CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

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Project Number

S0822

Project Title

Sandy Beaches: Pleasure or Pollutant? Year 3

Abstract

Objectives/Goals

We tested as a continuation of the previous 3 years to see if river water could be a source of the ocean water and sand contaminat6ion causing many Californian beaches to be closed frequently. We tested 3 beaches in different environments (urban, farming and undeveloped) to see if those environments had any correlation with the amounts of Escherichia coli (E.coli) and total coliform we found moving along a transect (at 0, 20 and 40 feet away) from the river mouths. We also tested to see if we could qualify the source of DNA in the river water.

Methods/Materials

We built an incubator from a Styrofoam cooler and a light bulb. We collected water from river mouths and the ocean they flowed into. We then collected sand along a transect from the river mouth 0, 20 and 40 feet away. We tested for Escherichia coli (E.coli) and coliform bacteria strictly by following the state regulations using materials such as distilled water, pipettes, sterilized jars, an iron, Quanti-Trays and bacteria reagent. We then put the sealed Quanti-Trays into the incubator for 18-22 hours. We also tested DNA in the river water to see where the bacteria we found was from. We tested using a PCR test, looking for human specific bacteria.

Results

Farming: Escherichia coli (E.coli) bacteria decreased in 2 out of 3 rounds, total coliform bacteria decreased in 2 out of 3 rounds.

Urban: Escherichia coli (E.coli) bacteria decreased in 2 out of 3 rounds, total coliform bacteria decreased in 1 out of 3 rounds

Undeveloped: Escherichia coli (E.coli) bacteria decreased in all 3 rounds, total coliform bacteria decreased in 1 out of 3 rounds

PCR: we found human specific DNA in 2 of the 9 river water samples we tested

Conclusions/Discussion

In conclusion, we can reject our hypothesis for Escherichia coli (E.coli) bacteria in Urban vs. Undeveloped vs. Farming environments. We can accept our hypothesis for both bacteria for some of the beaches with distance from river and we can accept our environmental hypothesis for total coliform. We can reject our hypothesis for the PCR test for DNA.

Summary Statement

We tested the river water in three different land environments and sand bacteria in order to find the source of the bacteria; we also qualified the DNA in the river water.

Help Received

Iddex Company for donating our supplies, Steve Peters for doing the PCR tests, Marc Los Huertos for helping analyze our data, Darrel Steely for mentoring us amd helping prepare project, parents for driving and helping to test