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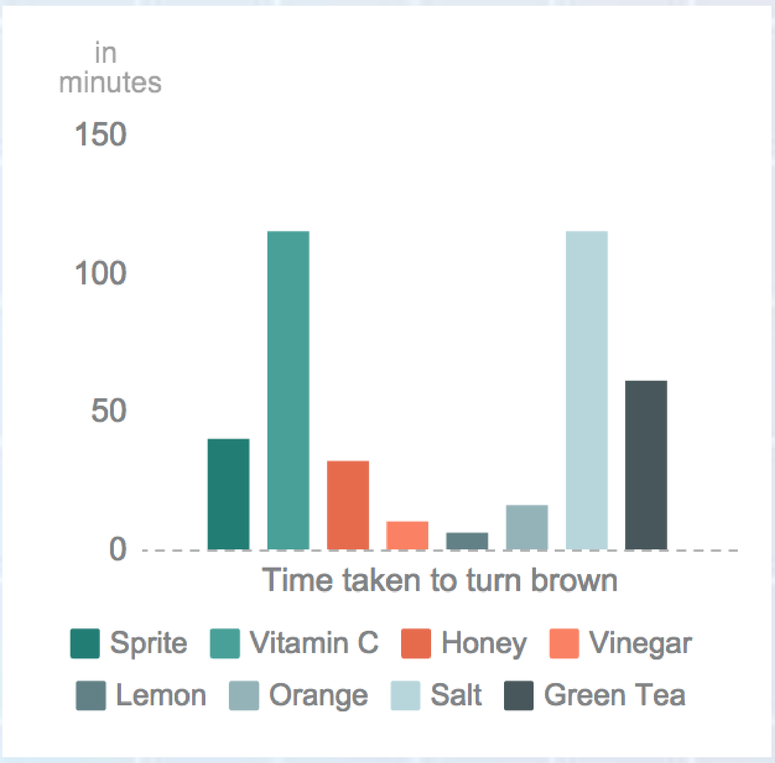
To investigate the effect of consumable solutions on the rate of oxidation in fruits



Abstract

This research is being conducted as oxidation affects the texture and colours of the fruits affecting how people might view it. We conducted the experiment with apples and 8 solutions. We recorded the time taken for the apples to turn brown. Salt solution is the best for slowing down oxidation in apples, followed by Vitamin C and green tea solution. Vitamin C and green tea are known to be a powerful anti-oxidants, hence their effectiveness in slowing down the rate of oxidation.

Introduction

The aim of the research project is to investigate the best consumable solution to slow down oxidation of fruits. There is a need to do research on this topic as oxidation affects the texture and colours of the fruits which one might not enjoy and affect the presentation of the fruits. Our research question- what type of chemical/liquid/method can delay oxidisation. Other researchers have found out that salt does help in slowing down oxidation but it is proven to be not practical as it affects the taste of the fruits. We are proposing to use other palatable natural liquids or reusing green tea which is otherwise thrown away after one time usage. This helps to conserve our limited resources and is environmentally friendly. We hypothesize that green tea solution is the best solution to reduce the rate of oxidation as it is an anti-oxidant.

TheoreticalBackground

We studied on 8 possible solutions that we can use on the apples for the experiment. Firstly, oxidation is a reaction that takes place when oxygen has access to products containing fat or pigments. If fats oxidize, they produce “less pleasant” odors and flavors (stale, rancid odors). Often, if fats oxidize, vitamins also oxidize and lose their activity. If pigments oxidize, they can change color completely. Salt solution is used as it reduces the amount of water on the surface of the apple through osmosis as the salt has a lower concentration of water, hence water in the apple would move out of the apple, thus slowing down oxidation. Sprite is used as it contains little bits of lemon extract and lemon is a type of natural fruit that slows down oxidation. The polyphenol oxidase in the lemon slows down the process of oxidation. Thus, sprite, containing lemon, slows down oxidation. Honey is used as there is a peptide compound in honey that stops the activation of polyphenol oxidase when it's exposed to air, or the enzyme responsible for the oxidation process in fleshy fruits and veggies like apples, pears, and potatoes. Green tea is an anti-oxidant because it fights free radicals which are in our surroundings. Green tea solution is used as it contains powerful antioxidants which can aid in slowing down the rate of oxidation.

Discussion

From our experimental results, salt solution was the best followed by green tea solution in delaying oxidation. However, you can see that the Vitamin C solution worked as well as the salt solution but it is costly and many would not want to waste money just to slow down the oxidation of fruits. It is well known that salt helps to slow down oxidation and thus we were finding an alternative to salt. Many people at home use tea bags and drink green tea. Instead of wasting the bags after the first or second use, why not use it for this purpose? Thus, we have come to a conclusion that green tea is suitable to slow down the rate of oxidation in fruits. The apples looked fresh even after 70 minutes and did not seem to turn any browner after waiting for another hour or so.

Bibliography
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Method/Procedure

1. Cut the apple into 8 identical slices. Use only 1 slice for each mixture.
Mixtures:
- Lemon
- Orange
- Sprite
- Honey
- Salt
- Vitamin C
- Vinegar
- Green Tea

2. Fully soak one slice of apple into each mixture for ten minutes.
3. After 10 minutes, take out the apple slices and expose them to air
4.The time when the apple begins to turn brown marks the beginning of oxidisation.

List of Reagents and Apparatus

Chemical	Carbonated drink, lemon, Orange, Vinegar, honey, tea.	Salt, Vitamin C tablets.
Quantity	15ml	15g

Conclusion

Overall the green tea solution was the best alternative solution to prevent oxidation in apples. The apple soaked in the salt solution took the longest to turn to a considerable brown. The time it took for the salt to make the apple oxidise was the average of 105 minutes. This time differed extremely from the other solutions. Other solutions like vinegar took a really short time for the apple to be oxidised. Green tea is an anti-oxidant because it fights free radicals which are in our surroundings. Hence, Green Tea Solution is the best alternative.