CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
Khadeeja Baqui

Project Number
J0202

Project Title
Converting Dirt into Fuel Using Bacteria

Abstract

Objectives/Goals
Scientists have been greatly plagued by the idea of dependence on nonrenewable resources and the resources# disappearance. In the last decade, they have increasingly researched on possible renewable resources to replace our dwindling supply of coal, oil, and other nonrenewable resources. The microbial fuel cell, which runs on tiny anaerobic bacteria that live almost everywhere around the globe in the topsoil layer, is a fairly new research topic. Very few scientists paid attention to it until recently. However, the ideas that it is based on date to earlier times. Scientists discovered the ideas, but people gave it little attention. It was largely forgotten. Now, though, microbial fuel cells, or MFCs, are thought to be important players in the future of our fuel and electricity.

Methods/Materials
Microbial fuel cell kit (from sciencebuddies.com) I did not modify the kit.

Results
I found that the 5 g of salt microbial fuel cell had a greater power output and better soil conductivity than both the 1 g and 10 g of salt microbial fuel cells. I also found that adding too much salt or too little would not maximize the bacteria's efficiency.

Conclusions/Discussion
The LED did not blink at all while testing with the potting soil because of low power output. However, with topsoil, before adding salt to the MFC, the attached LED began to blink after 2-3 days. Throughout the experiment, the temperature was kept at a constant 72℉. After adding salt, however, the LED attached to the MFC with 1 g of salt started to rapidly blink, faster than it had without salt. The voltage increased, causing the power output to increase as well. However, the 5 g of salt did not begin to blink until a few weeks after adding salt. The internal resistance for 5 g of salt lowered considerably, compared to 1 g of salt. After adding 10 g of salt to the MFC, the power output decreased. Compared to the other two MFCs, the one containing 5 g of salt had the highest power output. After adding salt, the soil conductivity of the 5 g of salt MFC is higher than that of the 1 g of salt microbial fuel cell.

Summary Statement
My project is about generating electricity from electrogenic, anaerobic bacteria.

Help Received
I received some assistance from my mentor.