California Science Center

CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)

Tessa L. Ridgway

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

Antimicrobial Properties of Herbs and Spices

Science Fair Use Only

J1226

Division

J Junior (6-8) J Senior (9-12)

Preferred Category (See page 5 for descriptions.)

12 - Microbiology

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.

Objective: My objective was to determine whether certain spices possess antimicrobial properties.
Materials and Methods: The spices that were used to conduct this experiment were oregano, mint, garlic, Habanero Chili, Thai Chili, Serrano Chili, and Japanese Red Chili. To perform this test, I first extracted juice from each of the listed spices. I then created three different concentrations, (100%, 10%, and 2%) for each of the spices enabling me to perform my test using a strong, a moderate, and a weak concentration. I then gathered sixteen Petri dishes each containing Trypticase Soy Agar and punched six wells into each one to contain the different concentrations. I then had a trained microbiologist apply four common bacteria types (Staphylococcus gallinarum, Staphylococcus intermedius, Escherichia coli, and Enterobacter cloacae) to four Petri plates each for a total of sixteen Petri dishes. I then dispensed 50 micro liters of each spice concentration into its own well. Then I incubated the plates for forty-eight hours. Once the incubation was complete, I measured the inhibition zones and recorded the results. I then repeated the entire experiment a second time.
Results: The overall results indicated that garlic exhibited the greatest antimicrobial properties out of all the spices that I tested. In the first experiment, garlic, Habanero Chili, Thai Chili, and Japanese Red Chili all showed signs of antimicrobial properties, yet in the second experiment only garlic, Thai Chili, and Japanese Red Chili showed signs of antimicrobial properties.
Conclusions: In conclusion, some spices may indeed possess antimicrobial properties and could eventually prove to act as natural preservatives or even help in modern medicine.
Discussion: One obvious problem I noticed with my experiment was that the test results from the first experiment were inconsistent with those of the second experiment. I theorize that this was caused by the difference in certain bacteria strains that were used in each test # each bacteria strain is different from the next even if it is referred to by the same name. Likewise, each bacteria strain has different immunities to different substances therefor possibly causing the inconsistency, which occurred in my test results.

Summary Statement (In one sentence, state what your project is about.)

My project was based on determining whether herbs are spices can inhibit bacterial growth.

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.

San Diego County Veterinarian Laboratory under supervision of Tammy Gonzales and Gene Creek. Tammy helped in the handleing of bacteria.