The Effect Of Liquid Preservatives on Strawberry Decay

Can strawberries really be saved?

Question

What is the best liquid preservative to help preserve strawberries for a span of two weeks??

Aloe Vera Gel used as preservative

White Vinegar used as a preservative

Aloe Vera Juice used as a preservative

Research

Mold is a type of fungus that feeds off of dead things to live (Farrelly). It can occur quickly and enjoys wet and dark climates like fruit (Farrelly). Since strawberries are not long lasting berries, mold will start to grow faster (How). Strawberries are able last longer if they are preserved or kept in the right climate (How). White vinegar is an excellent fluid to help preserve fruit because of its acetic acid. (Hill). White vinegar has been used to kill bacteria for medicines as well (Hill). Honey, a hygroscopic liquid, is also a great food preservative because it can eliminate the moisture in foods (Mandal). Honey can extract the excess moisture from food which makes it last longer (Hill). Another good preservative is Aloe vera because it is commonly used as a coating on fruit and vegetables to keep them shinier and longer lasting (Aloe Vera). Aloe vera is also able to be consumed and is environmentally safe (Aloe Vera)!

Risk Analysis

- Ceramic plates are used during this experiment; Be aware they can break easily and are not entirely durable.

Variables

- **Independent variable**: Different Liquid Preservative
- **Dependent variable:** Amount of strawberry decay
- **Controlled variables (constants):** Amount of Strawberries on each plate, amount of time the strawberries are being monitored, how long the strawberries will be dunked in their assigned preservative, the same size cups used to hold the liquids

Hypothesis

If honey, Aloe vera, and white vinegar are used to preserve strawberries, then the honey will produce the least amount of decay.

Materials

- Any brand of plates for the strawberries to lay on after they are soaked
- Honey (available from Amazon)
- Aloe vera juice (available from Amazon)
- Aloe vera gel (available from Amazon)
- White vinegar (available from Amazon)
- Two tubs 1 gallon strawberries
- Four plastic cups (available from Amazon,com)
- Sharpie Marker
- Sticky Notes
- Water
- Plastic Wrap

All the materials set and ready to begin procedure

Procedure

1. Lay five plates out on the counter next to each other
2. Grab the Sharpie marker and the sticky notes and label five sticky notes that say **Honey, Aloe Vera Juice, Aloe Vera Gel, White Vinegar,** and one that says **None**
3. Place the sticky notes in front of each plate or on the edge of the plate
4. Measure and pour half of a cup of each liquid preservative into its own plastic cup and place them behind each plate
5. Test their acidity using a pH strip
6. Get the tubs of strawberries out of the refrigerator and place them on the workspace
7. Now take six strawberries out of each container and place six on each plate
8. Dunk each all six strawberries on each plate in their designated liquid preservative marked on the sticky note (Make sure all sides of the strawberries are coated for seven seconds)
9. Now that all the strawberries are coated, place them back on their assigned place
10. After putting them back on their plate, cover the plates in plastic wrap and place the in the refrigerator
11. Dispose of the liquids by pouring them in the trash since most of them are thick and could clog the sink
12. Over the course of 14 days,use a table to record how many strawberries have started to mold on each plate
13. Once the seven days have gone by, uncover the plastic wrap from the plates and examine the strawberries to see the amount of Mold
14. Dispose of the strawberries by dumping them in the garbage can and recycle the sticky notes

Photos of strawberries before going into refrigerator

Data Table (Part 1)

The Effect of Liquid Preservatives on Strawberry Decay

Liquid Preservative Names:	PH Strip Test	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Honey	6.0	0	2	3	3	3	5	5
Water	7.0	0	0	1	1	1	2	3
White Vinegar	2.0	0	0	2	2	2	3	3
Aloe Vera Gel	5.0	0	1	4	4	4	6	6
Aloe Vera Juice	4.0	0	0	1	2	2	2	2
Zero treatment Control	N/A	0	0	4	5	6	6	6

Data Table (Part 2)

The Effect of Liquid Preservatives on Strawberry Decay

Liquid Preservatives	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
Honey	6	6	6	6	6	6	6
Water	4	6	6	6	6	6	6
White Vinegar	2	2	3	4	4	5	5
Aloe Vera Gel	5	5	6	6	6	6	6
Aloe Vera Juice	3	4	4	6	6	6	6
Zero Treatment Control	6	6	6	6	6	6	6

