage of ascorbic acid in the vitamin C tablet is 23.2324%.