



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Emaad K. Moinuddin</b>  | <b>Project Number</b><br><b>J0525</b> |
| <b>Project Title</b><br><b>Oh Say Can You "C": Comparing Ascorbic Acid Concentrations in Different Types of Orange Juice</b>   |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>This project is designed to test the relative amounts of vitamin C (ascorbic acid) in different samples of orange juice. I used an iodine indicator solution to test qualitatively the amount of vitamin C in these samples by employing a redox reaction.<br><b>Methods/Materials</b><br>Materials used in this project include 2% iodine, cornstarch, test tubes, measuring spoons, medicine dropper, water (negative control), vitamin C tablets (positive control) and an assortment of orange juices with varying properties. First I made an iodine indicator solution using cornstarch, water, and iodine. I placed carefully measured amounts of indicator solution in each test tube, and added 10 drops of the orange juice being tested. I observed color changes. A lighter colored solution indicates a higher vitamin C concentration than a darker solution.<br><b>Results</b><br>My hypothesis was that fresh squeezed orange juice would have the most vitamin C, but in fact frozen orange juice with pulp had the highest ascorbic acid concentration. The juices with the lowest vitamin C concentration were the low acid juice, and the carton juice from concentrate.<br><b>Conclusions/Discussion</b><br>Since both of the low ranking orange juices did not have pulp, and the highest ranking juice did, I can conclude that "pulpier" juices have more vitamin C. The low acid juice had been stored open in the refrigerator for a week. Vitamin C decay due to oxygen exposure could be a factor in its low vitamin C content. The harmful effect of oxygen exposure is also illustrated by the reduction in vitamin C content in fresh squeezed orange juice when it is stored for a few days in the refrigerator. |                                       |
| <b>Summary Statement</b><br>Using an iodine and starch based redox reaction, I found that vitamin C content is higher in orange juice with pulp and with limited oxygen exposure.  |                                       |
| <b>Help Received</b><br>My parents provided support and guidance, and my uncle helped me to understand the chemistry concepts that I used.   |                                       |