CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J1526

Project Title
The Unique Properties of Coccolithophorid Algae and Its Effects on the Biofixation of Carbon Dioxide

Abstract

Objectives/Goals
The purpose of this experiment is to show a way in which CO2 may be reduced by using Coccolithophorid Algae. These algae have the unique property of being able to lock up CO2 within their coccolith shells thereby producing carbon sinks. Because of this, CO2 does not get released back into the atmosphere where it would have the potential of contributing to global warming.

Methods/Materials
Prepare algae culture for the aeration process by combining algae with a solution of boiled salt water and soil nutrient water. Bottle the culture solution and hook up to aeration and light apparatus for 10 days. Remove and separately bottle into 12 (591ml capacity) bottles with 250ml of algae solution in each. Add ferric nitrate in specified quantities into each bottle leaving, 2 control bottles with no added ferric nitrate. Measure CO2 in bottle and record. Cover opening tightly with plastic wrap and then twist lid on securely. Place on continuous rotisserie motion apparatus. Remove 1 set of bottles after 4 days and carefully measure the CO2 level and repeat procedure with 2nd set of bottles after 7 days. Repeat all above for 2nd trial. Record and compare results.

Results
The results turned out to be consistent with my hypothesis. The algae had the greatest growth with the highest concentration of ferric nitrate at 16ml. Correspondingly, the increased amount of algae consumed the most CO2 at this level by decreasing the CO2 by 11.6%. Trial 1 and 3 were on the continuous rotisserie motion apparatus for 4 days and trial 2 and 4 were on the motion apparatus for 7 days. The additional 3 days of continuous light and motion proved to increase the amount of CO2 removed from the air by 1.5%. I surmised that over the 3 additional days, more algae grew therefore used up more of the CO2 within the bottle.

Conclusions/Discussion
The Unique Properties of Coccolithophorid Algae and Its Effects on the Biofixation of Carbon Dioxide confirms the usefulness of algae and its viability as a method to remove carbon dioxide from the air. Although it is not a final answer to our problem of global warming, it can help, while new technology is being developed and researched for more permanent solutions.

Summary Statement
My project shows the unique ability of Coccolithophorid Algae to reduce CO2 in our environment.

Help Received
Mr. Briner (my science teacher) was a great support answering my questions and directing me with his advice, my cousins helped me with their knowledge in the field of environmental studies, and my mom helped me with the board design.