CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36725

Project Title

Fueling a Sustainable Planet: Accelerating Algae Growth with Industrial Wastewater

Abstract

Objectives/Goals

Algae have the potential to rescue mankind from lack of sustainable fuel sources and global warming. Algae absorb 90 percent of surrounding CO2 into their cells and produce lipids that are usable as biofuel. Biofuel so produced is not only sustainable but also cleans the atmosphere. This project takes an additional step to accelerate algae growth using industrial waste and thereby putting the pollutants to good use. This project aims to use industrial wastewater to accelerate algae growth.

Methods/Materials

In this experiment, chlorella vulgaris cultures were grown with varying concentrations of industrial wastewater. In the first four samples, the industrial waste concentration was varied from 0, 1/32, 1/16, and 1/8 teaspoons. Four additional samples were prepared as counterparts with a regulated pH of 7.5.They were placed in a 72 degree fahrenheit room and 1 foot away from a 1500 lumens lamp. The lamp was on for 16-hours and off for 8-hours. pH of the solution was measured at the end of #light period# and at the end of the #dark period# and the fluctuation was noted.

Results

Algae growth was highest in samples with industrial waste. Samples with industrial waste and algae growth also showed the least pH fluctuation. The culture with a 1/32 tsp concentration of industrial water at a regulated pH exhibited the highest algae growth rates. In 1/16 tsp. industrial waste culture and 1/8 industrial waste cultures, growth rates were the higher than that of its controlled counterpart

Conclusions/Discussion

In conclusion, high concentrations of industrial waste stabilize pH and provide nutrients, thereby accelerating algae growth. Such acceleration of algae growth can pave the way for sustainable yet economical biofuel production. Algae will also absorb CO2 from the atmosphere, thereby reducing global warming.

Summary Statement

I measured that industrial wastewater provides nutrients and stabilizes pH, therefore accelerating algae growth

Help Received

My science teacher Mrs. Kristi Chung advised me on concentration levels, and my geometry teacher Mrs. Shobita Sinha taught me standard deviation for my data plots.