CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

31721

Project Title

The Impact of Toxins on Mytilus edulis (Bay Mussel) and Artemia (Brine Shrimp)

Abstract

Objectives/Goals

This research tests the impact of toxins on the filtering abilities of bay mussels and the growth of brine shrimp.The bay mussel feeds on phytoplankton and does so by filtering plankton rich water directly from their environments. Because of the invertebrates# close proximity to the shoreline, it is often used as an early indicator for ecologists and biologists to determine any foreign or toxic substances in the water.

Methods/Materials

I tested the filtering abilities of the bay mussels by applying several human byproducts (laundry detergent, motor oil, and dishwasher fluid), to see how the pollutants would affect the bay mussels# filtering abilities. I measured the bay mussels by taking samples of the water with a fluorometer every half hour for two hours. The fluorometer determined the amount of plankton contained in a set container. My results concluded that substances such as dishwashing soap and motor oil are not efficiently filtered by mussels because they kill and dissolve the plankton in the water. Without being able to eat plankton, the mussels cease to filter the water and die in large numbers. In order to see its impact on brine shrimp placed one tablespoon of brine shrimp eggs in twelve 250mL beakers. I then placed the beakers with the brine shrimp in a temperature controlled device. Later, samples were taken from each beaker and were examined under a microscope to see how the detergent affected the growth of brine shrimp.

Results

This research indicates that all three human waste products are detrimental to the bay mussels and brine shrimp. Also, due to the process of bioaccumulation, as one moves higher in the food chain, the concentration of each substance increases as well. Furthermore, these compounds are detrimental to both the filter feeders and the plankton they eat. The motor oil and dishwashing soap caused the phytoplankton to dissolve. Without phytoplankton, filter feeders will stop filtering toxic wastes found in the ocean water. Excess amounts of dissolved phytoplankton and increased amounts of algae caused by the build up of phosphates from cleaning agents will cause dead zones in the ocean. Also by expelling these particles in their feces, filter feeders accelerate sedimentation. This research project proves that human waste products could be devastating not only to mussel and shrimp farms, but also to the overall health of the marine ecosystem.

Summary Statement

This project is about the the impact of common toxins found in the ocean on the health of marine organisms.

Help Received

I conducted this research at CSU Northridge under the supervision of Dr. Kubler.

Preliminary