

The Effect of Inoculum Source on the Structure and Function of Bacterial Communities in Microbial Fuel Cells

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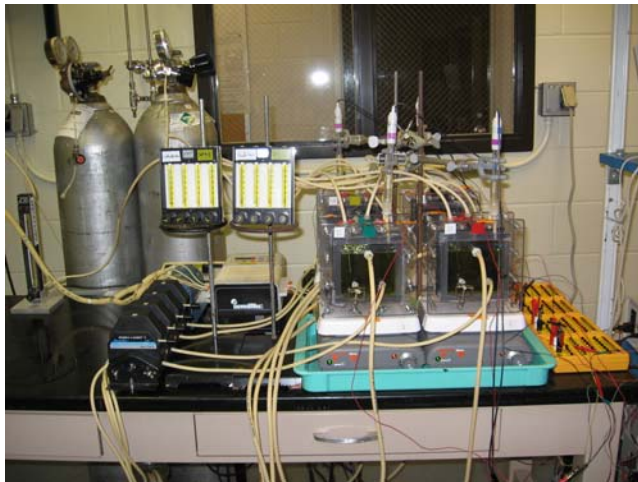
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NNIN Facility utilized: Characterization Facility

DESCRIPTION OF WORK

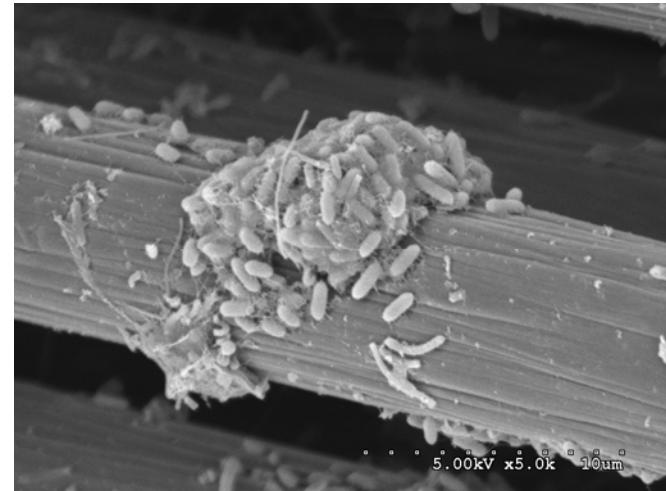
- ◆ Microbial Fuel Cells (MFCs) use bacteria as catalysts to treat organic contaminants in waste streams and simultaneously produce electricity.
- ◆ MFCs using five different bacterial inocula were set up and run for 30 days.
- ◆ Microbial fuel cell performance was measured by current and potential development.
- ◆ Consumption of organic material was measured by high performance liquid chromatography.
- ◆ The bacterial community was characterized by 16S rRNA gene cloning and sequencing.
- ◆ Scanning electron microscopy was used to visualize the bacteria on the electrode.



Microbial Fuel Cell Setup

MAJOR OBSERVATIONS

- ◆ Four of the inocula resulted in power production within 26% of each other.
- ◆ The MFC inoculated with dairy cow waste produced less than 1/100th of the power of the other four.
- ◆ *Geobacter* spp. were numerically abundant in all four of the high-powered MFCs and absent in the low-powered MFC.
- ◆ Scanning electron microscopy photographs indicated that the biofilm varied substantially between different inocula.



Scanning electron micrograph of bacteria on electrode

Facility Used: Imaging Center, Snyder Hall

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