



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Bilal Malik</b>	<b>Project Number</b> <b>J0508</b>
<b>Project Title</b> <b>Vitamin C in Vegetables: How Healthy Are Your Veggies?</b>	
<b>Objectives/Goals</b> The purpose of this project was to see the effect of different cooking methods on the amount of Vitamin C in a vegetable.	
<b>Abstract</b> <b>Methods/Materials</b> First I made a starch solution using 2 grams of cornstarch in 200 ml. near-boiling distilled water. Then I made a Vitamin C solution(1mg/mL) using 2.5 mL of liquid Vitamin C(500mg/5mL) and enough distilled water to total 250 ml. I measured out 20 ml. of the Vitamin C solution in the beaker and added 10 drops of the starch solution into it. I then measured out 10 ml of Lugol#s Solution into a graduated cylinder. I started to add drops of the Lugol#s solution into the beaker, and stopped when I noticed a blackish color change in the solution. I noted the amount of Lugol#s solution remaining in the graduated cylinder. I repeated these steps three times. Then I cooked the vegetables (cauliflower, bok choy, and yellow bell pepper) five different ways (grill, microwave, stir fry, roast, and boil) and pureed and strained them. I repeated the same steps as for the titration of Vitamin C solution. I then calculated the amount of Vitamin C using proportions.	
<b>Results</b> My results were that grilling resulted in the most amount of Vitamin C loss in Cauliflower (85.04 %), followed by boiling and stir-frying (57.58%). In the Bok Choy, boiled and grilled cooking methods showed the most amount of Vitamin C loss (66.74 %), followed by roasted (61.27%). In the Yellow Bell Pepper, boiled cooking method showed the most amount of Vitamin C loss (51.39%), followed by roasted (45.43%) and grilled (42.45%). Microwaving showed the least amount of loss in most cooking methods.	
<b>Conclusions/Discussion</b> My results show that the grilled cooking method resulted in the most amount of Vitamin C lost in cauliflower and bok choy, but the boiled method resulted in the most amount of Vitamin C lost in yellow bell pepper. The grill pan I used was made of cast-iron. Cast-iron pans have been shown to add iron to the food that is cooked in them. The greater loss of Vitamin C shown in the grilling method of cooking may have been a result of iron from the pan reacting with the Vitamin C. All cooking methods destroy an amount of Vitamin C in vegetables. There are different factors (heat, water, and oxidation) that determine how much. Eating vegetables raw rather than cooked would give you the most amount of Vitamin C.	
<b>Summary Statement</b> My project evaluates different cooking methods effect on the Vitamin C content of vegetables.	
<b>Help Received</b> My mom helped me cook the vegetables.	