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INFLUENCE OF MICROBIAL FUEL CELL DESIGN ON BIOENERGY PRODUCTION TREATING WASTEWATER

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Abstract

Microbial fuel cells (MFCs) have achieved a lot of attention in recent years. Around 24% of these studies are related to converting organic waste of low or high strength wastewater into power. If energy production of this type of system increases, MFCs technology would provide a new sustainable method to offset wastewater treatment plant operating cost. In the selection of MFC configuration the flow operation is the most important criteria in bioenergy production, simultaneously as a wastewater treatment method. Most of the research studies for optimization of power output focus on altering configuration in order to overcome electrochemical barriers related to electron and proton conductivity. However, enhancing the electrode surface area will affect the performance of the anode and cathode. The average power outputs in studies using wastewater as substrate are 400 mW/m² (17 W/m³) for batch/fed-batch and 245 mW/m² (8.8 W/m³) for continuous flow operation. By improving the configuration of MFCs the higher performance will be observed. Higher energy production of MFCs by stacking reactors containing multi electrodes is among new research for wastewater treatment. In this review, both the development of MFC configuration and mode flow to improve the performance of MFC system for wastewater treatment applications will be discussed.

Key words: bioenergy production, microbial fuel cells (MFCs), MFC configuration, operational mode, wastewater treatment

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