

Accepted Manuscript

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PII: S0960-8524(13)01534-4

DOI: <http://dx.doi.org/10.1016/j.biortech.2013.09.102>

Reference: BITE 12467

To appear in: *Bioresource Technology*



Please cite this article as: Akman, D., Cirik, K., Ozdemir, S., Ozkaya, B., Cinar, O., Bioelectricity generation in continuously-fed microbial fuel cell: Effects of anode electrode material and hydraulic retention time, *Bioresource Technology* (2013), doi: <http://dx.doi.org/10.1016/j.biortech.2013.09.102>

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Bioelectricity generation in continuously-fed microbial fuel cell: Effects of anode electrode material and hydraulic retention time

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Abstract

The main aim of this study is to investigate the bioelectricity production in continuously-fed dual chambered microbial fuel cell (MFC). Initially, MFC was operated with different anode electrode material at constant hydraulic retention time (HRT) of 2 d to evaluate the effect of electrode material on electricity production. Pt electrode yielded about 642 mW/m² power density, which was 4 times higher than that of the MFC with the mixed metal oxide titanium (Ti-TiO₂). Further, MFC equipped with Pt electrode was operated at varying HRT (2-0.5 d). The power density generation increased with decreasing HRT, corresponding to 1313 mW/m² which was maximum value obtained during this study. Additionally, decreasing HRT from 2 d to 0.5 d resulted in increasing effluent dissolved organic carbon (DOC) concentration from 1.92 g/L to 2.23 g/L, corresponding to DOC removal efficiencies of 46% and 38%, respectively.

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