

Mohamed Ibrahim

*Influencing Electricity Output of MFCs Using Electron Acceptors*

Microbial fuel cells (MFCs) have the potential of providing a reliable, alternative energy source. The purpose of the investigation was to determine if the combination of electron acceptors potassium ferricyanide and potassium permanganate would influence the electrical output of MFCs. A total of 4 - 2-chamber MFCs connected by a proton exchange membrane were constructed with the following cathode mixtures in an aerobic environment: 1) no electron acceptors (control), 2) potassium permanganate electron acceptor (control), 3) potassium ferricyanide electron acceptor (control), and 4) combination of potassium permanganate and potassium ferricyanide electron acceptors (experimental). Each anode contained South Platte River benthic zone sediment contained in an anaerobic environment. The experimentation lasted a total of eight days where the electrical output measured in volts was collected every 24 hours from each MFC. The Experimental MFC had an average daily output of 1.33 volts. Control 1, which had no electron acceptors, averaged 0.13 volts after the eight days of data collection. Control 2, which had only potassium ferricyanide, had an average daily output 0.54 volts. Control 3, which had only potassium permanganate, had an average daily output of 0.84 volts. This data supports the hypothesis, and shows electron acceptor combination is a way to improve MFC electrical output. If the experiment were to be repeated, a minimum of four trials would be done to create a more accurate statistical analysis, a different choice of sealant would be used, and the length of data collection would be extended to 30 days.