

Effect of Maximum Power Point Tracking (MPPT) Logic Algorithm and fixed load resistance for Flat-plate MFC

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Microbial fuel cells (MFCs) employ exoelectrogenic bacteria to generate electricity from wastewater and organic contaminant by oxidation of microbe on the electrode. However, due to their low power and voltage, power management systems (PMSs) should be needed to increase power density and voltage. In this study, we designed logic based algorithm on control automatically load tracking method as maximum power point tracking (MPPT) using LabVIEW™ with MPPT circuit for flat-plate MFC (FPM). We compared the effect of parameters such as organic load rate (OLR), hydraulic retention time (HRT) and sampling-load shifting time on fixed load resistance (FLR) and MPPT operating FPM. The results show the optimized OLR of 1.953gL⁻¹h⁻¹ and 5 min sampling-load shifting time for FPM operation. These results provide a strategy of MFC field scale application and consider the critical information for high power generation and sustainable bioenergy recovery with simultaneous wastewater treatment.