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عنوان مقاله:

Development of microbial fuel cell for wastewater treatment and electricity generation using domestic wastes

محل انتشار:

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خلاصه مقاله:

Background: The energy crisis is a growing problem around the world, requiring the creation of alternative energy sources that can generate less carbon dioxide and benefit the ecosystem. Reutilization of wastewater is becoming the emerging energy solution. Wastewater contains a large amount of organic matter that can be oxidized in microbial fuel cells (MFCs) to produce electricity. MFCs use biodegradable materials to create energy in the presence of microorganisms. Methods: Purposive sampling technique was employed to collect samples from critical polluting sources. The samples were certainly maintained in a refrigerator at ۴°C. Several mixes for sample were prepared and tested analytically- for physio-chemical and bacteriological characterizations of each substrate status at pre- and post-treatment stages. Electricity generating capacity of MFCs that employing different substrates was investigated experimentally using batch reactors. The cross-sectional methodology was employed to study possible power generation. Results: The maximum voltage output of ۱۱۸.۹۳, ۱۴۴.۸۴, and ۸۹.۷۶ mV were produced keeping the resistance unlimited for MFC۱ (urine substrate), MFC۲ (blackwater substrate), and MFC۳ (graywater substrate), respectively. MFC that utilized graywater as a substrate brought the tiniest quantity of electricity; however, it stood the most stable. The highest COD reduction (۶۵.۸۳%) in the process was reported in urine substrate and the highest BOD۵ removal (۶۹.۱۸%) was reported in black water substrate. Conclusion: The experimental results provided a promising indication of MFCs viability, providing hope for future power generation and alternative wastewater treatment option in developing countries.

کلمات کلیدی:

Domestic wastes, Electricity generation, Microbial fuel cell, Substrate, Water purification

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