CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34206

Project Title

Is Global Warming Algae Forming? The Effect of Temperature on Spirulina Growth Rate

Abstract

Objectives/Goals

The rising temperatures associated with global warming are a cause of great concern. Carbon dioxide is building up in the atmosphere. To reduce the amount of CO2 in the atmosphere, we need something to take it away. Algae sequesters carbon dioxide. The objective of my experiment was to determine what temperature algae grows the best in. This experiment seeks to determine if algae growth is increased when grown in a warmer temperature.

Methods/Materials

In my experiment, test tubes containing an algae culture were heated to temperatures ranging from room temperature to 40ºC. This was accomplished by preparing test tubes with different numbers of windings of thin magnet wire. The test tubes were then wired in series so that a constant electrical current flowed through each. In this way, the power (heating) for each test tube was systematically varied. Daily photographs were taken of all the test tubes. These images were subsequently analyzed with an image processing program to extract density as a function of time. In this experiment, I assumed the algae population is proportional to the color density.

Results

My results showed that the test tube heated to an intermediate temperature (28ºC) had the greatest color density change, meaning it had the highest algae growth rate. Temperatures on either side of this value demonstrated less color density change.

Conclusions/Discussion

In the end I learned that algae grows best at a moderately elevated temperature. The result suggests increased carbon consumption can be expected from global algae population as both a result and a mitigation of global warming. However the experiment also showed that this is only true if colony temperatures remain below 30°C.

Summary Statement

Spirulina algae growth rate was studied as a function of temperature, and intermediate temperatures showed the highest growth rate.

Help Received

Mr. Wright (my science teacher), and Mr. Nestlerode (my science fair advisor), and my Dad