CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

S1120

Project Title

Sandy Beaches: Pleasure or Pollutant? Year 4, An Analysis of Kelp as a Possible Source of Beach Sand Contamination

Abstract

Objectives/Goals

We tested as a continuation of the previous 4 years to see if decaying kelp at the high tide line could be a source of sand contamination causing many California beaches to be closed frequently. We collected fresh kelp and let it sit on sterilized and unsterilized sand for a 2-week period to see if the kelp added coliform bacteria to the sand as it decayed.

Methods/Materials

We built an incubator from a Styrofoam cooler and a light bulb. We collected fresh kelp from the ocean and sterilized half of it by steaming. We collected sand from the high tide line and sterilized half of it by baking it (the sterilized kelp and sand were our controls). We tested for coliform bacteria 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.

Results

Sterilization processes did not work. We tried sterilizing by using permanganate, but it did not work so we tried heating the kelp, but that did not work. The steaming method sterilized the kelp initially, but something contaminated all our samples and we had to throw our control data away. Our sterilization method for the sand worked initially, but later the sand became contaminated and we had to throw away our data. We do not know how the sand and kelp got contaminated. We also saw spikes of bacteria that increased and then decreased as time went on in our tests of sterilized kelp & unsterilized sand as well as sterilized sand & unsterilized kelp. Our test of unsterilized sand & unsterilized kelp had the least bacteria overall, surprisingly.

Conclusions/Discussion

We cannot make a reasonable conclusion with the data that we have. Our controls did not work so we have nothing to compare our data to. Also, we are confused as to why the bacteria levels in some tests increased on average and then decreased. We have a few theories as to why this is happening. Perhaps there is some sort of competition happening or maybe there are different types of coliform that we cannot distinguish between living in the sand (maybe aerobic vs. anaerobic) and we did not homogenize our mixtures enough. We modified our methods of testing when we saw they did not work (eg. Sterilization of kelp) and then we would start over. We are continuing to test and modify our project so that we can better understand what is going on.

Summary Statement

We tested the decaying kelp along the high tide line in order to see if it adds coliform bacteria to the sand.

Help Received

Iddex Company for donating our supplies, Darrel Steely for helping analyze our data, Adina Paytan for helping us create question and testing methods