CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
J1223

Project Title
The Effects of the Tide on Plate Counts and Chemical Balance in Ocean Water

Abstract

Objectives/Goals
The question that my project hoped to answer was if tide type or the height of the tide had any effect on bacterial and chemical levels in ocean water. I tested different tide cycles, spring tide or neap tide, as well as different tide heights, low or high.

Methods/Materials
To test my project, I required 58 petri dishes as well as 57 zippered bags. To ensure that all samples were taken from the same depth, I used a measuring stick. This experiment required the use of iron, phosphate, and nitrate/nitrite water testing strips. I used tape to seal the petri dishes, and stickers to label them. Samples were collected from three different locations on Crystal Cove State Beach. For each tide type, spring or neap, there were two trials. On the days that the most extreme spring and neap tides fell, I collected three samples from each location twice a day: once during high tide, and once during low tide. Roughly 1.5 mL of each sample was then spread evenly over a nutrient agar petri dish. I would then seal each petri dish and label it with a sticker. All of the petri dishes were grown for one week, and bacterial growth was monitored daily. To test each of the chemical levels, I used water testing strips. Chemical levels were counted in parts per million, while the bacterial level of each petri dish was determined by the number of colonies that were grown during that one week period.

Results
After obtaining the final bacterial counts, the results were averaged to determine which tide type had the highest bacterial levels. These results showed that high tide during spring tide had the highest levels, with low tide during spring tide following it with the second highest amount. After that was low tide during neap tide, and lastly was high tide during neap tide. I then averaged the different tide types to determine if high or low tide had higher bacterial levels. High tide had 94.959 bacteria on average, while low tide had 64.139 bacterial on average per petri dish.

Conclusions/Discussion
The results I obtained agreed with my hypothesis in certain aspects. Bacterial levels were ranked from highest to lowest in the same order as I predicted, however low tide during neap tide had higher bacterial levels than high tide during neap tide. However, phosphate and iron levels had no correlation, and only appeared in some of the locations, while nitrate and nitrite were not at all present in any of the trials.

Summary Statement
My project summarizes the effects of tide on ocean water through bacterial counts and chemical analysis.

Help Received
My parents paid for the supplies that I ordered and drove me to the beach whenever necessary for my project.