CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

J1502

Project Title

Nitrate: A Threat to Plankton

Abstract

Objectives/Goals

The main objective of this project is to investigate the effects of nitrate on aquatic microorganisms, such as plankton.

Methods/Materials

We built plankton net to collect plankton samples from the ocean. Other materials include a compound microscope, a nitrate solution, a nitrate testing kit, and a water sample collected from a river close to farmland. Our research methodology includes the nitrate experiment and the plankton experiment. We took a sample from a water source near a farmland and then tested for nitrate concentration to see whether farms contribute to the amount of nitrate in water sources. In the plankton experiment, we prepared four samples; two with nitrate added (n1, n2) and two without nitrate(x1, x2). To get accurate results, we divided each sample into two parts and observed the plankton movement through a compound microscope at an interval of 5 minutes.

Results

The nitrate experiment on a local water source showed that there is a high level of nitrate presence, about 6mg/l. In the plankton experiment, in sample x1, part 1, there was an average of 45 moving. In the second part of x1 there was an average of 110 plankton moving. In both first and the second part of x2, the average was about 60. This shows that sample x1 and x2 were very active. In the sample n1, part 1, there was an average of about 20 moving, and 5.5 moving in the second part. In the sample n2, part1, there was an average of about 4 moving, and in the second part, the average plankton movement was about 4.5. Most of the plankton was dead, save a few zooplankton drifting around in both cases with nitrate added.

Conclusions/Discussion

The problem this research focused on was the effects of nitrate on plankton. We did background research on the effects of nitrate on animals and humans and we tested water sample close to farmland to test whether fertilizers really are affecting the water. Then we conducted our plankton experiment by adding nitrate solution to the samples. We observed that the plankton samples without nitrate had more activity than the samples with nitrate. Our findings yielded the answer to our problem. We found out that nitrate killed most of the plankton in the sample. In the samples with nitrate, on average we saw about 8.5 plankton moving, but very slowly. In the other two, we saw average 68.75 plankton moving. From this we conclude that nitrate does have a negative effect on plankton.

Summary Statement

In our research we examined how nitrate in water sources affect aquatic microorganisms, like plankton.

Help Received

We used the lab facility and tools in Monterey Bay Aquarium Research Institute (MBARI).