CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

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Project Number

J0402

Project Title

Effects of Acidic Juices on Apples over Time

Abstract

Objectives/Goals

The objective is to observe and compare the effect of acidic fruit juices on apple slices to determine which juice will be the most effective in preventing oxidation (browning.) We believe lemon will perform the best.

Methods/Materials

Five fresh fruit juices, (pineapple, kiwi, orange, lemon and lime) were prepared undiluted and diluted, coated on apple slices and observed over a 48-hour period. The control group consisted of untreated apples. Visual observations were recorded using a scoring system of 0-5, along with a photograph, at Hours 0, 1, 3, 15, 24 and 48, for three complete trials.

Results

The lower the pH, the better the juice performed as an antioxidant compared to Controls. Lemon and lime proved to be the most effective. Lemon lasted longer over time, but lime was most consistent in all trials. Trial-to-trial results were not all consistent for a given juice. All juices prevented oxidation to some extent, compared to the control group.

Conclusions/Discussion

The diluted juices performed almost as well as the undiluted juices, and sometimes better, an unexpected finding. We learned oxidation is the reaction between oxygen in air and the juice substrate in the fruit. When this reaction is combined with the enzyme in apples,(Polyphenyl Oxidase), the apples turn brown. We discovered that the ascorbic acid in the fruit, acting as a conservative, is the actual substance that coats the apple, preventing the oxygen from reacting with the enzyme and juices.

Summary Statement

To compare the effect of fruit juices on apple slices to determine which juice will be most effective in preventing oxidation (browning.)

Help Received

Advisor and Mother (Gannon) gave suggestions and coaching.