CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY

Name(s)

Pola Pietrzkowski

Project Number

J1515

Project Title

Increasing Amount of Proteins in Edible Plant Cells to Improve Plant-Based Food

Abstract

Objectives

To find a method to enrich plant cells in proteins and obtain and protein-rich food.

Methods

Used algae cells grown in test tubes under different conditions, a rotating culture and a stationary culture, and different concentrations of trace minerals. All cells grown in laboratory in sterile conditions. Collected data for cell count and growth as well as protein content using Lowry method. Grown for 12 days.

Results

Results collected were optical density (OD), cell count using hematocytometers, protein content using Lowry method, and protein content per cell, calculated using cell count and total protein content results. Overall, rotation had beneficial effect on amount of cells and protein content comparing to stationary. Higher concentration of trace minerals (0.1%) created significantly more cells that were richer in protein in the case of the algae Chlorella Vulgaris. For the other algae used in this experiment, Arthrospira Platensis, the lower concentration (0.01%) created the best results in cell count and protein, while the higher concentration proved to be harmful. Overall, project achieved being able to increase the amount of proteins using added trace minerals and different culture conditions.

Conclusions

The methods used in this experiment succeeded in significantly increasing the protein content of algae cells, as well as the amount of cells grown when comparing to control groups. Higher and lower concentrations of trace minerals for different algae combined with rotary culture condition led to impactful increases in results measured. Applications of the project include food industry, since both algae used in the experiment are already used as food or supplements, and further study.

Summary Statement

In this project, I was able to increase the amount if proteins in algae by adding trace minerals and by using a rotatsing culture.

Help Received

My science teacher, Mrs. Afsaneh Miller, helped me by reviewing my work and answering my questions. My supervising scientist, Dr. Tania Reyes, supervised me while working under laboratory conditions and helped with collecting and analyzing data. I worked at a lab owned by private company FutureCeuticals.