CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
Jacqueline Lopez

Project Number
J1211

Project Title
Do Enclosed Beaches Have Higher Levels of E. coli and Enterococci When Compared to Open Beaches?

Abstract

Objectives/Goals
The goal of my project was to determine if the levels of Fecal Indicator Bacteria such as E.Coli and Enterococci were higher at enclosed beaches when compared to the levels of E.Coli and Enterococci at open beaches. I tested the sand at two enclosed beaches (Cabrillo Beach and Marina del Rey Mother#s Beach) and two open beaches (Sunset beach an Huntington Beach) along the Southern California coast. My hypothesis is that because enclosed beaches lack wave activity, the amount of E.Coli and Enterococci in these beaches will be much less that the amounts of E.Coli and Enterococci found at open beaches.

Methods/Materials
I collected triplicate samples at each of the four beaches. Each of the triplicates was 1 cm surface sand that was at an approximate 3-4 feet away from the intertidal zone. In addition, 3.5 ml. of ocean water was collected from each of the beaches. The samples were then tested for Enterococci and E.Coli. The bacteria that was removed from the sand and into the ocean water was incubated for 20-24 hours. There were four different tests done, two for E.Coli and two for Enterococci. All of the beaches were tested in all of the different tests. The results compared open to enclosed beaches.

Results
The levels of E.Coli and Enterococci at enclosed beaches were higher than the levels the FIB in open beaches. All the sets of test (E.Coli and Enterococci) showed that the amount of E.Coli and Enterococci at enclosed beaches were far more in number when compared to the open beaches. In the majority of the tests, the open beaches showed no E.Coli and Enterococci. The only open beach that had any E.Coli or Enterococci was Beach 3 (Sunset Beach), in E.Coli sample B, with 1.94 per every gram of sand. The average amount of bacteria in the sand in E.Coli Sample B was of 194.665 E.Coli in 1 gram of sand, so the 1.94 is at a difference of 191.725.

Conclusions/Discussion
In the end, the results supported my hypothesis. Fecal Indicator Bacteria in the sand, such as E.Coli and Enterococci were higher at enclosed beaches, in comparison to the FIB in open beaches. Research that I obtained has showed that sand can act as an #incubator# where FIB can live longer and flourish, sand that was disturbed less by wave activity can hold higher levels of E.Coli and Enterococci.

Summary Statement
The purpose of my project was to determine if enclosed beaches have higher levels of E.Coli and Enterococci when compared to open beaches.

Help Received
My mom took me to all the beaches to collect the sand. Anand Patel, graduate student at USC#s Fuhrman Lab provided the supplies to collect and test the sand, along with guidance for one days worth of lab usage to test my samples. My science teacher Mr. Quintrell provided the scientific guidance.