



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) <p style="text-align: center;">Yosias Amha</p>	Science Fair Use Only <h1 style="margin: 0;">J1202</h1>
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <p style="text-align: center;">Natural Killers</p>	Division <u>X</u> Junior (6-8) _ Senior (9-12)
Preferred Category (See page 5 for descriptions.) <p style="text-align: center;">13 - Pharmacology / Toxicology</p>	
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Objective: The objective of this study was to see if certain spices kill bacteria.</p> <p>Materials and Methods: Five spices were selected for this experiment from our kitchen collection. These were cinnamon, cloves, garlic, thyme and turmeric. A water extract and an alcohol extract were prepared from each of the spices. The extracts were tested for antibacterial effect using the ring method and the direct method. In the ring method filter papers were soaked with the extracts and dried. The filter papers were then hole punched to get discs.</p> <p>Four of these discs were then put in each of 10 petridishes (5 for water extracts of each spice and 5 for alcohol extracts) that contained agar media containing bacteria from my mouth. The dishes were then incubated for 48 hours at 37oC. Ring formation was then observed. In the Direct method the spice extract was already added to the agar medium. Bacteria from the mouth were then added to the petridishes. The petridishes were then incubated at 37oC for 48 hours. The number of bacteria in each dish was then counted. In both the disk method and the direct method, the control dishes did not have spice extracts.</p> <p>Results: In the disc experiment only the alcohol extract of turmeric showed a ring of no bacterial growth. All other extracts did not show a zone of no growth. In the direct experiment the bacteria killing effect of the water extract was in this order: garlic > cinnamon > cloves > thyme. Turmeric had too numerous bacterial to count just like the control with no spice extract added. With the alcohol extract the order of antibacterial effect was: cloves > garlic > thyme > turmeric > cinnamon. Overall (for water and alcohol extracts) garlic had the highest antibacterial effect.</p> <p>Conclusion: The results of the study prove my hypothesis that some spices kill bacteria. The results are significant because they show that substances in our daily food can fight bacteria. These spices can be added to tooth paste or mouth wash to fight bacterial like Streptococcus that cause throat infection. Many bacteria are showing resistance to known antibiotics. Spice extracts may have many antibacterial substances in them and resistance to all of them may be difficult.</p>	
Summary Statement (In one sentence, state what your project is about.) <p style="text-align: center;">This project is about the ability of some common spices to kill bacteria.</p>	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. <p>Mrs. Lilia De La Cruz taught me the methods. My dad helped with the experiments and my mom with the board.</p>	