Environmental Engineering and Management Journal

August 2010, Vol.9, No. 8, 1069-1087
http://omicron.ch.tuiasi.ro/EEMJ/

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MICROBIAL FUEL CELLS – AN OPTION FOR WASTEWATER TREATMENT

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Abstract

The Microbial Fuel Cell (MFC) is a promising technology for efficient wastewater treatment and recovering energy as direct electricity for onsite applications. For treatment of biodegradable organic matters in MFCs, removal efficiencies comparable with established treatment methods can be obtained. Even some of the bio-refractory compounds can be effectively removed in MFCs. Power densities higher than 2 W/m^2 and volumetric power of 500 W/m^3 are reported. However the power output varies drastically depending on the MFC configuration, substrate used, type of bacterial culture and operating conditions. The results presented so far demonstrated that electricity can be generated by exploiting microorganisms as biocatalysts, but both technical and biological optimizations are needed to maximize power output. The advantages of using MFCs for wastewater treatment, the organic matter removal efficiency and electricity generation reported recently for different MFC configurations are described in this paper. Factors affecting performance of the MFC are summarized. MFC scale-up issues and further development needs are emphasized. This information on factors affecting MFC performance and scale-up issues would be very useful tool for researchers for shifting this technology from lab-scale to pilot and full-scale applications for sustainable wastewater treatment.

Key words: electricity generation, factors affecting performance, MFC design, scale-up, wastewater treatment

Received: April, 2010; Revised final: July 2010; Accepted: August, 2010

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