



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title Vitamin C Content: Analysis of Food by Titration	
Objectives/Goals Which fruit & vegetable juices contain the most amount of Vitamin C? Does temperature affect vitamin C and does it have antioxidant properties? Does the amount of vitamin C change when orange juice is kept in an open or closed container over time? Does the amount of vitamin C in oranges increase or decrease after the fruit is picked?	
Abstract Methods/Materials Standard vitamin C solution was titrated with iodine(starch used as indicator) until endpoint. Titrations were done to determine concentration of vitamin C in various fruits and vegetables. Following equation was used to find the content of vitamin C in all solutions tested: $\frac{\text{of vitamin C} / \# \text{ of iodine drops}}{25\text{mg of Vitamin C} / \# \text{ of drops of iodine}} = \text{.?mg}$ Similar titrations were done to determine if vitamin C content differs after picking oranges from citrus tree. Temperature effect was investigated by titrating boiled, then frozen orange juice. The anti-oxidant properties were tested by cutting an apple in half, sprinkling crushed vitamin C tablet on 1/2, then observing both halves to see if the apple's enzymatic surface browning was affected.	
Results The grocery bought orange juice had 24 mg of vitamin C; apple juice had 34 mg. This was inaccurate since vitamin C is added in processed juices; however, pure juices gave better results. For example, strawberry juice had 23 mg, orange had 20 mg and green pepper juice had 17 mg etc. Boiling orange juice almost destroyed the vitamin C, and it diminished when stored in open container. 1st day: tree-picked oranges had 18 mg vitamin C. 20th day: it went down to 16 mg. Vitamin C sprinkled on the cut apple prevented surface browning after 1 day.	
Conclusions/Discussion My hypothesis was wrong. Strawberry juice had most Vitamin C. Cauliflower, orange and green pepper juice had similar amounts, Pear and Plum juice had the least. Temperature does affect vitamin C content-boiling almost destroyed it, but freezing had little effect. Vitamin C is readily oxidized so it prevents other chemicals from being oxidized. It is very sensitive to oxygen, light and heat. The vitamin C from oranges picked from the citrus tree decreased after a few weeks.	
Summary Statement Finding Vitamin C in fruit and vegetable juices and investigating its properties and sensitivity.	
Help Received Mother explained the chemistry background; sister helped type the report.	