

Testing for Vitamin C in Drinks

Introduction

Vitamin C, also known as ascorbic acid, is an important nutrient for human health. Its primary purpose is to activate certain enzymes that help speed up some chemical reactions in the body. It also helps repair damaged tissue. Vitamin C is found naturally in many foods, especially citrus fruits. It is also added as a preservative or supplement to many other foods, including drinks.



In this lab, you will compare the amount of vitamin C in several different types of drinks. Vitamin C reacts with iodine solution; iodine reacts with starch to form a dark purple complex. We will react the iodine solution with the vitamin C in fruit juice by pouring it in from a long tube called a *buret*. Once all of the vitamin C has reacted, the iodine will be free to react with the starch and change color. This process of measuring the amount of chemicals that react is known as *titration*.

Materials

fruit drinks, various	iodine solution
hydrochloric acid, 1M [HCl]	starch solution

Equipment

beaker, 250-mL	graduated cylinder, 100-mL
buret	ring stand
buret clamp	stirring rod
Erlenmeyer flask, 250-mL	

Safety Considerations

- Iodine solution and hydrochloric acid are toxic and irritating to the skin; you must wear goggles for the entire lab.
- Sometimes chemicals from previous labs still remain in glassware and on other lab equipment; wash all lab equipment before and after performing this lab.
- Wash your hands thoroughly after completing this lab.

Procedure

1. Set up a buret using a ring stand and buret clamp.
2. Fill the buret with iodine solution to the "0 mL" mark. If you overfill the buret, you may open the nozzle and pour the excess into your waste beaker.
3. Measure 25 mL of fruit drink into a 250-mL Erlenmeyer flask. Record the brand of drink in the Data Table.
4. Add two drops of hydrochloric acid to the flask and mix thoroughly.
5. Add 1 mL of starch solution to the flask and mix thoroughly.
6. Using the buret, slowly add the iodine solution to the Erlenmeyer flask and swirl gently until a dark color appears and remains for 10-15 seconds. This is the end-point; record the volume of iodine solution used in the Data Table.
7. Repeat steps #2-6 for a total of three different fruit drinks.

Clean-up

1. Dispose of any leftover solutions in the sink.
2. Clean all used lab equipment with soap, water and a test tube brush.
3. Return all equipment to its proper location.
4. Wipe down your lab area and wash your hands before leaving the lab.

Data Table

Fruit drink	Volume of iodine used

Questions

1. What fruit drink required the **most** iodine solution? What is its daily value of Vitamin C in one serving?

2. What fruit drink required the **least** iodine solution? What is its daily value of Vitamin C in one serving?

3. Based on how often vitamin C is found in all kinds of food, do you think it is expensive to manufacture or not? Explain.

4. Besides fruit drinks, what are two other types of foods that contain vitamins?

5. List one way you could change this lab and describe how your results might be different.
