

# Microbial Fuel Cells: Principle and Use of Electrical Microbes in Waste Water Treatment <sup>†</sup>

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**Abstract:** Microbial fuel cell (MFC) is a device that converts chemical energy into electrical energy by using microorganisms. The electricity is directly generated by using the bacteria- *Geobactor* or *Shewanella* (electrical bacteria which produces electricity). The bacteria generate electricity by biodegrading organic matter or wastes substrates. MFC systems consist of an anode chamber and a cathode chamber separated by a proton exchange membrane (PEM). The bacteria grow on the anode and act as a biocatalyst to degrade the organic waste substrates into carbon dioxide, protons, and electrons. The electrons flow from the anode to the cathode side through an external electric circuit. MFCs are one of the recently developed eco-friendly technology of wastewater treatment. This is an emerging technology with increasing interest, as MFC represents the regeneration of electricity while purifying wastewater concurrently. This study details the working principle, types, substrates, microbes, design and technology of MFCs, and advancements in these techniques. MFCs is one of the promising alternative sources of energy and conversion technology that is clean, non-polluting, which can substitute traditional fossil fuel and provide solution for environmental waste pollution. It can achieve up to 50% chemical oxygen demand removal and up to 420-460 mW/m<sup>2</sup> of power densities.

**Keywords:** microbial fuel cell (MFC); wastewater treatment; bioelectricity generation.

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## Conflicts of Interest

The authors declare no conflict of interest.