



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> Sarah C. Nahigian	<b>Project Number</b> <b>J1326</b>
<b>Project Title</b> <b>The Antibacterial Effectiveness of Various Essential Oils</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Objective: The objective of this experiment was to determine if various essential oils could be effective antibacterial agents on the bacteria, bacillus subtilis. <b>Methods/Materials</b> Materials and Methods: Eighty petri dishes were inoculated with bacillus subtilis. The essential oils tested were cinnamon, clove bud, eucalyptus, oregano, rosewood, sage, tea tree, and red thyme. The controls used were vegetable oil and distilled water. Filter disks dipped into each oil were placed on the inoculated dishes. Ten dishes of five disks each were done for each oil. The dishes were placed in an incubator for 36 hours. They were then removed and the zone of inhibition was measured in millimeters per disk. All measurements were recorded and averaged. One overall average was calculated for each oil. Oregano, rosewood, and red thyme were retested using a single disk per dish because these oils allowed no bacterial growth. Five readings were done for each of these retested oils. <b>Results</b> Results: Red thyme showed the most bacterial effectiveness with an average inhibition zone of 28 millimeters. Oregano showed the second best effectiveness with an average zone of 26.4 mm. Rosewood showed good results of 15.6 mm. Cinnamon showed fairly good results of 9.44 mm, while tea tree and clove bud showed moderate results of 6.58 mm and 6.08 mm respectively. Eucalyptus and sage showed low inhibition readings of 3.82 and 3.7mm. Distilled water and vegetable oil showed no bacterial inhibition. <b>Conclusions/Discussion</b> Conclusion: My hypothesis for the red thyme, tea tree, rosewood, sage, distilled water and vegetable oil was correct. My hypothesis for oregano, cinnamon, clove bud, and eucalyptus was incorrect. In conclusion, I found through my investigation and testing that essential oils can inhibit bacterial growth and that they can act as effective antibacterial agents. The results of this project help to expand our ever increasing knowledge of microbiology and show that natural products such as essential oils can serve as powerful antibacterial agents.	
<b>Summary Statement</b> My project is about the antibacterial effectiveness of various essential oils.	
<b>Help Received</b> Mr. Whittington provided the bacillus, nutrient agar, dishes, and the incubator. My mother helped with the board.	