Battle of the Bananas

By Eva Wysong

Does storing bananas in different ways cause them to stay yellow longer?

Variables, Constants, and Control

Manipulated Variables:

- Placing the bananas in green bags.
- Wrapping the bananas' stems with plastic wrap.
- Hanging the bananas in the air so they are not touching any surface.

Responding Variable:

- The percentage of banana peel that stays yellow.

Constants:

- All bananas were located in the same room with the same temperature and humidity.
- No bananas were exposed to direct sunlight.

Control:

- Bananas sitting on a shelf.

Research

Bananas ripen by absorbing an airborne hormone called ethylene. The acids in fruits begin to break down when exposed to ethylene, causing their flesh to soften and the green chlorophyll pigments to break apart. Climacteric fruits, such as bananas, apples, pears, and avocados, continue to create ethylene after they have been picked. In bananas' case, the yellow pigments in the skin disperse and create brown spots. This process is called enzymatic browning. There is no perfect answer to keep bananas from turning brown. However, there are several common methods to slow down the ripening process. This experiment studied a few methods.

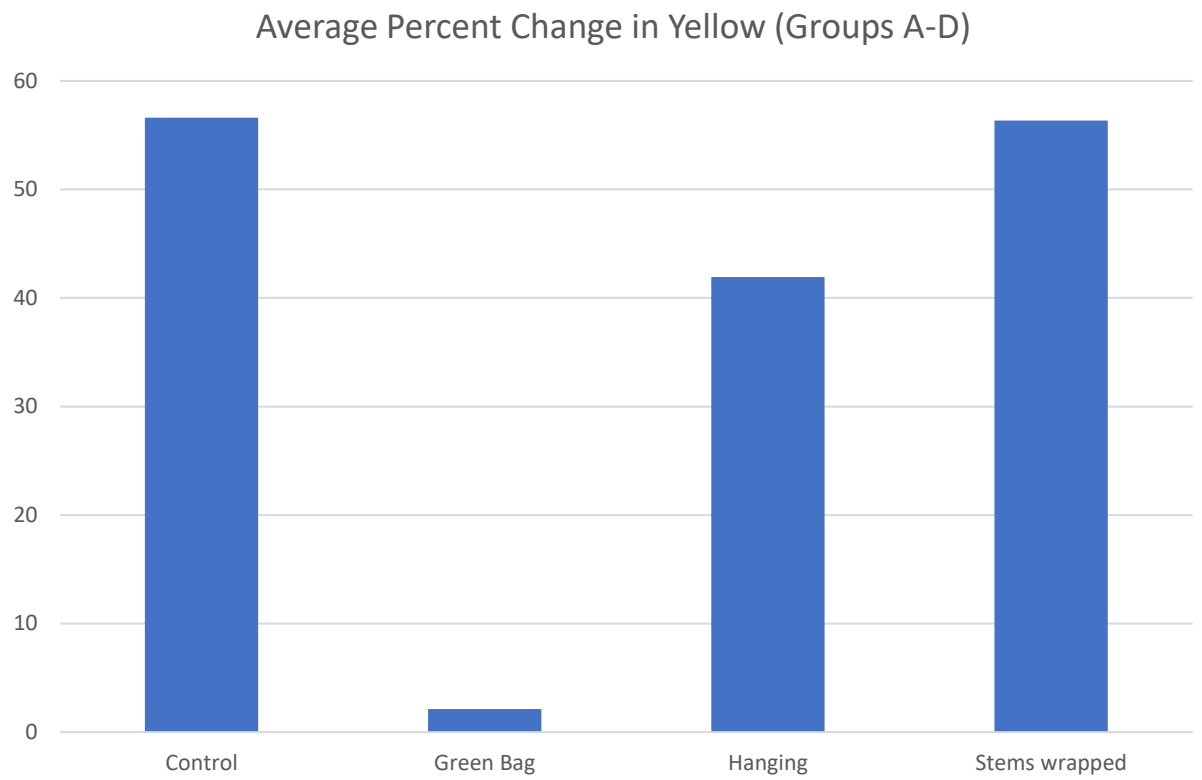
Hypothesis

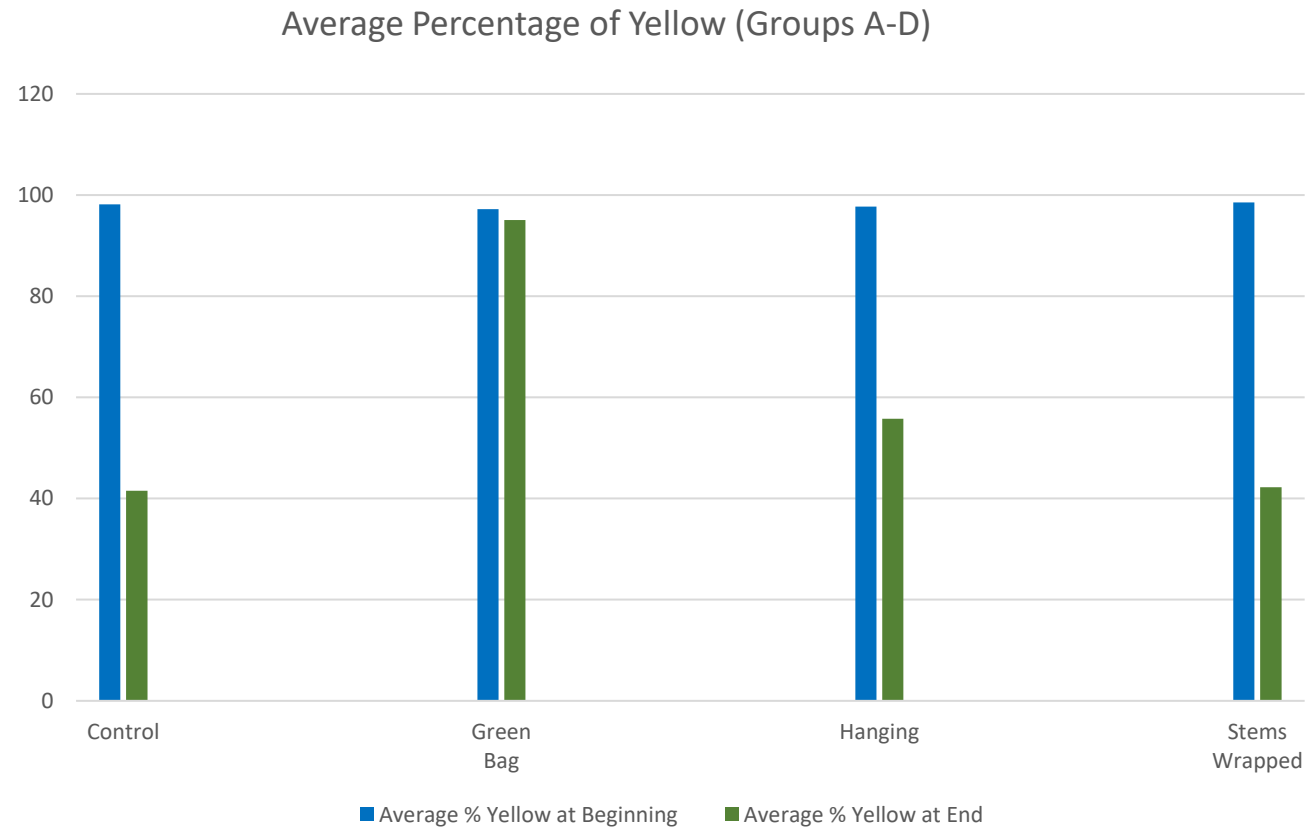
I predict that wrapping the bananas' stems will enable them to have the highest percentage of yellow, as it may block the ethylene from reaching the banana more than the other variables.

