

## **Simultaneous Power Generation and Wastewater Treatment by Using Air-Cathode Single Chamber Microbial Fuel Cell**

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### **ABSTRACT**

This paper presents the study on simultaneous power generation and wastewater treatment by using air-cathode single chamber microbial fuel cell (MFC). A non-precious catalyst which is  $\alpha$ -MnO<sub>2</sub> was synthesized to be used for air cathode microbial fuel cell (MFC) in order to replace the conventional used catalyst, platinum (Pt). The as-prepared  $\alpha$ -MnO<sub>2</sub> was characterized through XRD, FESEM and EDS in order to examine its crystal structure, morphology and chemical composition. The results obtained indicated that the as prepared  $\alpha$ -MnO<sub>2</sub> matched the XRD pattern, nanoneedles shape with large surface area, high purity. The air-cathode single chamber MFC was set up in order to treat POME and generate power simultaneously catalyzed by  $\alpha$ -MnO<sub>2</sub>. Different catalyst loadings were coated on the air cathode in order to study the effect of catalyst loading on the performance of the MFC based on the power generated and also the chemical oxygen demand (COD) removal efficiency from POME. The result obtained shows that higher catalyst loading give better performance to the MFC by generated higher power as well as higher COD removal efficiency. The maximum power density generated was 671.98 mW/m<sup>3</sup>. The prepared  $\alpha$ -MnO<sub>2</sub> may be useful and ready to replace the non-precious catalyst Pt for higher performance on the MFC for future study.

**KEYWORDS:** MFC, POME, COD,  $\alpha$ -MnO<sub>2</sub>, Power, Current.