CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
J2207

Project Title
Drowning in Acid: The Effect of CO(2) on Coral

Abstract

Objectives/Goals
My objective was to see if the presence of CO(2) in a trumpet coral polyp's environment would cause the water to become more acidic and break down the polyp's outer shell.

Methods/Materials
I used two trumpet coral polyps, roughly the same size and weight, and introduced them to separate saltwater tanks. The tanks were equipped with filters, heaters, thermometers, protein skimmers, blue lights, and hydrometers. I monitored the salinity, pH, KH hardness, and measured the shell thickness of each polyp in each tank daily. I also monitored the calcium, nitrate, and phosphate levels weekly. One tank was exposed to CO(2) using a Turbo CO(2) Bio System, a machine that uses sugar and yeast to generate CO(2). The other tank was not exposed to any CO(2).

Results
After four weeks of exposure, the coral polyp's shell thickness decreased quickly in the tank exposed to CO(2) and the pH levels in its environment decreased from 8.2 to 7.9. Its KH hardness levels fell from 10 dKH to 7 dKH. The control polyp's shell kept growing, and the pH and KH hardness levels in the control tank remained stable. My hypothesis was correct.

Conclusions/Discussion
Ocean acidification is the process of carbon dioxide seeping into the world's oceans, which reacts with the water to create carbonic acid. This acid lowers the pH of the water, which is extremely harmful to many varieties of marine life. My experiment tested the effect of this process on trumpet coral. Coral are a huge part of the marine ecosystem, and are also very receptive to changes in pH. We need to protect our planet's oceans and marine life from ocean acidification. Damage to sensitive species like coral can have a ripple effect on the greater ecosystem, potentially affecting future life on our planet as we currently know it.

Summary Statement
My project tested the effect of carbon dioxide on the outer shell thickness/growth of trumpet coral.

Help Received
Mother helped to acquire materials, Advisor provided school time for me to test calcium, nitrate, and phosphate levels.