CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S0504

Project Title
A Three Year Study of Natural Antibiotics: Analysis of the Bioactive Compound in Arctostaphylus in Various Solvents

Abstract

Objectives/Goals
The object of this experiment was to determine the best solvent for the extraction of the bioactive compound in Arctostaphylus.

Methods/Materials
In the preliminary tests, I tested five different solvents for enhanced extraction of the antibiotic compound. An extract of each sample was obtained by grinding the plant with the solvent using a mortar and pestle. A concentration disk was then soaked in the extract and placed on an agar plate inoculated with E. coli. Duplicate tests were run for each plate. Fresh garlic was used as a positive inhibitory control, while pure solvent was used as a negative control. These plates were incubated at 84 degrees. The degree of extraction was measured by the distance between the ring of inhibition for the test concentration disk and the ring of the control disk. The three solvents with the largest ring differences were retested in the secondary experiments.

Results
In the preliminary experiment, the largest ring of inhibition difference was apparent in isopropyl alcohol, 4.5mm, followed by DMSO, water, ethanol, and acetone. In the secondary experiment, DMSO showed the largest difference followed by water and isopropyl alcohol.

Conclusions/Discussion
The bioactive compound in Manzanita was more soluble in DMSO than water. Ethanol and acetone do not draw out this compound well. My results using isopropyl alcohol showed opposite extremes. In the preliminary test, isopropyl seemed the best solvent for Manzanita, but, during the secondary tests, it seemed the worst. Further testing should determine which results are correct.

Summary Statement
The purpose of my project was to determine the best solvent for the extraction of the bioactive compound in Arctostaphylus in hopes of using this information to isolated the antimicrobial agent in this plant.

Help Received
I would like to acknowledge the help of Ms. Barbara Mudrinich, for lending me the E. coli culture and the L B broth as well as Mr. Tom George for letting me use his electric balance and graduated cylinder. Tracie Baptista at the Butte County Health Department gave me the petri plates.