Microbial Fuel Cell: From Your Toilet to Your Outlet

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For years, the United States has been dependent on fossil fuels as their energy source; but because of its negative effect on the ecosystem, the pursuit for renewable energy began. The process in which the microbial fuel cell generates its electricity is beneficial for it does not release any harmful toxins, and can reprocess our waste to our advantage. Bacteria contain electrons and protons, the two parts of an atom needed to create electricity. I hope to contribute to research initiatives focused on bettering the Microbial Fuel Cell (MFC) technology. The MFC is separated into four main divisions; the anode, cathode, proton exchange membrane (PEM), and the external circuit. The cathode,where the fresh salt water is placed to help the protons circulate better, and the anode, where the waste material is being held, are coupled by the salt bridge. Separating the protons from the bacteria, the salt bridge helps the protons travel from the anode to the cathode. While the protons are traveling through the salt bridge, the oxygen from the cathode container is drawing out the electrons from the bacteria; and the electrons are traveling to the cathode through the external unit, thus creating a flow between the electrons and protons which generates electricity. I measured the voltage produced by one gallon of waste using a 100K, 10K, 1K, and 100 Ohms for three days. Repeating the process with a two and three gallon container, it resulted in greater voltage production the higher the volume. Contributing to MFC research and proving the effects the volume makes on the voltage, the purpose was fulfilled by proving the volumes importance in voltage production. From research studies conducted, the volume is one factor needed to generate enough voltage.

Awards Won: