



## Curiosity Guide #801

### Fruit Science

Accompanies Curious Crew, Season 8, Episode 1 (#801)

#### Browning Fruits

Investigation #6

#### Description

Can we stop fruits from turning brown? Find out!

#### Materials

- Apple
- Banana
- Strawberry
- Kiwi
- 4 plates
- Knife
- Sugar
- Lemon juice
- 2 bowls
- Water
- Post-it notes
- Marker

#### Procedure

- 1) Cut each of the fruits into at least four slices. Divide the slices evenly among the four plates.
- 2) Sprinkle sugar to cover the top surface of the fruit on one of the plates. Use a post-it note to label the plate with the word "sugar."

3) Pour some lemon juice into a bowl and submerge each of the slices from the second plate in the juice. Then put the slices back on the second plate and label the plate with the words "lemon juice."

4) Pour some water into a bowl and submerge each of the slices from the third plate in the water. Then put the slices back on the third plate and label the plate with the word "water."

5) Leave the fourth plate alone. Label this plate with the word "control."

6) Leave the plates alone for 30 to 60 minutes, then observe.

7) What do you notice?

**My Results**

## Explanation

Fruits have a chemical that causes the fruit to turn brown when the fruit meets air. This chemical change is called enzymatic browning. You could see this change in the control plate as the slices started to change color. Fruit molecules have enzymes, which are proteins that speed up chemical reactions. These enzymes are also responsible for fruit ripening and over-ripening. The enzyme in the cells of the fruit responsible for browning is called polyphenol oxidase or PPO. When PPO is exposed to oxygen and phenolic compounds, PPO forms quinone compounds that further react and form melanin, the brownish color on the fruit. Melanin is also the pigment in our skin, hair, and eyes. The skin of fruit typically keeps the compounds apart, but when the fruit is cut and the inside exposed, the browning process begins. This also happens when fruit tissues get damaged, get old, or endure extreme temperatures. Stress to the fruit's tissue allows the enzymes and compounds to mix with the air, and the fruit begins to discolor. To prevent the cut fruit from browning, we tried different preservative methods. The lemon juice worked well because the acid changed the pH level so the enzyme couldn't work as well. Both water and sugar provide a barrier to the air to slow down how much oxygen can react with the enzyme.

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