CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
J1804

Project Title
Antibiotics: Natural vs. Pharmaceutical

Abstract

Objectives/Goals
The objective of my project was to determine if some natural antibiotics are as effective as synthetically or pharmaceutically produced antibiotics in either arresting the growth of bacteria or killing bacteria that cause disease or infection in the human body.

Methods/Materials
In conducting two different experiments, the same natural antibiotics (Grapefruit Seed Extract, Olive Leaf Extract, Tea Tree Oil, Garlic, Oil of Oregano, and Raw Unfiltered Honey)and the same pharmaceutical antibiotics (Amoxicillin, Erythromycin, and Tetracycline) were used. Both experiments also used the following bacteria: Serratia Marcescens, Streptococcus Lactis and E-Coli. In Experiment I, sterile paper disks soaked in 6 natural and 3 pharmaceutical antibiotics were applied to agar sufaces that had been inoculated with 3 different kinds of bacteria 12 hours earlier. In Experiment II, sterile paper disks soaked in all 9 antibiotics were immediately applied to agar sufaces that had just been inoculated with 3 different kinds of bacteria. In both experiments, a micrometer was used to measure any bactericidal action around the disks after 24 and 48 hours.

Results
In Experiment I, Amoxicillin inhibited the growth of all 3 bacteria the most successfully, followed by Tea Tree Oil, Grapefruit Seed Oil, Tetracycline,and Oil of Oregano. In Experiment II, all 9 antibiotics were more successful at inhibiting the growth of all 3 bacteria when compared to Experiment I. Tea Tree Oil was the most successful antibiotic at inhibiting the growth of all 3 bacteria in Experiment II, followed by Amoxicillin, Tetracycline, Erythromycin, Garlic, and Oil of Oregano.

Conclusions/Discussion
The results of both experiments suggest that some natural antibiotics are as effective as pharmaceutically produced antibiotics in inhibiting the growth of bacteria. Unlike pharmaceutically produced antibiotics, drug resistance does not develop against naturally occuring antibiotics. It is clear that the medical and scientific communities need to continue to conduct research on the bactericidal efficiency of herbs and other natural substances as viable alternatives to pharmaceutical antibiotics, so that their use could potentially help reduce the rise of drug-resistant bacteria in humans.

Summary Statement
My project tests the bactericidal efficiency of six natural and three pharmaceutical antibiotics with cultures of Serratia Marcescens, Streptococcus Lactis, and Escherichia Coli (E-Coli)

Help Received
Dr. Roy Grekin and Dr. Dale Ritzo prescribed the pharmaceutical antibiotics; Susan Bachus provided the bacteria necessary for conducting the experiments; my mother helped assemble the materials for my project.