

A comparative study of power generation using different substrates in a two-chambered and mediator-less microbial fuel cell (MFC)

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Microbial fuel cell can be used simultaneously for electricity generation and waste water treatment. Many factors are affecting power generation in MFC such as type of substrate, configuration and design of MFC, internal resistance etc. Unfortunately, proton exchange membrane (PEM) is permeable to oxygen to anode chamber where anaerobic condition should be strictly followed, resulting in a shortage of power generation. In order to maintain anaerobic condition at anode, cysteine, a chemical oxygen scavenger is added. An H type MFC containing a PEM was inoculated with anaerobic sludge, artificial wastewater as media, and glucose as substrate. Over a period of weeks, electricity generation gradually increased to a maximum power density of 71 mW/m² (1000 ohm external resistance, plain carbon, 0.5 mg/cm² with 10% Pt) and 14.4 mW/m² with plain carbon cathode. It indicates that cathode reaction is playing a crucial role in the MFC. Power was immediately generated up on addition of fresh medium. In addition to glucose, other carbon substrates such as fructose, sucrose, acetate and oxalate were tested. The results were comparable with the glucose result.