



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jason X. Tuermer-Lee	Project Number 34377
Project Title Bacteria Killers: Alcohol vs. Non-Alcohol Sanitizers	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to test which type of sanitizer kills bacteria most effectively.</p> <p>Methods/Materials Bacteria were swabbed from the bottom of a sink and streaked onto five petri dishes. The first swab was used to streak a petri dish. That was my control group. The next four swabs were first exposed to one of four sanitizers containing either ethyl alcohol (Sanitizers A and B) or benzalkonium chloride (Sanitizers C and D) and then used to streak their respective petri dish. All five petri dishes were then incubated at 37° Celsius for 24 hours. After the bacteria cultures were incubated, the number of colonies were counted and compared to the control group. Three trials were run.</p> <p>Results On average, Sanitizer C killed 90.05% of the bacteria, suggesting it to be the most effective sanitizer. Contrary to my hypothesis, Sanitizer C, a sanitizer with benzalkonium chloride, killed bacteria more effectively than sanitizers with ethyl alcohol. Sanitizer D, also containing benzalkonium chloride and killing 88.55% of the bacteria on average, was similarly more effective than both of the two alcohol based sanitizers.</p> <p>Conclusions/Discussion My experiment suggests that benzalkonium chloride as the active ingredient in hand sanitizers is more effective at killing bacteria than ethyl alcohol. Given that benzalkonium chloride also is less irritating to the skin, these preliminary findings suggest that next time you are at the store, be sure to check the drug facts on the back of the hand sanitizer bottle for benzalkonium chloride to keep yourself healthy.</p>	
Summary Statement The purpose of my project was to see which kind of sanitizer kills bacteria most effectively: sanitizers with ethyl alcohol as the active ingredient or alcohol free sanitizers with benzalkonium chloride as the active ingredient.	
Help Received Science Fair Coordinator Diana Skiles discussed my project with me and provided some guidance; Teacher Nicholas Dedini discussed my project with me and provided some guidance as well as an incubator; Mother supervised experiment	