



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Gregory J.C. Brostek	Project Number J1304
Project Title Natural or Pharmaceutical: Which Works Best?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The object of my project was to determine if natural antibiotics such as garlic and tea tree oil, work as effectively in killing bacteria as the pharmaceutical prescription antibiotic amoxicillin. My hypothesis was that amoxicillin would be most effective.</p> <p>Methods/Materials Four nutrient agar petri dishes were inoculated with Serratia marcescens bacteria. Dish # 1 was treated with Garlic, # 2 Tea Tree Oil, #3 Amoxicillin, #4 control distilled water. The area where bacteria was killed was measured until results stopped to progress to determine which agent was the most effective in killing bacteria.</p> <p>Results The most effective anti-bacterial agent was tea tree oil with an effective rate of 91%. Amoxicillin was 81% effective. Garlic was 80% effective, the Control 0% effective. Based on the results, the tea tree oil was 12-14% more effective than amoxicillin and garlic respectively. Initial results seemed to show that my hypothesis was wrong. Additional observations three months after entering my project in the County Fair show that amoxicillin and tea tree oil have both continued to keep a barrier around the treated disc to keep the bacteria from re-growing. The effectiveness of tea tree oil has dropped from 91% to 70% with the bacteria growing slightly in towards the teated disc. The effectiveness of the amoxicillin dropped from 81% to 79%. Garlic was effective in killing the bacteria in the beginning, over time it has lost all of its effectiveness and the bacteria have over-grown the treated disc. The results show amoxicillin was most effective.</p> <p>Conclusions/Discussion Scientists have found that bacteria are more sensitive to specific antibiotics than others. Research shows bacteria are becoming resistant to antibiotics. The natural antibiotics had a more immediate effect but I believe this was due to the fact that they were oils and could spread out more than the amoxicillin mixed in distilled water. After additional time to observe the treated bacteria, the pharmaceutical antibiotic has had a longer lasting result for killing the bacteria but the tea tree oil was effective as well. A more precise method to compare strengths and concentrations of the agents should be done. It is interesting to find that natural antibiotics did work to kill bacteria and have valuable health benefits. Because of my experiment I can see that natural antibiotics definitely have real medical benefits.</p>	
Summary Statement My project is about the effects of the natural anti-bacterial abilities of garlic and tea tree oil compared to the anti-bacterial effectiveness of the pharmaceutical drug amoxicillin.	
Help Received Mother took pictures of me working on my project. Parents paid for all materials. Customer service person at Carolina Scientific named Laura gave me a suggestion to use the serratia marcescens bacteria after my first selection of Micrococcus luteus bacteria did not work well.	