

# Performance Enhancement of Microbial Fuel Cell by CNT-PANI Anode Surface Modification

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**Abstract**—Microbial fuel cell (MFC) technology has potential to generate bioelectricity. The bottleneck of the low power density generation in MFC mainly associated with electrode material and mass transfer resistances. This project aims to design a laboratory model of microbial fuel cell and enhance the power output. Glassy carbon was used as electrode and Nafion-117 was used as Proton exchange membrane. The power output was then enhanced by various methods like making variations in rate of aeration of the cathode, varying the substrate concentration in anode and using mixed culture in anodic chamber. In the present study, modified anode for 145 mL size MFC has been developed using carbon nanotubes (CNT) and polyaniline (PANI) (1:1 ratio) nanocomposites. Suitable nanocomposite coating on anode's surface enhances the performance considerably and shows great potential in enhancing power output in MFCs. The electrochemical activity and capacitance of CNT-PANI modified anode are determined by cyclic voltammetry and galvanostatic charge-discharge, respectively. The analytical and morphological properties of CNT-PANI nanocomposites will be characterized by FTIR, XRD and SEM. In further studies, the improvements in MFC's power output using the modified anode will be studied.