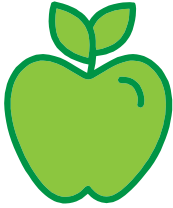




## Enzymatic Browning of Fruit Lab

<b>Purpose</b>	<b>To compare methods to stop enzymatic browning.</b>	
<b>Scientific Explanation</b>	Enzymes found in some fruits cause the formation of brown pigments called melanins when exposed to oxygen.	
<b>Equipment</b>	<b>Supplies</b>	
bowls	1/3 c. lemon juice	3/4 c. granulated sugar
tongs	1 Vitamin C tablet	water
timer	1 apple	1 banana
Paper plates		
Apple corer/slicer		
<b>Procedure Steps</b>		
<b>1. Prepare Vitamin C dip-</b> dissolve 1 tablet in 1/2 c. warm water-stir to dissolve. Label bowl-Vitamin C dip. (ascorbic acid)		
<b>2. Prepare Sugar Dip-</b> stir 3/4 c. granulated sugar in 1/2 c. warm water. Label bowl- Sugar Dip.		
<b>3. Measure and pour 1/3 c. Lemon juice</b> into a bowl. Label bowl-lemon juice.		
<b>4. Measure and pour 1/3 c. water</b> into a bowl. Label bowl-water.		
<b>5. Slice banana</b> into 1/4 in slices. Place a few pieces on a plate and label- <b>control</b> . Evenly divide remaining banana slices in remaining bowl. Let stand <b>3 mins. Remove</b> from dip- placing on slices on corresponding paper plates. Let stand for 30 minutes recording your observations of changes every 10 mins on <b>data chart</b> .		
<b>6. Prepare apple slices</b> using apple corer/slicer repeating the procedure listed above using tongs to dip the fruit. Rinse tongs when changing dips.		
<b>7. Prepare fruit dip recipe-</b> record data on table. Complete process questions and clean up lab area.		

Lab is adapted from: *Lab: Enzymatic Browning-pg. 29-30. Food science Activities for Middle School-* Learning Zone Express.



**Prediction** (hypothesis) of results of experiment is \_\_\_\_\_

**Data Table- Apple**

<b>Level of Browning*</b>					
<b>Time Min.</b>	<b>Control</b>	<b>Vit. C. Ascorbic Acid</b>	<b>Sugar</b>	<b>Lemon juice Citric Acid</b>	<b>Water Soak</b>
<b>0</b>					
<b>10</b>					
<b>20</b>					
<b>30</b>					

- 5=completely dark brown
- 4=fully covered light brown
- 3=half-covered light brown
- 2=scant brown patches
- 1= no browning present

**Data Table- Bananas**

<b>Level of Browning*</b>					
<b>Time Min.</b>	<b>Control</b>	<b>Vit. C. Ascorbic Acid</b>	<b>Sugar</b>	<b>Lemon juice Citric Acid</b>	<b>Water Soak</b>
<b>0</b>					
<b>10</b>					
<b>20</b>					
<b>30</b>					

- 5=completely dark brown
- 4=fully covered light brown
- 3=half-covered light brown
- 2=scant brown patches
- 1= no browning present

**Tables-adapted from: Enzymes in Food Systems-Act #3-“Enzymatic Browning of Apples”** pg. 5. Institute of Food Technologists, 1996.

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## **Process Questions**

1. Was your prediction (hypothesis) correct? Why or why not?
2. Which method worked the best and why?
3. Why is it important to prevent enzymatic browning in cooking and baking?

## **Research questions**

4. How do citrus juice or ascorbic acid (Vit. C) retard browning of fruit slices?
5. How does sugar slow enzymatic browning?