

Cost Effective Method to Determine Effect of Ethylene Gas on Ripening of Bananas

Ashley Sieftring, Devin Sieftring, Brooke Gaerke, and Colby Homan

Wright State University – Lake Campus, Celina OH

Abstract

The purpose of this project was to draw conclusions on the process and speed of ripening in bananas due to natural presence of ethylene gas. Ethylene gas is released as a byproduct of ripening fruits, so to test ethylene’s effect on ripening, ripe bananas were mixed with non-ripe bananas to observe the speed of decay. To determine if the non-ripe fruit ripened faster in the presence of ethylene, half of a bunch of bananas was set apart from the ripe bananas and the speed of ripening was also recorded. We split and tested a single bundle to ensure that the bananas were at the same stage of ripeness before the study was conducted. The study's findings formed the result that the bananas that were included with the riper bananas ripened faster than the bananas that were set apart from the ripe bananas. Through this information, the conclusion was drawn that the ripe bananas caused the non-ripe bananas to ripen faster due to the ethylene gas since there were no other changes of environment between the bundles.

INTRODUCTION

This study was conducted in order to discover the effects ethylene gas has on the ripening rate of bananas. According to Maduwanthi and Marapana (2019), ethylene gas can be described as a hormone found within plants that accelerates their ripening rate. This information was used to set up this experiment, which includes multiple trials of placing premature and ripened bananas within the same environment and examining their natural reactions with one another. Similar studies were completed by Burg and Burg (1961), as they compared the role of ethylene gas in multiple fruits: bananas, pineapples, and mangos. However, their study was much different than this one, as they injected the fruits with ethylene gas before the fruits had time to naturally produce it themselves. It was found that mangos and bananas depend majorly on the production of ethylene gas in order to ripen those products; however, pineapples were found to ripen merely on their own, and prefer the absence of ethylene (pg. 184-188). The research in this study is adding to the body of knowledge that already exists by offering a more cost-effective way to analyze this relationship.

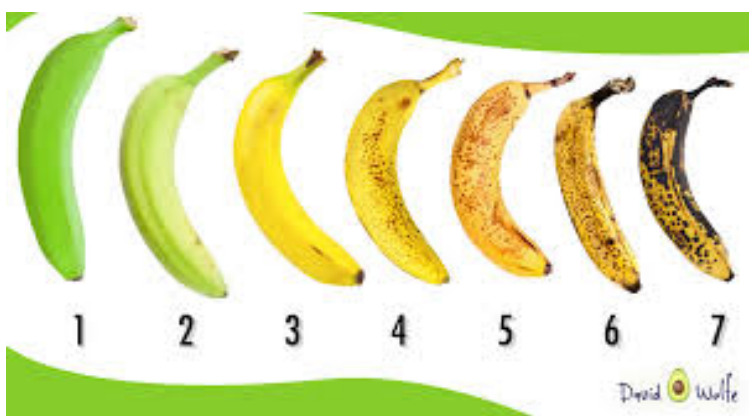
MATERIALS & METHOD

Materials:

