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

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Pseudomonas putida is recently highlighted for versatile carbon metabolism and also known as electro-active in a microbial fuel cell (MFC). Hence, *P. putida* is an ideal host strain for electrode-based metabolic regulation to produce platform chemicals. In this study, we examined the effect of electrode anaerobic growth of P. putida in different culture condition such as conventional fermentation and anode respiring environment (closed circuit MFC) using acetate as carbon source. The cell growth of *P. putida* was maintained in the presence of the electrode with simultaneous electricity generation. This strain has discharged electrons up to 110 $\mu A/cm^2$ of anodic current. Further acetyl-CoA synthetase activity assay and regulated NADH/NAD+ ratio support that *P. putida* can respire to an electrode and oxidize acetate. These results imply that the carbon electrode in MFC may improve utilization of refractory substrate such as acetate. Further metabolic engineering and optimization of *P.putida* may provide a platform for bioenergy production and BES based bio-refinery process.