



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Sarah Waliany	Project Number J1639
Project Title Novel Ways to Increase the Vitamin C Production in Lettuces without Genetic Manipulation	
Objectives/Goals This study was conducted to increase the production of Vitamin C in leafy lettuces without genetic manipulation.	
Abstract	
Methods/Materials For eight months, 224 leafy lettuces (Grand Rapids) were grown. They were exposed to the same temperature and soil, and they received 200 ml of water per flat each day. Phase 1: Planting of lettuce leaves: After germination, only 224 seedlings that were 2.5 inches tall were selected to be transplanted and divided into seven groups. Each group contained 32 seedlings. Phase 2: After transplanting, once a week for the next eight months, Group 1 received chewable Vitamin C tablets; Group 2, pectin powder; Group 3, blended ripe strawberries; Group 4, D-galacturonic acid; Group 5, L-galactono-1,4-lactone; Group 6, homogenized orange peels; and Group 7, nothing. The substances were mixed with distilled water before they were applied to the soil around the lettuces. Phase 3: Once a month, lettuce leaves were plucked, and their preservation was observed at room temperature every six hours for the next 24 hours. Phase 4: Once a month, lettuce leaves were blended with distilled water. The amount of Vitamin C was measured from this extract by using DCPIP (dichlorophenolindophenol), and their acidity was measured by using pH strips.	
Results The average amounts of Vitamin C found in lettuce leaves extracts from Groups 5, 4, and 2 were 2.1 mg, 1.6 mg, and 1.4 mg per gram of lettuce leaves, respectively. The average amounts of Vitamin C in Groups 6, 3, 1, and 7 were 1.1 mg, 0.8 mg, 0.5 mg, and 0.18 mg per gram of lettuce leaves, respectively. The average pH levels of Groups 5,4,2,6,3,1, and 7 were 4.35, 4.85, 5.35, 5.7, 5.75, 6.025, and 6.325, respectively. Lettuce leaves in Group 5 showed the most preservation, while the lettuce leaves in Group 7 showed the least preservation. Lettuce leaves in Groups 1, 2, 3, 4, and 6 showed moderate preservation.	
Conclusions/Discussion This study showed that it is possible to increase the Vitamin C production by using natural means rather than genetic manipulation, thereby increasing the nutritional value and shelf life of lettuce leaves.	
Summary Statement The purpose of this project was to increase the Vitamin C production in leafy lettuces by giving them natural substances.	
Help Received My uncle helped me understand the chemistry.	