

Example – Science Fair - Research Plan

Name(s): Middle School Student

Title: Which Orange Juice Has the Most Vitamin C?

A. Question or problem being addressed

Vitamin C is required for good health. Most birds and animals make their own vitamin c. A few species, including humans do not. The U.S. Food and Drug Administration 's daily value guidelines recommend 60mg of vitamin c each day for a balanced diet. Good sources of vitamin c include fruits, vegetables, and vitamin tablets. Fruit juice is a good source of vitamin c. The purpose of this project is to find out which fruit juice has the most vitamin c.

B. Goals/Expected Outcomes/Hypotheses

The hypothesis of the examiner is that orange will have more vitamin c because it is often advertised as a good source of vitamin c.

C. Method or procedures

Materials:

Cornstarch
Water
Pot and stove
Measuring spoons
Measuring cup
Water glasses
Iodine tincture (2%) u.s.p.
Dropper that measures in milliliters)
Paper cups
Spoons for stirring

Juices to Test: pineapple, apple, grapefruit, orange, lemon

Steps:

1. Boil 4 cups of water in a pot. Add ¼ teaspoon cornstarch and stir to dissolve. Allow this solution to cool.
2. Measure ¼ cup of the cornstarch and water mixture into a water glass. Add 8 drops of iodine. Stir. The mixture will turn dark blue.
3. Put some of the juice to be tested into a paper cup. Pull some of the juice into the milliliter dropper. Watching amounts carefully, start adding juice to the blue mixture 1 milliliter at a time. Count and keep track of the number of milliliters added. Stir after every addition and look closely at the blue color. When it disappears, stop adding juice. Record the total number of milliliters of juice needed to get rid of the blue.
4. Repeat steps 2 and 3 for each juice. Always use clean glasses and spoons. Wash and dry the milliliter dropper between each test.
5. Perform three tests for each juice and average the results.
6. Use a standard solution to determine exactly how much vitamin C is in each juice. To make your standard, crush a 250-milligram vitamin C tablet. Dissolve it in 250 milliliters (1 cup) of water. The concentration of your standard is then 250 milligrams/250 milliliters, or 1 mg/ml. Then follow the procedure again, using the standard instead of a juice. This tells how many milligrams of vitamin C is needed to make the blue disappear. Then calculate the milligrams of vitamin C in each of your juices using this formula:
$$\text{ml of standard (needed to remove blue)} \div \text{ml of juice} = \text{mg of vitamin C per ml of juice}$$
7. The results will be analyzed and charted.
8. A conclusion will be drawn.

D. Bibliography

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