



# CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

<b>Name(s)</b> <b>Caroline R. Fontes</b>	<b>Project Number</b> <b>J0514</b>
<b>Project Title</b> <b>The Effects of Heat on Vitamin C in Tomatoes</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Vitamin C is an important vitamin, and tomatoes are a good source of Vitamin C. Most tomato products we consume have been processed by heat, and I wanted to discover if cooking altered the level of Vitamin C. My goal was to determine if heating the tomatoes to three different temperatures affects the level of Vitamin C. My hypothesis is that the Vitamin C content of tomatoes will decrease when heated because Vitamin C is water soluble and is affected by heat.</p> <p><b>Methods/Materials</b> I used titration to test my hypothesis. The Vitamin C in the tomatoes is the titrant, and iodine is the titrating solution. I made a tomato solution by blending store-bought red tomatoes with 200mL of distilled water. I filtered the solution to remove seeds. A 10mL sample was removed and set aside as the control. The Vitamin C from this sample is the dependent variable. The remaining tomato solution was heated on a gas stove, and three 10mL samples were taken at three different temperatures, 50C, 75C, and 98C (independent variable). While the samples cooled to a standard temperature of 17C, I prepared a starch solution (1T cornstarch and 200mL distilled water). Ten drops of the starch solution were added to each of the four samples. I then added the titrating solution, iodine (Iodine Tincture USP) one drop at a time to the samples and recorded the number of drops necessary to change the pink colored tomato/starch solution to a blue/black color. The results were charted, and compared on a graph. I repeated this procedure a total of three times.</p> <p><b>Results</b> The presence of Vitamin C in a fresh tomato solution declined after it was heated. In the first trial, my uncooked sample needed five drops of iodine to change color, while the other three samples needed 20% less solution (four drops). Trial Two started with six drops for the Control and concluded with four drops for the 98C sample. The final trial gave the clearest results--the Control required seven iodine drops to change to blue/black and the 98C sample only required four drops (43% less).</p> <p><b>Conclusions/Discussion</b> This experiment showed that Vitamin C in a tomato can decrease due to heat. Heat causes the Vitamin C content in tomatoes to decrease by decomposing the water-soluble vitamin. Tomatoes that are cooked will have less Vitamin C than raw tomatoes. If you want the most Vitamin C from a tomato--EAT FRESH!</p>	
<b>Summary Statement</b> This project showed that Vitamin C in raw red tomatoes is reduced by heat.	
<b>Help Received</b> My science teacher, Mr. Jeff Fox, loaned me laboratory equipment. My mom was my laboratory assistant.	