CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Michele K. Jenkins

Project Number
J0599

Project Title
Do pH and Ingredient Ratio Levels Affect Fruit Peel Mixtures Used to Preserve Plants in Freezing Conditions?

Abstract

Objectives/Goals
The objective of my project was to see if the pH and the peel-to-water ingredient ratios in my mixture would affect its performance level on plants in freezing conditions.

Methods/Materials
I used 3 different types of peels, lemon, lime, and orange, and 9 different ratio levels. I made the mixture by combining a water level and a peel level in a blender on "Liquefy" setting for 8 seconds. After this was done, I froze 100 drops of the mixture on a foil board for 3 minutes. I then found the top freeze resistant mixture from each peel type against the control of water. When the data had been recorded, I used the 3 mixtures for another experiment. For the second section of my project, I used 2 different types of Viola plants (Sorbet Blueberry Cream and Sorbet Coconut), the 3 mixtures, and water as a control. I sprayed 2 of the Viola plants with each mixture, 1 with plain water, and one with nothing. I then froze the plants for 3 hours, and let them thaw for 1 hour. When this was done, I recorded the data to see the progress.

Results
The best performing mixture from the first section of my experiment was the lemon mixture. It also performed the best in the second section of the experiment. The least effective mixture in the first and second section was the orange mixture

Conclusions/Discussion
The results of the first section of my experiment mostly supported my hypotheses. The first part of my hypothesis stated that pH levels would not have an effect on freezing rates. I was correct. The second part of my hypothesis stated that ingredient ratio levels would have an effect on freezing rates. This also proved to be true. In the third part of my hypothesis, I believed that the most freeze-resistant fruit peel mixture overall would be the lemon peel plus water dilution with the greatest peel-to-water ratio. This was again true. The final segment of my hypothesis said that the least effective dilution would be the lime mixture with a high ratio of water to peel because the water level would be too high, causing it to freeze more quickly. This part of my hypothesis was incorrect. The fastest freezing mixture was actually the orange peel dilution with 1/2 cup of peel to 3/4 cup of water.

Summary Statement
My project is about the effects of pH and concentration levels in fruit peel mixtures used to prevent freezing in plants.

Help Received
Mother helped type reports; Grandma cleaned supplies and helped glue board