

Power Generation through Wastewater using Microbial Fuel Cell

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Abstract

A Microbial Fuel Cell (MFC) is a device that converts chemical energy into electrical energy with the help of microorganisms. This research uses MFC to compare the power generation from two wastewater samples using carbon and copper electrodes. It is currently underway to explore the feasibility of utilizing MFC technology in Sri Lanka to generate electricity while simultaneously treating wastewater and identifying the system which produces the maximum electricity. Among the MFC technology systems, the Batch mode dual-chambered MFC system has been used throughout the research. This research compared four scenarios using 8 MFCs, each with two unique wastewater samples and electrodes. One litre of wastewater could produce an optimum voltage of 694.0 mV using copper Electrodes and 545.1 mV using carbon electrodes. The two wastewater samples, the effluent of a factory and a treatment plant inlet, have been comparatively tested on their performance. Parameters like Biochemical Oxygen Demand 5 (BOD5), Chemical Oxygen Demand (COD), total nitrogen, total phosphorus, pH, and temperature have been tested by a laboratory to check the possibility of treating the wastewater while generating electricity. Wastewater samples were successfully neutralized with a pH level of 6.8-7, BOD5 levels decreased by 7 mg/l and 6 mg/l, COD values dropped by 30 mg/l and 16 mg/l, total nitrogen levels reduced by 12.6 mg/l and 11.2 mg/l, total phosphorus levels decreased by 0.3 mg/l and 0.1 mg/l, in plant inlet and factory effluent respectively at room temperature after using MFCs.

Keywords: *Microbial fuel cell, Wastewater treatment, Effective parameters, Bioelectricity*