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MICROBIAL FUEL CELL USING UASB AS ANODE AND EFFECTS OF HYDROGEN PEROXIDE ON TREATMENT EFFICIENCY

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Dual chambered continuous up-flow microbial fuel cell (MFC) was used to check the effect of controlled temperature and addition of different hydrogen peroxide (H_2O_2) doses on bioelectricity production. MFC-1 and MFC-2 showed 77 and 89 % of COD removal efficiency, respectively, while same amount 13.4 % of coulombic efficiency under continuous operation mode were produced by both reactors. Oxygenation of cathode chambers of both MFC with 5 mL of H_2O_2 resulted in higher values of potential difference and current, 1100 mV and 0.6 mA in MFC-1 and 674 mV and 0.32 mA in MFC-2. Higher power density of 166 Pd·cm^{-2} was produced by reactor 1 than 75 Pd·cm^{-2} from reactor 2. Result showed that control temperature of 35°C had lowered down the bioelectricity production while increased the COD removal. The use of H_2O_2 for oxygenation was found to improve the voltage and current production and stability of MFC.

Keywords: coulombic efficiency, voltage, power density, salt bridge, waste water, COD.

Introduction

One of the main sources of many industrial contaminations is the wastewater produced by industries which must be treated in order to achieving local effluent discharge standards [1]. Treated water is considered as an essential part of the freshwater sustainability and resulted water is considered as a fresh water resource instead of a waste [2]. Bioelectricity generation during wastewater treatment can be a great achievement by its dual benefits of

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