CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
Katie L. Tam

Project Number
34565

Project Title
Microbial Fuel Cells: The Next Source of Green Energy

Abstract

Objectives/Goals
The objective of this project is to determine if time has a significant effect on the energy produced by a microbial fuel cell. I hypothesize that as time goes on, the electricity produced by a microbial fuel cell will increase.

Methods/Materials
Three microbial fuel cells were constructed, all identical in design. Materials for this project were purchased from local hardware stores, or online. The anode container was filled with a mud sample collected from a local benthic zone, while the cathode was filled with a conductive salt water solution. An electrode was then placed in each container and connected to copper cables that ran out of the anode and cathode. These were connected by a resistor, which is where the test leads of the digital multimeter were placed to measure the voltage in millivolts. Measurements were taken twice a day, morning and evening. At each time of testing, three measurements were taken concurrently for consistency.

Results
Although there were some fluctuations, generally it was found that as time went on, the rate at which electricity is produced by a microbial fuel cell increases.

Conclusions/Discussion
Based on my data, for the most efficiency it is best to operate a microbial fuel cell some time after the initial assembly, with the bacteria inside. Initial bacteria populations were unable to be taken, and the differences in the quantity could have caused the fluctuations in data. Measurements taken in the evening were often higher than measurements taken in the morning. These differences can be attributed to temperature. Changes in temperature were uncontrollable and may have contributed to inconsistent data, as the construction of the fuel cells may have as well. Fuel cell construction was done by the student, so small imperfections that led to inconsistency in data were to be expected.

Summary Statement
Testing the effect of time on microbial fuel cells can help future developments in finding sources for a renewable and inexpensive source of energy.

Help Received
Received support from parents.