



CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

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Project Title
Spice of Life: Oregano as an Antibacterial Agent: Does State Matter?

Abstract

Objectives/Goals
The purpose of this experiment was to compare the antibacterial effectiveness of different states of oregano (essential oil and liquid herbal decoctions from dry and fresh plants), and to determine which state is most effective in killing or inhibiting the growth of E. coli bacteria.

This is a continuation of a previous experiment, in which I found that oregano oil is an effective antibacterial agent. I take strong prescription medications to control Crohn's Disease; I worry about long-term effects of these medications and I want to study natural cures.

Methods/Materials
Agar medium in Petri dishes with E.coli bacteria spread in perpendicular patterns. Decoctions of both fresh and dried oregano. Oregano oil and liquids were added to the Petri dishes using the Kirby-Bauer method with antibiotic disks. Oregano solution was dropped onto all 4 disks until they were each soaked in solution. Dishes were incubated overnight at slightly warmer than room temperature. After 24, 48 and 72 hours, I measured the zone of inhibition around each disk using Vernier calipers.

Results
The decoction from fresh oregano was the most effective antibacterial agent. It had the largest zone of inhibition, which means it was the most powerful state of oregano in stopping the growth of the bacteria.

Conclusions/Discussion
It is interesting that the fresh herb decoction was more effective than the essential oil. Essential oils, which are expensive, are very popular for fighting illness and bacteria. Fresh herbs are a much simpler, cheaper, and more effective alternative. They are available at markets, and can even be grown in your own yard! Decoctions are actually as easy to make as tea, so this is a simple way to take the herbs. It would be best to consult with a licensed herbalist before making or taking any herbal decoction.

Summary Statement
As measured using the Kirby Bauer zone of inhibition method, I found that a decoction of fresh oregano was more effective antibacterial agent against E. coli than a decoction of dry oregano or oregano essential oil.

Help Received
My teacher, Ms. Nogueira, helped me come up with ideas and learn about decoctions. Dr. Mulhotra at Thousand Oaks High School allowed me to get advice from her students about my experiment. Vincent Lok, a T.O. High School student, suggested the Kirby-Bauer antibiotic testing method.