Procedure

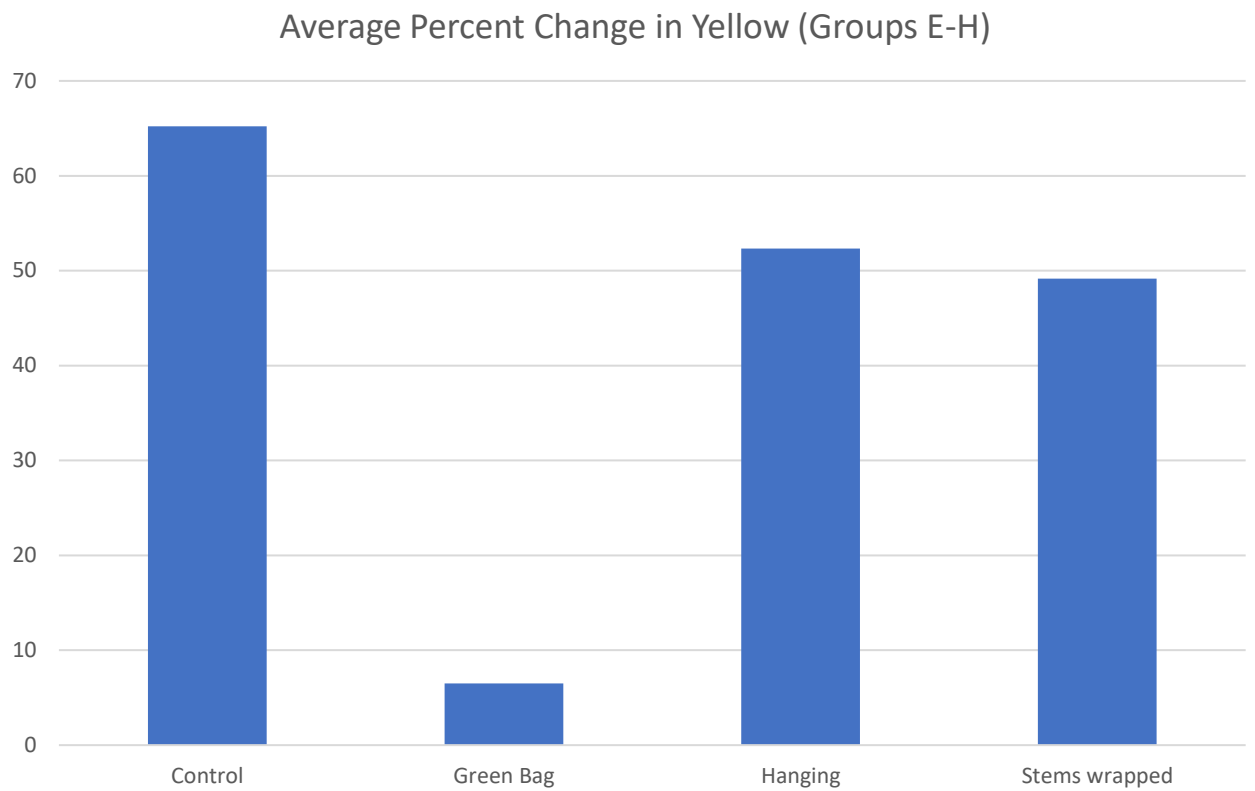
1. Buy four bunches of bananas.
2. Take four random bananas from each bunch. Label all bananas from the first bunch “A,” the second bunch “B,” the third bunch “C,” and the fourth bunch “D.”
3. Randomly select one banana from each group (A, B, C, and D) to test each variable (wrapped stem, hung, green bag, control).
4. Take sixteen sticky notes and assign one to each banana as a label.
5. In good lighting, take pictures of each banana individually.
6. Wrap the banana’s stems, hang them, insert them into green bags, or put them on the shelf.
7. Record daily observations of the bananas.
8. After 10 days, remove all plastic wrap, rubber bands, twine, and green bags from the bananas. Take pictures a second time.
9. Repeat process for the second group of bananas.
10. Equalize brightness and analyze the pictures using Fiji.

