Sprouts or Mature Plants

Levels of Vitamin C

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1. **Abstract of experiment.**

The question that has plagued nutritionists and those on the hunt for a better diet is: Do sprouts or mature plants have more Vitamin C. The answer is it depends on the plant. Through the process of extraction and the use iodine we have found that the amount of Vitamin C is dependent on the type of plant and the age of the plant.

**2. Introduction**

This Experiment has allowed us to make a conclusion on what most believe to be fact. Do sprouts really have higher amounts of vitamins? Throughout the experiment the method that was used to measure the quantity of vitamin C was by counting the number of drops of tincture of iodine that are needed to react with Vitamin C, an ascorbic acid, in a liquid. Ascorbic acids do not just act as vitamins they are also antioxidants. The reason vitamin C is important is because if you are deficient in it may cause health problems such as scurvy. Scurvy is a disease that is caused when you do not have enough vitamin c in your body to create collagen, an important component in connective tissue such as that found in the gums.

**3. Materials and Methods**

*Plants Chosen*

* Kale
* Radish

Calibration of Iodine Solution

Materials:

* Soluble vitamin C tablet (ideally effervescent with 500 mg vitamin C per tablet)
* 1 liter measuring jug
* Small measure
* Clear plastic disposable cups
* Corn flour
* Kettle (hot water required – not boiling)
* Tincture of iodine
* Pipette or eye dropper (widely available or from Amazon)

Method:

1. Prepare your starch solution: put a teaspoon of corn flour into a cup and ¾ fill it with hot water. Stir the suspension
   * 1. each time this is used.
2. record how much vitamin C is in the tablet (A).
3. Make the calibration solution by dissolving a vitamin C tablet in 500 cm3 of water. Note this volume.
4. Place 10 cm3 of your calibration solution in a clean plastic cup. Note this volume. Add water until the cup is about half full.
5. Add 5 cm3 of starch solution to your cup and stir.
6. Carefully add tincture of iodine drop by drop to the cup and count the number of drops. Stir the solution gently after each drop. Stop adding drops when the solution turns a deep purple/black color.
7. Calculate the mass of vitamin C that reacts with one drop of iodine.
8. Using the Average Data table, calculate the average mass of vitamin C that reacts with one drop of iodine. (I)

Data of Calibration

|  |  |
| --- | --- |
| Average mass of Starch | **110 mL** |
| Volume of water added (step 3) | **500 mL** |
| Mass of starch per cm3 of calibration solution | **1** |
| Volume of small measure | **2cm2** |
| number of drops of iodine needed | **1 cm3** |
| mass of starch in small measure | **21 g** |
| **Mass of starch per drop of iodine** | **10 mL** |

Testing Kale for Vitamin C

Materials:

* Kale (mature and sprouts)
* Electronic scales
* Crucible
* 100 cm3 measure
* Test tube
* Clear container
* Kettle (hot water required – not boiling)
* Tincture of iodine.
* Eye dropper

Method:

1. Decide how your fruit or vegetable is to be prepared.

minutes

1. Prepare your starch solution: put a teaspoon of corn flour into a cup and ¾ fill the cup with hot water. Stir the suspension each time it is used.
2. Cut approximately 5 g of your food and record the mass (J).
3. Chop or grate the fruit or vegetable into small pieces.
4. Add 100 cm3 of water to your prepared sample.
5. Gently stir the pulp and water mixture for about a minute.
6. Allow the pulp to settle. Decant off the liquid into a clean cup.
7. Add 5 cm3 of starch solution to the liquid and stir (see figure 5).
8. Add tincture of iodine to the mixture drop by drop and count the number of drops as you add them and stir the solution gently after each drop. Stop when the solution turns a deep purple/black color. Depending on the strength of your tincture of iodine solution it should take around 3–80 drops to reach the end point.
9. Repeat steps 3–9 twice more and record the data in the table.
10. Average your data as you did for the calibration
11. Calculate the mass of vitamin C in milligrams per gram of food using your calibration standard.

Personal Data Average of Vitamin C in Kale Sprouts

|  |  |
| --- | --- |
| Mass of Food Used | 15 g |
| Number of Drops of Iodine | 42 |
| Number of Drops of iodine per drops of Food | 2.8 drops/g |
| Amount of milligrams of Vitamin C per Drop of Iodine | .35 mg |

Personal Data Average of Vitamin C in Mature Kale

|  |  |
| --- | --- |
| Mass of Food Used | 8.5 g |
| Number of Drops of Iodine | 48 |
| Number of Drops of iodine per drops of Food | 14.9 drops/g |
| Amount of milligrams of Vitamin C per Drop of Iodine | .58 mg |

**4. Results**

Based on not only my personal data but also the overall class data mature kale has more milligrams of Vitamin C for every gram of Kale than in kale sprouts. But in radish there are more milligrams of Vitamin C for every gram of radish sprouts than in sprouts than mature radish. Discrepancies in individual data can be a result of environmental conditions that may have affected the growth and nourishment of individual plants.

|  |  |  |
| --- | --- | --- |
| **Overall Class Average of Kale Data** | | |
|  | Sprouts | Mature |
| Kale | 1.7818 | 2.0995 |

|  |  |  |
| --- | --- | --- |
| **Personal Averaged Data** | | |
|  | Sprouts | Mature |
| Kale | .35 | .81 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Overall Class Average of Radish Data** | | | |
|  | Sprouts | Mature Bulb | Mature Leaf |
| Radish | 1.6803 | 1.3988 | 1.3523 |

**5. Discussion Analysis**

The results lead to the conclusion that the difference between the amount of Vitamin C in sprouts versus mature plants is dependent on the plant the statement is in reference to. For instance, in this particular experiment Mature Kale tends to have more Vitamin C than sprouts do. Though when you compare Mature radish to its sprout the sprout has more Vitamin C in both its bud and leaf.

**6. Reference Citations**

"Global Experiment." N.p., n.d. Web