

## Immobilization of glucose oxidase by starch-based nanofibers using plasma surface modification

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**ABSTRACT:**

In this research in order to produce blood sugar biosensor, an appropriate membrane for glucose oxidase immobilization by using nanofibers created from polymers of polyacrylic acid and starch are studied. They are biocompatible and biodegradable respectively and were prepared by electro-spinning method for nanofiber fabrication. Dimethylformamide and distilled water were used as solvent for PAA and starch respectively to get a homogeneous solution. Because nanofibers made of polyacrylic acid-starch face with enzymes, due to its extremely high hydrophilic 'OH' groups may lose their cohesion, crosslinking as chemical surface modification and for better enzyme immobilization, non-thermal plasma surface modification using atmospheric pressure Dielectric Barrier Discharge (DBD) were used. Crosslinking was carried out by APTMS and Glutaraldehyde (GA). The effect of electro-spinning process variables on morphology of nanofibers was examined by Scanning Electron Microscopy (SEM). Nanofibers structure and chemical composition to demonstrate the successful linking and immobilization of enzymes in the composite membrane was obtained by Fourier Transform Infrared spectroscopy (FTIR) and improved thermal stability of nanofibers in presence of enzyme and surface modifications was determined by Thermal Gravimetric Analysis (TGA).

**Keywords:**

Polyacrylic acid biosensor, Glucose oxidase, Enzyme stabilization.