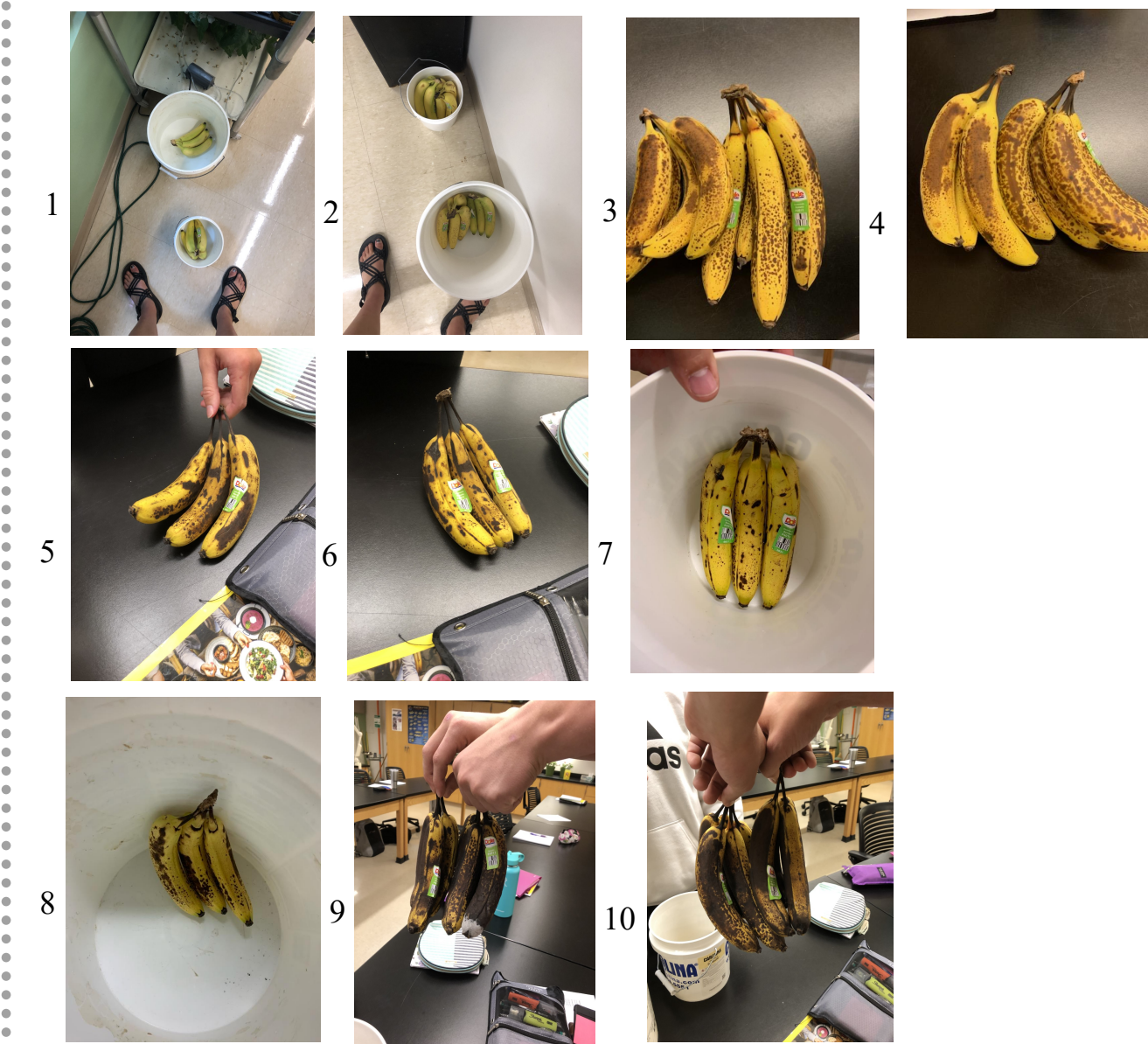
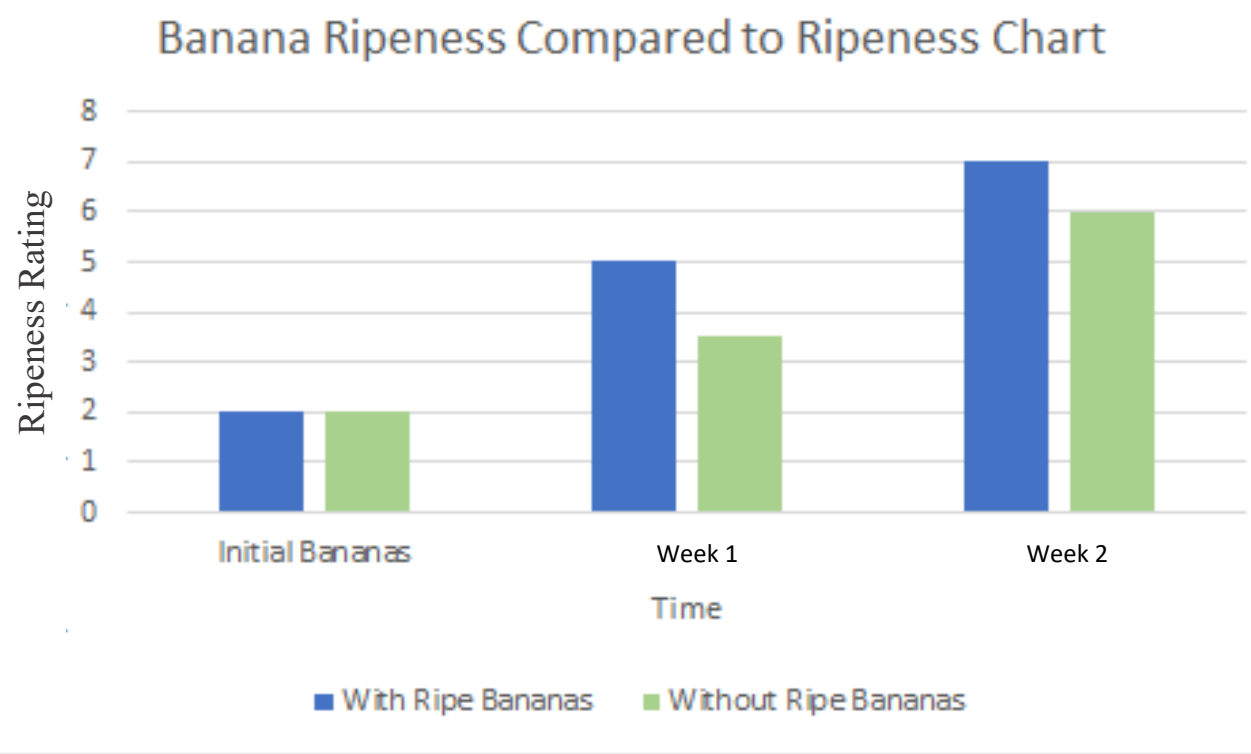
- Two bundles of ripened bananas
- Four bundles of premature (green bananas)
- 4 buckets (around the same size)
- Phone Camera

