

Development of electron transfer mediator using chitosan by concentrated acetic acid solution
in Enzymatic fuel cell

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Biofuel cells consists of a glucose oxidase (GOD) based anode (*Aspergillus niger*) and a laccase (Lac) based cathode (*Trametes versicolor*) by using redox polymers as mediators of the biocatalytic electron transfer at graphite electrode. This study investigated the influence of temperature, concentration, and storage time on the rheological properties of chitosan solubilized acetic acid solutions. Performance of cell potential and power density of biofuel cell was evaluated as availability of electron transfer mediator with various concentrations of weak acid. The acetic acid concentration on the availability of electron transfer mediator was assessed for development of enzymatic fuel cell performance. The results showed that chitosan was soluble in acetic acid concentrations ranging from 1% to 10%. Cyclic voltammetry (CV), fourier transform infrared spectroscopy (FT-IR) were measured and the surface morphology was observed. Physical and chemical properties were affected for the chitosan solution, as well as strongly concerned with the dissolution of the natural chitosan. Finally, 0.567 V of the Cell's open circuit voltage and $1,198 \pm 8.2 \mu\text{W}/\text{cm}^2$ of the maximum power density were obtained at 0.342 V in 5% acetic acid solution.