Shocking Scum: The Effects of Electrical Stimulation on Chlorella vulgaris

Martinez, James

Fossil fuels play an important role in transportation and production; however, with a limited supply and detrimental effects to the environment, safer, renewable, and more efficient energy sources such as biofuels are needed. As a solution to this problem, algae biofuels seem to be a promising alternative to fossil fuels, but optimal growing conditions have yet to be achieved. This project attempted to increase cell growth and biomass yield by applying electrical stimulation during growth phases of the microalgae, Chlorella vulgaris. Five cultures were established; three of the five cultures were provided varying amounts of electricity and their growth was compared to the control cultures. Samples were taken every day for one-week testing periods and optical density measurements were taken using a spectrophotometer. Using a hemocytometer and optical density measurements, cell counts were used to create a calibration curve of absorbance to cell density to assess cell growth. After the one-week period was completed, the algae was filtered from its medium and gravimetric analysis was used to assess biomass. Results showed a significant increase of algal growth and biomass yield as electricity was increased. Results from this research can be used to improve upon current growth methods of algae for biofuels.

Awards Won: