



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Peter D. Oliver	Project Number J1027
Project Title From Mud to Electricity: Using Microbial Fuel Cells	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project was to determine whether a microbial fuel cell produced more electricity with mud from a stream bed or mud made from commercially sold topsoil and distilled water. I hypothesized that the mud from the stream had more organic material and would produce more electricity.</p> <p>Methods/Materials Microbial fuel cells are a fairly new type of renewable energy which uses the bacteria in the mud in a process to generate electricity. Using plastic containers, piping, and various types of glues I built six cells made up of four major parts: the anode, the cathode, the PEM or salt bridge, and the external circuit. As the variable I used two different types of mud in the cells, mud from the bottom of a stream and mud made from commercially sold topsoil and distilled water. I filled three of the cells with river mud and river water, and the other three with topsoil mud and salt water. I started up the cells by giving them a regular oxygen supply and tested them for voltage twice a day over a thirty-day period.</p> <p>Results The fuel cells containing the river mud immediately shot up to about 400 millivolts in the first few days of testing while the cells with the topsoil mud produced less than 50 millivolts early on. Every cell rose in voltage slowly but steadily until their final standings were with the river mud cells around 450 millivolts and the topsoil mud cells around 300 millivolts. During the last 20 days the rate of change in the topsoil mud was greater than in the river mud.</p> <p>Conclusions/Discussion The more organic river material offered a better environment for the bacteria to produce electrons. Since the bacteria in the microbial fuel cells use the organic material in the mud to produce electrons, the river mud performed better than the commercial topsoil. There was not a great amount of electricity produced in my fuel cells, but this technology can be used in places that lack proper sanitation and electricity because the process of generating electricity in these fuel cells also purifies the water. In this way microbial fuel cells may be helpful, but I can not see them becoming one of our leading power sources in the near future.</p>	
Summary Statement In this project I tested two types of mud for electricity production in microbial fuel cells.	
Help Received Father purchased materials and monitored safety during construction; Mother proofread final copy and helped organize the backboard display.	