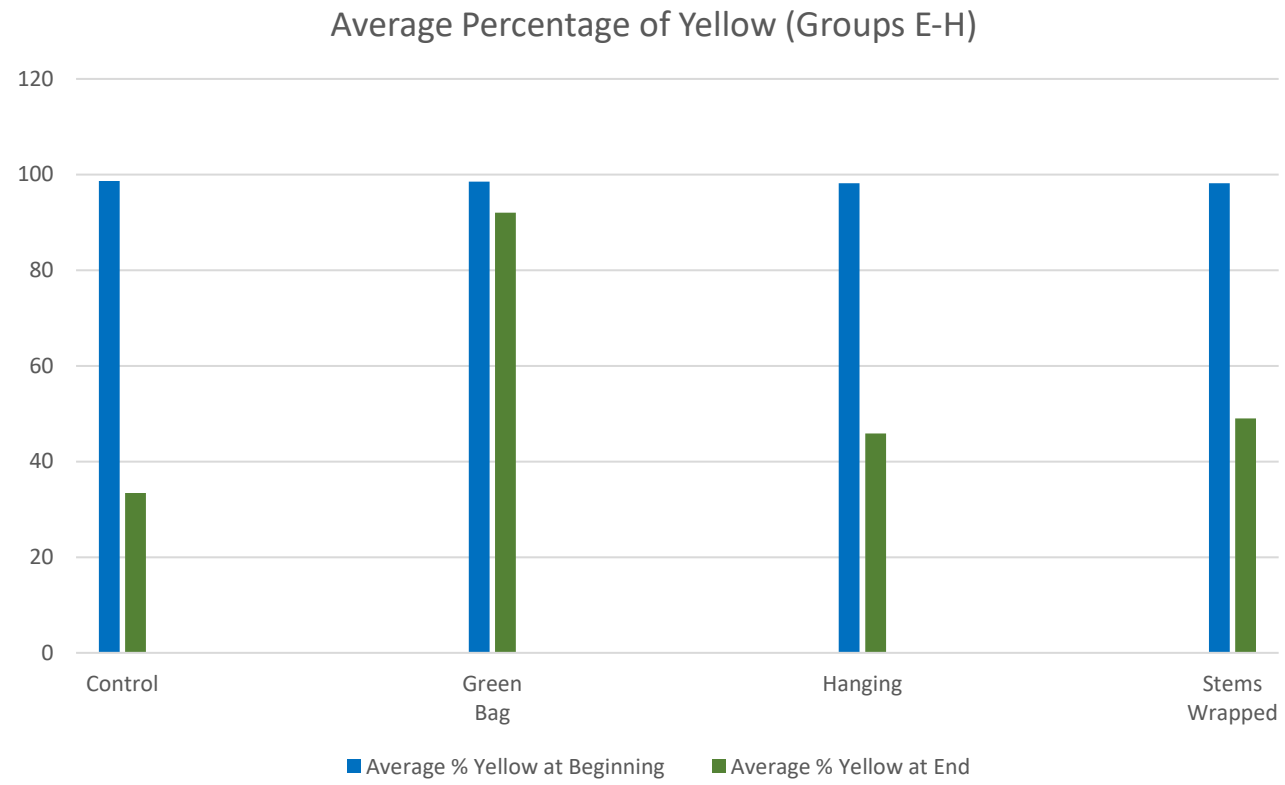
Graphs


Average Percent Change in Yellow (Groups A-D)
60
50
40
30
20
10
0
Control
Green Bag
Hanging
Stems wrapped

