

**Which factors help prevent a banana from ripening
fast?**

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Abstract:

Around the world bananas are planted, harvested and consumed every day. However, many bananas go to waste because they ripen too quick and develop brown spots and become mushy which is unappetizing to most. Because of this people have been trying to find the best methods to prolonging the life of a banana. To test this, bananas will be placed in different settings around the house in which the sun will hit it, or not, as well as in some colder temperatures. It was found that the sun as well as colder temperatures cause a banana to ripen quicker.

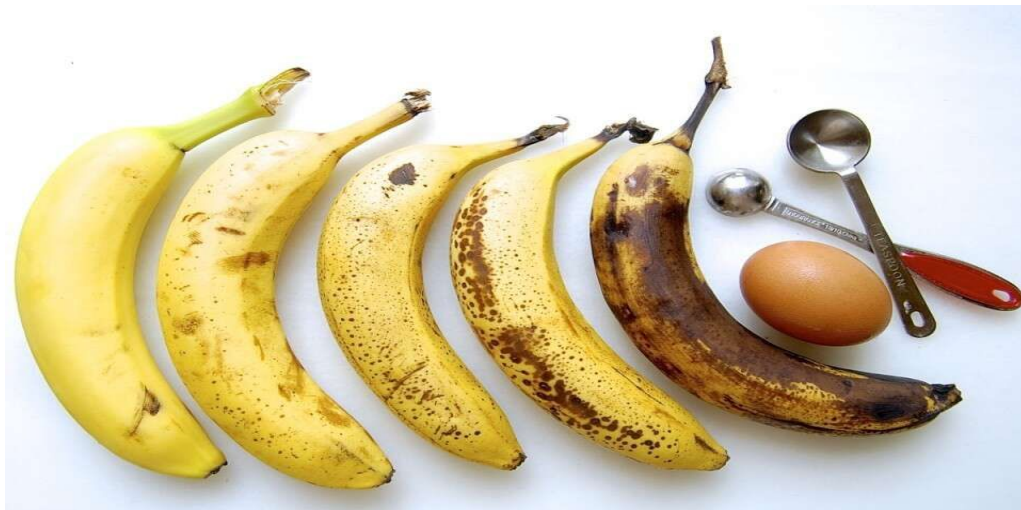
Introduction:

The purpose of this lab is to determine what factors affect a banana's ripeness. Around the world bananas are consumed every day. It is the fourth most consumed fruit in the world having more than 100 billion consumptions a day around the world [1]. It is used for deserts, breads, smoothies, as a topping and in many more ways. Bananas are known to be yellow in color; however, that is not fully true, bananas start off as unripe, hard in texture, and light greenish. It is during these stages when commercial bananas are harvested [2]. They are harvested early that way when bananas arrive at the shelves of stores, they are still early in the ripening stage. That is because once the banana breaks off from the stem of the plant it has a shift in hormones [2]. The hormones convert specific amino acids in the banana into a gas called ethylene [2].

Ethylene is a one of the only gas regulators that exists in nature [3]. It is very essential in plants like tomatoes and bananas, both fruits that go through drastic change in color over their life spans. Ethylene is responsible for the cell growth in most plants which in other way could be the ripeness of a fruit [3]. As the fruit continues its life span the ethylene gas within the fruit releases

more and more making the fruit softer, change color, and ripen. Because of ethylene's huge impact on a fruit's lifespan and ripeness many scientists have been trying to genetically modify the level of ethylene produced and the amount of ethylene present in the fruit [3]. The American Society for Horticultural Science reports some progress in the process to genetically modifying the ethylene factor in plants [4]. However, there is no clear-cut way of modifying the release of ethylene.

It is because of this that we look for other ways to control the release of ethylene in a fruit. Some methods include the ones that will be done in this lab including the direct shine of sunlight on a banana or the temperature it is set at. By examining how the banana reacts we will be able to see what factors contribute to a fruit releasing or detaining its ethylene. In this experiment it is expected that the sunlight and cold temperature settings will speed up the ripening of a banana.



[5]

Objective:

- To see the different types of factors that cause a banana to ripen faster
- To determine whether a colder setting helps a banana ripen faster or slower

- To determine whether the sun has an effect on a banana ripening slower or faster
- To find different methods in order to control the ripening of a banana

Materials:

- 5 un-ripened bananas of light greenish color.
- 5 plastic containers with a cover lid
- 1 marking pen
- 5 pieces of tape about one inch long
- Paper towels or a drying towel
- Knife
- Data sheet
- 1 shoe box
- Ice cubes
- One cup
- Notepad/Lab book
- Pencil/Pen
- Measuring cup

Procedure:

- Set 5 bananas on table side to side
- Take the one-inch long tape and place stem of banana
- Label each banana in numerical order from #1 to #5

- Pour ice cubes into the cup
- Measure out 1 cup of ice
- Fill one container with a cup of ice
- Place a towel in each container to keep a clean base
- Place one banana in each container
- Place bananas in their settings.
 1. Place banana #1 in the refrigerator
 2. Place banana #2 in a regular room temperature setting with sunlight hitting the banana
 3. Place banana #3 in a regular room temperature and cover with a shoe box
 4. Place banana #4 in the freezer
 5. Place banana #5 in container filled with ice and have sunlight hitting the banana
- After placing the containers in their setting allow the bananas to ripen
- Monitor the bananas for 3 days and see how ripe the banana is
- Make three different sections for the brown spots: small brown spots, medium brown spots, large brown spots
- Record the number of brown spots that appear on each banana in your notepad or Lab book
- Cut open the banana with a knife
- Examine the inside of the banana, what is the texture?
- Record all information into data table

- After the experiment dispose of the shoe box and melted ice water
- Wash all equipment used (containers, knife, measuring cup)
- Do not dispose bananas
- Use the ripe bananas to make desserts or smoothies of your choosing.

Results:

Below is the chart containing information on the texture, and color of the banana. From the chart we see that the bananas over the three days had different results. The banana sitting in the sun ripened the most followed by the banana in ice and direct sunlight shining on it. Furthermore, the bananas in the freezer and fridge had similar results in color; however, the banana in the freezer had a harder texture. The banana that was at regular temperature had the least change in color, and texture.

Banana #	Texture	Small spots	Medium spots	Large spots	Total spots
Banana #1	Solid/firm	4	6	3	13
Banana #2	Mushy	10	6	4	20

Banana #3	Soft	6	1	0	7
Banana #4	Frozen/hard	5	4	2	11
Banana #5	Soft	4	3	1	8



[6]

Analysis:

After examining the results, we see that the cold temperature as well as the sun light affect the release of ethynyl drastically. Although the bananas under the sun had more spots the bananas in the fridge and freezer came close in terms of ripeness. The banana under the sun ripened quickly and rapidly because of the heat the sun exposes on the banana. When the temperature of the banana rises or the banana itself heats up the release of ethylene gas rises

therefore causing the banana to ripen faster [7]. However, in the case of the banana in the container filled with ice it did not ripen that much because even though it was in the sun the ice had kept the banana cool instead of warming it up and ripening it quick. As for the bananas in the fridge and freezer had a weird occurrence. Although their skins are very ripe the texture was not that of a ripe banana. The texture was hard and firm, it is reported that keeping a banana in a fridge is the best way to preserve ripeness of the actual banana, although the skin will become very brown the banana will still be at peak ripeness [8]. At the end of the experiment it was the banana covered with a shoe box that ripened the slowest, since it was at room temperature and not heating up from the sun it was able to sustain a good life span.

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