CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35187

Project Title
The Effects of Different Chemicals on Sea Grass Microbial Communities in Winogradsky Columns

Abstract

Objectives/Goals
Sea grasses are one of the most important parts of the ocean ecosystem, providing both shelter and nutrients to all marine life. These sea grasses are also home to a community of microbes which work and interact with the sea grasses. This project, which is partnered with the UC Davis Seagrass Microbiome Project at Bodega Bay, tests how different chemicals would affect the seagrass microbial communities,specifically that of the species Zostera Marina. The effects of different chemicals will be tested with winogradsky columns and the number of colors that result in the columns. The hypothesis is that if the additional chemicals are added to the columns, the number of colors will increase in the winogradsky columns over time because the chemicals will encourage growth of certain microbes.

Methods/Materials
Winogradsky columns were used to test the effects of the chemicals since they allow a clear visual way to culture microorganisms with different metabolism strategies. The mixture inside the columns has chemicals that contain elements like carbon, nitrogen, and sulfur. The experimental columns will have the additional ammonium acetate, elemental sulfur, and seagrass. A control was also added without any additional chemicals. These columns were tested starting in October 2014 using water around seagrass beds to obtain the seagrass microbes.

Results
The results show that the seagrass columns had less microbial growth than the ammonium acetate and elemental sulfur columns since seagrass columns only had 1.6 average colors compared to 5.2 and 6.6 average colors of the sulfur and ammonium columns respectively in March. It was observed that the total number of colors increased and many of the microbe populations changed over time in the columns. The columns are still providing more data and experiment is currently being developed to provide new types of data.

Conclusions/Discussion
There was evidence to support the hypothesis since the averages of the number of colors in the experimental columns were generally higher than the control columns average of 2.8 colors. However, sources of error from the subjective color counting method and other human measuring error and blunders are sources of error in the project. Overall, researching the effects of chemicals on seagrass microbiomes greatly contributes to our understanding of crucial seagrass communities.

Summary Statement
The project tests the effects of chemicals on microbes from ocean sea grasses communities.

Help Received
Researchers at the UC Davis Bodega Marine lab like Jenna Lang helped set up and build the Winodgrasky columns and Mrs. Dixon helped develop the research focus questions and provided advice on the project.