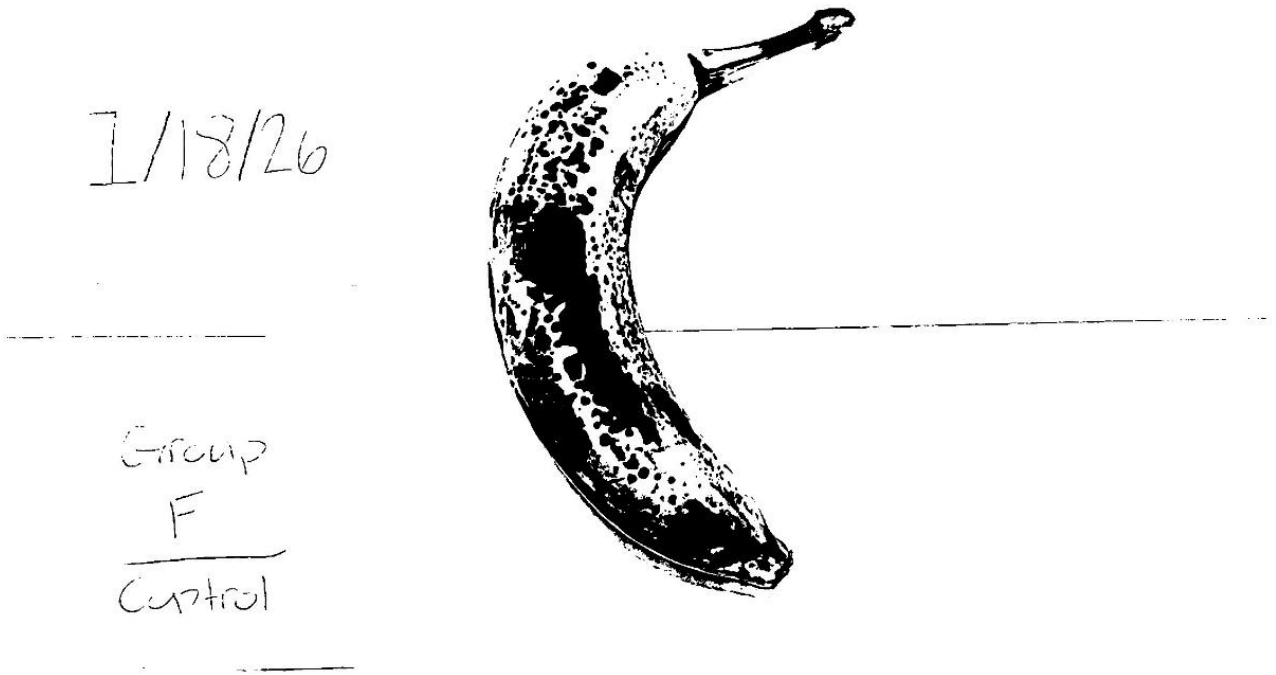

Average Percentage of Yellow (Groups A-D)
120
100
80
60
40
20
0
Control
Green Bag
Hanging
Stems Wrapped
Average % Yellow at Beginning
Average % Yellow at End

Graphs


Average Percent Change in Yellow (Groups E-H)
70
60
50
40
30
20
10
0
Control
Green Bag
Hanging
Stems wrapped


Average Percentage of Yellow (Groups E-H)
120
100
80
60
40
20
0
Control
Green Bag
Hanging
Stems Wrapped
Average % Yellow at Beginning
Average % Yellow at End

Here is an example of a banana's photo in Fiji using MaxEntropy. The % Area shows how much of the banana appears white, which is the yellow part of the banana peel.



	% Area	
IMG_0474.JPG	44.143	

Conclusion

The data did not support my hypothesis. The average amount of yellow for the stems-wrapped bananas changed from 49-56% in both groups. This was hardly better than the control group, which changed from 56-65%. The hanging bananas did slightly better; they changed 41-52%. Surprisingly, the green bag bananas changed the least both times, only 2-6% from the beginning to the end. I inferred that the green bags contained a substance that was very effective at absorbing the bananas' ethylene. Wrapping the stems and hanging the bananas did not stop ethylene's effects. I learned that green bags work best in preserving bananas. While keeping bananas from turning brown may be challenging, these results can help families enjoy their yellow bananas longer.