Observations

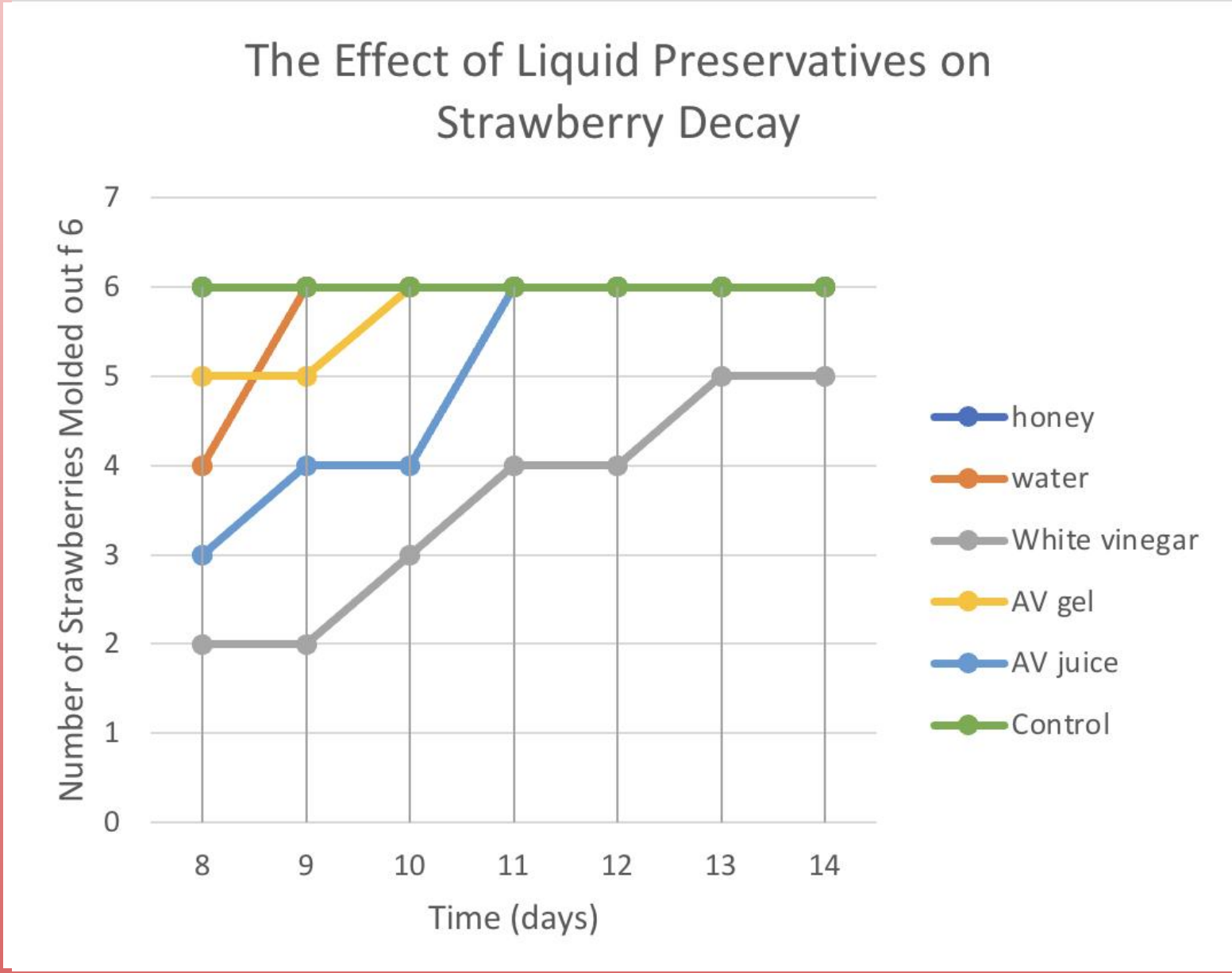
Picture of Zero Treatment Control Strawberries during days 1-7

Picture of Zero Treatment Control days 8-14

Honey coated strawberries days 1-7

Picture of Honey dipped strawberries days 8-14

Graph


The Effect of Liquid Preservatives on Strawberry Decay
Number of Strawberries Molded out f 6
7
6
5
4
3
2
1
0
8
9
10
11
12
13
14
Time (days)
honey
water
White vinegar
AV gel
AV juice
Control

Conclusion

The hypothesis that the strawberries dipped in honey would produce the least amount of mold was rejected. On day 14, the strawberries dipped in white vinegar had 5 decayed, while the honey, water, and Aloe vera gel had all 6 decayed. This is because white vinegar goes through a fermentation process which can help preserve food due to acetic acids. Honey is known for drawing moisture out of foods to prevent white mold and bacteria on the surface of fruits, however, since there was plastic wrap covering the strawberries for a long period of time, this could have prevented the moisture from exiting the strawberries, causing them to decay and bruise. To test this experiment further, try dipping strawberries into different kinds of vinegar to observe how the fermentation process helps preserve the fruit or how the similar ingredients may contrast with the results.

Error Analysis

Possible random errors include measurement of the pH using pH strips. These strips rely on human perception of color. A more reliable method would be an automated pH meter. The strawberries were kept in the refrigerator for the experiment and the temperature of the appliance could have fluctuated due to the amount of times it was opened and closed (the refrigerator was set to a steady temperature throughout the two weeks). This could affect the results of the strawberries because they were exposed to a different temperature some of the time. A dedicated refrigerator could have prevented this error from occurring.

Works Cited

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Photos: All photos taken by student