

Optimization of conditions of immobilization of glucose oxidase using response surface method

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The immobilized glucose oxidase is necessary for the development of enzyme biofuel cells which can be applied to power sources of implantable devices as well as biosensors. Enzyme immobilization method affects the performance of biofuel cells. We have been performing the immobilization of glucose oxidase (GOx) on the multi-wall carbon nanotubes (MWCNTs) by forming covalent binding in the presence of a coupling reagent, 1-ethyl-3(3-dimethylaminopropyl) carbodiimide (EDC) and N-Hydroxysuccinimide (NHS). In the preliminary experiment, we found that the concentrations of EDC, NHS, and glucose oxidase greatly influenced on the immobilization efficiency. In this study, the concentrations of these factors were optimized using response surface method. The GOx-bound MWCNT was characterized by FT-IR, SEM, and AFM analysis. Enzyme assay was performed to evaluate the immobilized GOx. Gluconic acid was analyzed by TLC or using commercial kit.