CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

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Project Number

J1827

Project Title

More Sugar, Please!

Abstract

Objectives

Ethylene is a plant hormone gas that is released in the ripening of fruits. It tells fruit to produce certain enzymes that facilitate the ripening process. I wondered whether the presence of ethylene during storage will cause fruits to produce more fructose (fruit sugar) than they would ve if stored on their own; so, I designed an experiment that would test said concept. My question was how does ethylene affect the fructose quantities in fruit. I hypothesized that if unripe fruits are stored with ripe fruits then they will produce more fructose than they would ve if stored on their own because of ethylene presented by the ripe fruit. My experiment included fruit stored in paper bags, as paper bags trap the ethylene while allowing oxygen to circulate. I chose bananas and avocados as the ethylene producers because they are the most efficient fruits in creating it. I selected mangoes and pear because they contain juice that can be be easily extracted for testing fructose testing with a refractometer. The independent variable was the presence of ethylene presented by the ripe fruit. The dependant variable was the amount of fructose in the unripe fruits.The experimental groups were the bags containing unripe fruit and ripe fruit. The control groups were those with only unripe fruits. The control groups would determine the fructose levels under normal, unaffected circumstances possible, while the experimental groups would show how the fructose levels varied with the addition of the presence of ethylene. After four days of storage in the paper bags, the fruits were ready for their fructose levels to be tested. My measuring method was with a refractometer, which finds the concentrations of a solution based on the solution s optical density, or how it bends light. The solution it tested was a given sample of the unripe fruit juice. In the end, the fruits stored in the presence of ethylene on average posted greater Brix percentages (unit of sugar measurement in solutions) on the refractometer, indicating more fructose. The results were consistent with my hypothesis, supporting the idea that ethylene induces more fructose.

Methods

Materials
Refractometer
20 unripe mangoes
10 ripe bananas
20 unripe pears
10 ripe avocados
40 paper bags

Summary Statement

Fruits release ethylene during ripening; will this gas influence fruits to produce more fructose(fruit sugar) than if not kept in ethylene's presence.

Help Received

My father bought the refractometer for me. All remaining work was completed by me at home.