



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Grace Jin Li	Project Number S1512
Project Title The Effect of Geobacteraceae on the Power Generation of a Microbial Fuel Cell	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals What is the effect of different sources of geobacteraceae on the power generation of a microbial fuel cell? Is one of the products of the microbial fuel cell pure, drinkable water?</p> <p>Methods/Materials Three microbial fuel cells with identical cathode and anode chambers, electrodes, and salt bridges were built. The secondary (biological) treatment sample was collected from the wastewater plant, and the ground food household wastewater sample was mixed. The wastewater samples and control were poured into individual anode bottles, and sealed airtight. Each cathode bottle was filled with a saltwater conductive solution. The external circuit was connected to the resistor (multi-meter) and the millivolt readings were recorded twice daily, for thirty days.</p> <p>Results</p> <ol style="list-style-type: none">1. Wastewater sample resulted in the highest power production.2. Ground food sample resulted in the lowest power production.3. One of the products of the microbial fuel cell is clean, drinkable water.4. SODIS and UV light are not as effective as microbial fuel cell and boiling are at disinfecting water. <p>Conclusions/Discussion Wastewater sample resulted in the highest power production because it contains the most potential bacteria. Benthic mud sample resulted in average power production because the bacteria were moved out of its natural environment. Ground food sample resulted in the lowest power production because it is the most unnatural of the three and had to generate its own bacteria. Microorganisms added to the secondary (biological) treatment wastewater at the treatment plant, generated the highest reading of 152.45 millivolts. This is only 10.16 percent of a 1.5 volt AA battery output. Ground food naturally produced nearly half the secondary treatment millivolt level. The data demonstrates that a microbial fuel cell can be used to harvest electricity from ground food and secondary (biological) treatment wastewater. One of the products of the microbial fuel cell is clean drinkable water. It is effective in disinfecting water. Boiling the water kills bacteria because in this process, water reaches the high temperature that burst the cell walls and deform the bacteria, SODIS never reaches these high temperatures. It does, however, kill a good amount of bacteria by mutating the DNA of the bacteria. It kills more bacteria in six hours than exposing the water to UV light bulb for thirty-six hours does.</p>	
Summary Statement To determine the effects of different sources of geobacteraceae on the power generation of a microbial fuel cell and to determine if one of the products of the microbial fuel cell is pure, drinkable water?	
Help Received My parents drove me to the stores and bought the supplies for me.	