



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Marina D. Plesons	Project Number J1430
Project Title Bacteria's Natural Enemies: The Effects of Natural Antibacterial Agents on Bacteria Found on Hands	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to test my hypothesis that tea tree oil would be the most effective against bacteria found on hands because it is often used in disinfectants. My goal was to determine which of the three natural antibacterial agents I tested (grapefruit seed extract, tea tree oil, and apple cider vinegar) was most effective against bacteria found on hands.</p> <p>Methods/Materials I compared the effects of three natural antibacterial agents (apple cider vinegar, tea tree oil, and grapefruit seed extract) on bacteria cultured randomly from hands. I also tested the effects of these agents on several known harmful bacteria including Pseudomonas Aeruginosa, Staph Aureus, EColi, Enterococcus, Group A Strep, and Streptococcus Pneumonia. While conducting this experiment, I used methods such as the Kirby Bauer Disk Diffusion Test and streaking for isolation. To conduct this experiment, I used bacteria, and purported disinfectants, such as apple cider vinegar, tea tree oil, and grapefruit seed extract. I also used Petri dishes, blood agar and MacConkey agar plates, and absorbent wipes.</p> <p>Results The result of my experiment was that grapefruit seed extract was the most effective against bacteria found on hands. It had an average zone size of 24.06 mm and all of the zones were bacteriocidal. Apple cider vinegar did not work very well, with a average zone size of 11.52 mm and almost all of the zones were bacteriostatic. Tea tree oil was not very successful, with an average zone size of 14.39, except on one fungal hyphae I experimented on and Pseudomonas Aeruginosa.</p> <p>Conclusions/Discussion In conclusion, the results did not support my hypothesis that tea tree oil would be the most effective except in the cases of Pseudomonas Aeruginosa and one fungal hyphae I experimented on. These findings suggest that natural antibacterial agents might be useful in medicine. In order to really tell whether grapefruit seed extract could be used as an antibiotic, further research would have to be done. Because antibiotic resistance is becoming more common, these alternative options of treatment might be useful in the future.</p>	
Summary Statement My experiment , which examined the effectiveness of 3 natural antibacterial agents against various hand-borne bacteria, produced unexpected results demonstrating that grapefruit seed extract was the most effective agent.	
Help Received Mrs. Brooks, Director of Microbiology at the Sansum Clinic, helped me refine the project and taught me the necessary techniques for conducting my experiment; UCSB Prof. Mahan assisted me with the advanced statistical analysis; Mr. Penkala, science teacher at GVJHS, advised me on the format of the	