



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Maariyah Patel	Project Number J1719
Project Title The Sweet Truth: The Effects of Sucrose and Xylitol on the Growth of Streptococcus mutans	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of my project was to determine the effects of sucrose and xylitol on the growth of Streptococcus mutans. I hypothesized that sucrose would potentiate the growth of Strep mutans; while xylitol would inhibit it. I also wanted to determine whether increasing the amounts of xylitol would further inhibit the growth of Strep mutans.</p> <p>Methods/Materials For each experiment, blood agar plates were streaked with diluted Strep mutans using a calibrated loop. Experiment 1- plates were labeled, control plates were set aside and respective mixtures of sucrose and xylitol poured onto their correctly labeled plates. Plates were left to dry. Experiment 2 - repeat of experiment 1 using only xylitol and in differing amounts. After inoculation, plates were incubated for 48 hours (for both experiments). Growth was recorded at 24 and 48 hours. Both experiments were repeated as trials 2 and 3 for accuracy.</p> <p>Results In all three trials, the blood agar plates with Strep mutans and sucrose were observed to have 4 + bacterial growth, at both 24 and 48 hours, compared to the control which had 3 + growth. On the other hand, the agar plates with Strep mutans and xylitol did not have the same results in all trials. In the first and third trial, the plates were observed to have 2 + growth at 24 hours and 3 + growth at 48 hours. In the second trial, the growth was observed as 2 + at 24 and 48 hours. With increasing amounts of xylitol, the growth of Strep mutans was inhibited significantly. The inhibitory effect of xylitol became most clear with 2.5 grams to 3 grams of xylitol. There was no growth observed in any plates with 3 grams of xylitol.</p> <p>Conclusions/Discussion Based on my research and results, I conclude that sucrose potentiates the growth of Streptococcus mutans. Sucrose is utilized by S. mutans to produce a sticky, extracellular polysaccharide that allows them to cohere to each other and multiply avidly. My results also prove that xylitol's different chemical structure keeps it from being metabolized by Streptococcus mutans. This results in the accumulation of xylitol phosphate in the bacterial cells, resulting in growth inhibition Streptococcus mutans.</p>	
Summary Statement I observed the effects of sucrose and xylitol on the growth of Streptococcus mutans, and determined that sucrose potentiates its growth, while xylitol inhibits it.	
Help Received I used the space at the LAC+USC Microbiology lab. Parents provided me guidance.	