Electrode driven energy recovery and acetate oxidation by P.putida 2523 in a microbial fuel cell

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Microbial fuel cells (MFCs) have been recently highlighted for bioenergy and biochemicals production using various electrochemically active strains. Electrode in MFCs acts as source or sink for a respiratory electron of metabolic pathway, thus maintains intracellular redox ratio and viability as well as produces bioelectricity. Pseudomonas putida is also known as an electrochemically active bacteria, hence its metabolic capability can be regulated by electrode. In this study, P.putida 2523 strain is cultured using acetate as a sole carbon source in MFC anaerobically where the carbon electrode act as terminal electron acceptor. The acetate consumption and cell viability were compared with an open circuit MFC (i.e. electrode does not act as electron acceptor). In the presence of electrode NAD+ regeneration rate increased under MFC in anaerobic condition. These results implicate that P.putida 2523 may undergo electro-respiration and a future potential host for platform biochemical production using MFC with appropriate metabolic engineering and optimization.