**3.03 Control of Enzymatic Browning in Mushrooms**

**Safety**

Follow lab safety procedures as determined by your teacher. Be particularly careful while cutting the mushrooms, as they are soft flesh and easily can slip on a cutting board. Flush all solutions down the drain, one at a time, be sure to use plenty of water.

**Purpose**

Enzymes speed up chemical reactions, especially in food. You may observe this reaction upon slicing an apple or banana. This lab focuses on the catalyst called polyphenol oxidase which causes enzymatic browning of various fruits and vegetables. You will explore various methods used to slow down enzymatic browning and ultimately increase the shelf life of sliced mushrooms.

**Equipment**

500 mL Beakers (6)

Paring or chef’s knife

Cutting board

**Supplies**

¼ container of white mushrooms per team

50 mL ascorbic acid solution

50 mL lemon juice

50 mL white vinegar

50 mL calcium chloride solution

50 mL hydrogen peroxide

50 mL water

**Procedure**

1. Slice your mushrooms into ¼” pieces. Do not wash the mushrooms before using.
2. Use a wax pencil or sharpie with tape to label a small beaker with the appropriate treatment your group has been assigned: ascorbic acid, lemon juice, vinegar, calcium chloride, or water.
3. Place the sliced mushrooms into the treatment solution and allow it to sit covered for three minutes.
4. Take out the samples and place them in a space where they can sit and dry. Be sure to label the treatment.
5. Place your sample along with the others.
6. Make observations according to the data table after slicing and soaking.
7. Make one final observation at the beginning of class the following day.

**Lab**

Assigned variable:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Enzymatic Browning of Mushrooms Data Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 5 min after | 10 min | 20 min | 30 min | 45 min | Class Day 2 |
| Ascorbic acid solution |  |  |  |  |  |  |
| Lemon juice |  |  |  |  |  |  |
| White vinegar |  |  |  |  |  |  |
| Calcium Chloride |  |  |  |  |  |  |
| Water |  |  |  |  |  |  |
| Control |  |  |  |  |  |  |

**Observations**

Describe how enzymatic browning impacts the mushroom’s quality over time:

|  |  |
| --- | --- |
| Aroma |  |
| Touch |  |
| Site |  |

**Post-Lab**

Questions

1. What did the solutions do to the speed of enzymatic browning?
2. Which solution prevented enzymatic browning the best?
3. Which solution would be best used in food preparation?
4. Which solution would most likely not be used in food preparation?
5. Which of the solutions effective in preventing enzymatic browning but not good for food preparation?
6. Did any of the solutions cause more enzymatic browning than the control? Why do you think this occurred?

**Teacher’s Notes**

To create ascorbic acid solution:

To create calcium chloride solution: