

Electricity Production Enhancement in a Constructed Microbial Fuel Cell MFC Using Iron Nanoparticles

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Abstract : The electrical energy generation through Microbial Fuel Cells (MFCs) using microorganisms is a renewable and sustainable approach. It creates truly an efficient technology for power production and wastewater treatment. MFC is an electrochemical device which turns wastewater into electricity. The most important part of MFC is microbes. Nano zero-valent Iron NZVI technique was successfully applied in degrading the chemical pollutants and cleaning wastewater. However, the use of NZVI for enhancing the current production is still not confirmed yet. This study aims to confirm the effect of these particles on the current generation by using MFC. A constructed microbial fuel cell, which utilizes domestic wastewater, has been considered for wastewater treatment and bio-electricity generation. The two electrodes were connected to an external resistor (200 ohms). Experiments were conducted in two steps. First, the MFC was constructed without adding NZVI particles (Control) while at a second step, nanoparticles were added with a concentration of 50mg/L. After 20 hours, the measured voltage increased to 5 and 8mV, respectively. To conclude, the use of zero-valent iron in an MFC system can increase electricity generation.

Keywords : bacterial growth, electricity generation, microbial fuel cell MFC, nano zero-valent iron NZVI.

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