CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J1602

Project Title
Adaptation, Antibiotics, and Bacteria

Abstract

Objectives/Goals

My project had two main objectives.
The first objective was to determine how effective some natural products are against bacteria. I used Coconut oil, Cayenne Pepper, Vinegar, my dog's drool, my Mom's drool, and molded cheese to see if they would prevent bacteria from growing.
Once I established the first experiment, I tried to see in a second experiment if I could grow some bacteria that were resistant to those substances and determine if I could see adaptation and evolution of bacteria.

Methods/Materials

For experiment 1, I grew the bacteria overnight and then recorded the effect of the substances.
I then took bacteria that could grow (and possibly resist the substance) and plated those again for experiment 2.
In experiment 2, I again recorded how the substance affected growth of bacteria.
All experiments were done twice to control for variation.

Results

Experiment 1. Substances that I used had different effects on the bacteria:
Coconut oil and Moldy cheese had little effect on the bacteria. Mom's drool had some effect but not as strong an effect as Dog's drool, which was quite effective. Cayenne pepper controlled bacterial growth effectively. Vinegar had the strongest effect at controlling bacterial growth

Experiment 2. We predicted that bacteria that were picked from the region of inhibition of a substance would be more effective at resisting that substance in experiment 2, yet this was not always the case. I could not see a difference in the 4 weaker substances. In the two stronger substances, Cayenne Pepper and Vinegar, I did see an effect, where bacteria seemed more resistant in experiment 2 than in experiment 1.

Conclusions/Discussion

In conclusion, I have found that some natural products do prevent the growth of E. coli.
For the second experiment, I was expecting growth of bacteria in most plates. The experiment showed me that there was a marked effect on the strongest antibiotics and this may mean that this is where I can actually see results.

Summary Statement

Antibiotic properties of natural products, and the adaptation of bacteria to those products are tested.

Help Received

I was advised by my mother and my father. I did the lab work at UC Santa Cruz on my own, under the supervision of my Dad.