Method:

1. Both the mature and underdeveloped bananas were collected
2. Two sets of buckets were labeled “With Ripe Bananas” buckets and two sets of buckets were labeled “Without Ripe Bananas” (two sets because of replicating the process)
3. Ripened banana bundles were split into two and place a halve in each "With Ripe Banana" bucket
4. One premature banana bundle was then placed in each of the four buckets
5. Pictures were taken of each bucket to compare data
6. Bananas were let to ripening for one week
7. Data and pictures were collected again
8. Bananas were left to sit for one more week
9. Data and pictures were collected again
- 10.The bananas were then thrown away
- 11.All Pictures were compared to the Ripening Scale between each data collection point
- 12.Information that was gathered was then used to formulate conclusions



RESULTS



- 1-Two buckets including premature bananas.
2-Two buckets including premature bananas, also with a bundle of ripened bananas.
3 and 4- The result from premature bananas ripening with ripe bananas in the bucket after one week.
5 and 6- The result from premature bananas ripening on their own after one week.
7 and 8- The result from premature bananas ripening on their own after two weeks.
9 and 10- The result from premature bananas ripening with ripe bananas in the bucket after two weeks.

DISCUSSION & CONCLUSION

Throughout this experiment it was discovered that bananas exposed to the ethylene gas naturally emitted by ripening bananas did have a faster rate of decay. In the study, half a bundle of green bananas were placed in an open bucket along with a bundle of ripe bananas. In another bucket the other half bundle of green bananas were isolated in an open bucket and placed on the opposite side of the room. Two trials were produced to help ensure consistency within the results. The bananas were allowed to set for two weeks with data being collected at the one-week and two-week intervals. With two trials of the study it was determined that the ethylene gas given off by bananas was a factor for the faster rate of decay of bananas nearby. This knowledge could be further implemented in real life as a cheap way to speed up the ripening process of bananas, or it could be reversed to help preserve bananas by separating the ripe bananas from the green bananas. Gaps that still need filled to enhance knowledge on this subject would include temperature’s effect, as well as if the amount of air alters the presence and functions of ethylene gas. This experiment also brings to question whether this ripening strategy could be applied to all fruits and, if so, could bananas be used as a cheap ripening agent for all fruits.

REFERENCES

- Burg, S. P., & Burg , E. A. (1961). Role of Ethylene in Fruit Ripening. *Plant Physiology* , 179–187. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC549760/pdf/plntphys00425-0067.pdf>
- Free Research Poster PowerPoint Templates. (2019). Retrieved from <https://www.posterpresentations.com/free-poster-templates.html>.
- Maduwanthi, S. D. T., & Marapana, R. A. U. J. (2019). Induced Ripening Agents and Their Effect on Fruit Quality of Banana. *International Journal of Food Science*, 2019, 1–8. doi: 10.1155/2019/2520179
- Sankhe, D. (2015). Ripness Inspection System for Banana. *International Journal of Computer Applications*, 6–9. Retrieved from <https://pdfs.semanticscholar.org/32ba/c78a56ca096cab3c87f091a53058d2a325a6.pdf>