CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
S1308

Project Title
Isolation, Identification, and Characterization of Four Antibiotic-Resistant Soil Bacteria

Abstract

Objectives/Goals
To show that the four bacteria strains are distinct strains; the antibiotic resistance is carried on plasmids that they contain.

Methods/Materials
I grew the bacteria on agar plates with Tetracycline, Kanamycin, or Amphicillin. If the bacteria grew on the plate, it is antibiotic resistant. To find multiple resistance, I grew each bacteria (12 samples from each plate) on the other two antibiotics. (Ex. I grew the amphicillin resistant samples on Tet and Kan plates) I purified plasmids with the alkaline-lysis method. I used a spectrophotometer to quantitate the DNA. I ran the results from the alkaline lysis in gels to assure myself that it is plasmid DNA. I then transformed the plasmids into competent bacteria. I grew the transformed bacteria on antibiotic agar plates to make sure that the plasmid was responsible for the antibiotic resistance. (Here, I also grew competent bacteria on the antibiotic agar plates as a control.)

Results
I identified four different strains of antibiotic resistant bacteria based on types of antibiotic resistance: amp, tet/amp, kan, and kan/amp. There are twelve samples for each strain except kan, for which there are ten, and kan/amp, where there are two. I also successfully isolated the plasmid DNA of five samples, two resistant to Tet/Amp, one resistant to Kan, and two resistant to just Amp.

Conclusions/Discussion
It is unclear how these bacteria acquired antibiotic resistance. Since I have isolated the plasmid as a source of antibiotic resistance, I plan to sequence the plasmid and map the plasmid to get a clear picture of what this plasmid looks like and then perhaps get an idea of the acquiration of the antibiotic resistance through this map.

Summary Statement
I identified four species of antibiotic-resistant soil bacteria and have isolated and transformed the plasmids to verify that antibiotic resistance is carried on a plasmid.

Help Received
Used lab equipment at UCI under the supervision of Dr. Gardiner