



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Kiran Suryadevara	Project Number J1826
Project Title Effects of pH on the Browning of Cut Apples	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I conducted my experiment to determine which acidic fruit juice or tap water would help to best prevent enzymatic browning from occurring on the surfaces of freshly cut apple slices.</p> <p>Methods/Materials Apple slices were dipped, one per each of seven juices: apple, pineapple, orange, lemon, lime, white grape, and white grapefruit, along with tap water for five minutes. They were then removed from their respective juices and observed during four intervals occurring at 15 minutes, 3 hours, 6 hours, and 9 hours, to see what antibrowning effects the acidic juice and water had on the cut surfaces of apple slices. I developed and used a browning scale to determine my results.</p> <p>Results The apple slices soaked in lime (pH 2.38) and lemon (pH 2.49) juices consistently performed the best, in terms of inhibiting the browning of cut apples at all select intervals, while the slices soaked in less acidic juices were not as good in preventing browning. This was true, but for one exception. Orange juice (pH 3.87) dipped slices performed better than white grape (pH 3.49) and apple juice (pH 3.79) dipped slices, in spite of having a lower pH than orange juice.</p> <p>Conclusions/Discussion I have proven my hypothesis such that the acidity of a fruit juice plays an important role in inhibiting enzymatic browning of cut apples, thus apple slices dipped in low pH juices like lemon and lime, will maintain their fresh-cut apple color longer. In the case of the apple slices dipped in orange juice, I can also conclude that they maintain the fresh-cut apple color better than apple and white grape dipped slices due to the fact that orange juice is known to contain high levels of the antioxidant, ascorbic acid (also known as vitamin C), than the other two. Both ascorbic and citric acids are important factors to make note of in juices, since they are antibrowning agents.</p>	
Summary Statement Acidic juices of various pH were tested along with tap water to observe their effectiveness in preventing the oxidation of freshly sliced apples.	
Help Received My science teacher, Ms. Skiles, guided me throughout the project. My Mother helped me to make the needed, fresh fruit juices for my experiment, and my Father helped me in creating a browning scale and graphs.	