



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Elizabeth R. Cutler</b>	<b>Project Number</b> <b>J1605</b>
<b>Project Title</b> <b>How to Treat a Sweet Tooth: The Comparative Effects of Common Sweeteners on Tooth Decay</b>	
<b>Abstract</b> <b>Objectives/Goals</b> To compare the effects of common sweeteners on tooth decay, by evaluating their effect on oral bacterial growth. <b>Methods/Materials</b> Oral bacterial samples were obtained and combined with common sweeteners. The test groups involved raw and refined sugar, natural sweeteners including honey, agave and Stevia, artificial sweeteners including Splenda and Sweet N Low, and a positive and negative control group. The environment was maintained to allow the bacteria to thrive well. Over four days, spectrophotometric readings were taken to assess turbidity, a measure of bacterial growth. The turbidimetric results were then compared to determine the effect of sweeteners on bacterial growth. Bacteria were then disposed of as biohazard waste. <b>Results</b> The results showed increased turbidity in relation to the positive control for raw sugar, Splenda, Stevia and refined sugar, with relative growth over the four days of 102%, 83%, 52% and 37%, respectively. The Sweet N Low had growth comparable to the positive control. The turbidity of the honey and agave samples declined in comparison to the positive control, by -133% and -200%, respectively. <b>Conclusions/Discussion</b> Honey and agave are excellent choices as sweeteners to avoid bacterial growth and tooth decay, as these appear to have antiseptic properties. Splenda, raw sugar, refined sugar and Stevia are not good choices based upon the data collected. Sweet N Low is a good choice to avoid bacterial growth, and therefore tooth decay, although there are studies that indicate it may present health risks such as oral cancer.	
<b>Summary Statement</b> The main purpose of this project is to determine which sweeteners promote good dental health.	
<b>Help Received</b> Dr. Tai Wei Ly mentored, provided the lab equipment and supervised the experimenter's procedures. Dr. Joseph Gordon provided guidance on how to measure bacterial growth. Father coached throughout the project.	