



## The Vitamin C Challenge



### About the Experiment

Do different varieties of the same fruit (like navel-, blood- or Mandarin oranges) have the same level of vitamin C? What about different brands of orange juice—or even fresh juice compared to juice made from frozen concentrate?

Let's find out with this project.

Using the steps and materials described below, you'll compare relative vitamin C content and rank orange varieties or juice brands from highest to lowest. Just keep in mind that you won't be able to get exact quantities.



**Ages – 10-17 (parental supervision required)**



**Time – 15-20 minutes**



## Difficulty – Medium

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### What You'll Need for the Experiment



- 2% iodine solution (available for purchase at local pharmacy)
  - cornstarch
  - water
  - eye dropper
  - measuring spoons and cup
  - saucepan
- one orange from multiple varieties or two or more brands of orange juice or orange-juice concentrate
  - 15-milliliter test tubes (or other similar glass vial). Use the same number as orange varieties or juice brands you'll be testing.
  - sheet of white paper
  - plastic kitchen wrap
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### Let's Do This!

1. Mix 1 tablespoon of cornstarch into enough water (start with a few teaspoons and go from there) in a saucepan to make a paste.
2. To this paste, add the 250 milliliters of water and boil for 5 minutes. Then turn off heat (please ask a parent or guardian to help).
3. Add 10 drops of the starch solution to 75 milliliters of water (use an eyedropper) in a measuring cup.
4. Add enough iodine to produce a dark purple-blue color. Your indicator solution is now ready.

5. Place 5 milliliters of indicator solution (about 1 teaspoon) in a 15-milliliter test tube (one for each sample).
6. To the test tube, use a clean eyedropper to add 10 drops of juice squeezed from the oranges or poured from the juice containers. Re-clean the eyedropper for each sample. You can place some plastic wrap over the opening to prevent spillage.
7. Line the test tubes against a white background from lightest to darkest purple. You can write down which type of orange or juice it is below each one.

**Results:**

What do you see? Note that the lighter the solution, the higher the vitamin C content. That's because vitamin C causes the purple indicator solution to lose its color. Now, record your results and draw your conclusions about which oranges or juice have the most vitamin C content.