



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Organic Substitutes for Antibacterial Hand Sanitizer	
Abstract Objectives/Goals Antibacterial solutions, such as alcohol and the chemical triclosan, are found in hand sanitizers and antibacterial hand soaps. These chemicals are potentially dangerous to human and animal health, and the environment. Instead of using those chemicals why not use a natural substitute that's good for the planet and not dangerous to your health? In order to do that we need natural substitutes that are just as effective as the chemicals. This experiment tests three main oils that supposedly have antibacterial properties and compares them against store bought products that contain chemical antibacterials. The main research question was: How do natural alternatives compare to chemical and store bought antibacterials? Methods/Materials Household bacteria was collected and grown in petri dishes with nutrient agar. Then several natural (grape seed, coconut, and tea tree oils, witch hazel, Clean Well) and chemical antibacterials (Purel, bleach, triclosan soap) were applied to the bacterial colonies. Petri dishes were photographed before and after. Visual results were recorded and compared. Results The results of the first experiment showed few visible results, even with known, proven store bought antibacterial products. In a second experiment, using larger amounts of each antibacterial, I found visible results with witch hazel appearing to have the best results. Overall, no product completely destroyed the bacteria colonies. Conclusions/Discussion None of the hypotheses were proven correct and the results were unexpected. It is surprising that the three store bought products had little to no effect on bacteria colonies. I expected instant or fast visible results from these products. When I did not, I attempted a second experiment including bleach. While bleach did have an instant effect, after it evaporated its effects did not continue, leaving many colonies behind. Similarly, antibacterials when added in larger quantities worked better; However, like the bleach, the effect did not last after 15 minutes. The exception to this result was the witch hazel, which continued to show some antibacterial effects after 2 hours. This could be due to the fact that the witch hazel did not evaporate. While the oils do not evaporate, the visible effects did not continue after 15 minutes.	
Summary Statement This experiment tested organic antibacterials against chemical store bought antibacterial hand sanitizer to determine if natural substitutes could be used in place of potentially dangerous chemical and alcohol based hand sanitizer.	
Help Received Mother helped photograph experiment and assisted in putting together the display board.	