



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2019 PROJECT SUMMARY**

<b>Name(s)</b> <b>Tejus Gokal</b>	<b>Project Number</b> <b>S0509</b>
<b>Project Title</b> <b>Vitamin C Content and Acidity of Tangerines</b>	
<b>Abstract</b> <b>Objectives</b> I wanted to discover if the vitamin C contents and acidity of tangerines changes as the fruit grows and develops. <b>Methods</b> I used iodine titration to find the pH. I mixed a little starch solution into 25 mg of tangerine juice, then dropped the iodine in. I recorded the amount of iodine used before the color changed. This works because iodine will react with the vitamin C first and then the starch. I experimented again, substituting a vitamin C solution for the tangerine juice. This was a standard of comparison. I titrated again to find the amount of iodine needed to change the color of the vitamin C solution. I ran these multiple times and took the averages. Then I used the vitamin C standard to calculate the amount of vitamin C in the tangerine juice, of the same volume. I tested the tangerine juice two weeks later, and again two weeks after that. I used underripe tangerines the first time, then ripe tangerines, and finally overripe tangerines. I also took the pH of the juice from each test to find the acidity. Some important materials are tangerine juice from underripe, ripe, and overripe tangerines, vitamin C powder, soluble starch, and distilled water. <b>Results</b> I found that the vitamin C content does not change very much between underripe and overripe tangerines. Test 1 (underripe tangerines) showed an average of 0.596078 mg of vitamin C per ml of juice. Test 2 (ripe tangerines) showed an average of 0.571704 mg of vitamin C and test 3 (overripe tangerines) showed an average of 0.590196 mg of vitamin C. I found that they really did not change significantly. The acidity also stayed the same, at 2.9 pH the entire time. <b>Conclusions</b> I hypothesized that the amount of vitamin C would increase and the acidity would decrease as the fruit developed, however neither happened. The levels of both stayed about the same and did not change dramatically. Knowing when it has the most vitamin C could have helped those who are eating tangerine juice for the health benefits and knowing when acidity is lowest could have helped those trying to eat tangerines, although they have acidity related disorders such as acid reflux.	
<b>Summary Statement</b> Finding when tangerines are more acidic and contain the most vitamin C could have been useful in helping people enjoy the fruit at the best possible time, however, the amount does not vary enough to be significant.	
<b>Help Received</b> I conducted by research at APPL Laboratories. They allowed me to use their burette, laboratory scale, and some glassware. I was supervised by my mother, Dipti Gokal, who works at APPL Laboratories	