A Study of the Carbon Dioxide Consumption and Sequestration by I. galbana and A. platensis Under Pyrolytic Conditions

Joshua, Daniel (School: Madison Central High School)

The purpose of my experiment is to test how well Isochrysis galbana and Arthrospira platensis algae cultures capture and sequester carbon dioxide while under conditions of extreme heat and extreme carbon dioxide concentration levels while being treated with nitrogen and phosphorus. 25 mL samples of Isochrysis galbana and Arthrospira platensis were grown for a week. Two samples of each culture were treated with phosphorus; two samples of each culture were treated with nitrogen; two samples of each culture were treated with both; and two samples of each culture were treated with nothing for control. For three trials, one sample of each culture was placed in Nalgene bottle with a carbon dioxide concentration between 10,000 and 14,000. The other was tested while being heated in a 3-necked flask with carbon dioxide concentration between 10,000 and 14,000. The carbon dioxide concentration of the Nalgene bottles and flasks were raised using dry ice. During each of the three trials, for ten minutes, a carbon dioxide concentration measurement was taken every four seconds. The heated algae culture samples were later heated until the medium became solid. The solid form was tested identically to the non-heated algae cultures for an hour each. The pH, nitrate, nitrite, general hardness, and carbonate hardness measurements taken initially, halfway through the growing period, and after testing were graphed. At the conclusion of the experiment, my hypothesis was somewhat supported. Phosphorus-treated Isochrysis and Arthrospira and nitrogen-tested Isochrysis and Arthrospira consumed more carbon dioxide on average, but the samples of both cultures that were treated with both nitrogen and phosphorus consumed less than average.

Awards Won: