



# CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

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| <b>Name(s)</b><br>Deborah Lee; Odelia So   | <b>Project Number</b><br><b>S1513</b> |
| <b>Project Title</b><br><b>How Effective Are the Three Most Popular Teas: Black, Green, and Oolong Tea in Preventing Tooth Decay?</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>Our teacher told us a story about how her dentist observed that even though American people pay more attention to dental hygiene, they seem to be more prone to tooth decay, whereas those from Asia and Europe seemed to be less prone to tooth decay. Upon further research, we realized that Asian and European countries drank tea, whereas America leaned more towards coffee. We are avid tea drinkers ourselves, especially green tea. The story made us wonder if our beloved green tea and possibly other types of tea would have a cavity prevention property.</p> <p><b>Methods/Materials</b><br/>We wanted to simulate the environment of the mouth, so we used Lactobacillus Acidophilus, commonly found in the mouth and known to digest sugar consumed through food and produces lactic acid to decay teeth. We picked 10 teeth per tea. We thought that 10 would be a good sample size in order to draw conclusions and obtaining virgin molar teeth plucked within the age of 15-22 was difficult, we were forced to choose the most effective and efficient number. We soaked each tea in 2 cups of boiling water in the designated time labeled on the back of the tea bag. We took photos manually and digital x-rays for each of the teeth, which was difficult because we needed to take 5 consecutive days of the time of the dentist in order to compare our data at constant increments. We took the photos outside in natural lighting and measured the distance from the lens to the ground to make sure that all the teeth were the same sized photo.</p> <p><b>Results</b><br/>After compiling our data onto a table and graphing the average, we saw that the increase of decay was directly correlated to the amount of fluoride each tea contained. Black tea was most effective in preventing tooth decay with an average of 1.46 mm<sup>2</sup>, green tea was second most effective with an average of 4.0mm<sup>2</sup> of decay, and oolong came in least effective with 4.05 mm<sup>2</sup> of decay.</p> <p><b>Conclusions/Discussion</b><br/>Our data supported our hypothesis; black tea was proven to be the most effective in preventing tooth decay with the least average of decay, 1.46 mm<sup>2</sup>. We deduced that the amount of decay had a direct correlation to the fluoride levels present in each tea. However, there were some factors that we did not account for, such as the uniform alignment under the camera lens as well as the individuality factor of the teeth because the chemical makeup of each tooth depend on the lifestyle of the person and eating habits.</p> |                                       |
| <b>Summary Statement</b><br>Our project is about the effect of the three most popular teas in preventing tooth decay.  |                                       |
| <b>Help Received</b><br>We used the digital x-ray at Smile Family Cosmetics and Dentistry, under the supervision of Dr. Rottjakob. We obtained teeth from Dr. Patel, and Dr. Follmar. Dr. Rottjakob assisted us by analyzing the decay on each tooth. We borrowed an incubator from Bret Harte Middle School under supervision of Ms.  |                                       |