GLUCOSE BIOSENSOR BASED ON GLUCOSE OXIDASE AND POLYANILINE NANOFIBERS

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Polyaniline (PANI) is one of the mostly studied organic conducting polymer that has been developed over the past 30 years due to its low-cost, ease of synthesis and attractive electrochemical properties [1]. One-dimensional (1D) PANI nanostructures were recently employed in biosensors and biofuel cells fabrication [2]. PANI nanostructures usually serve as a biocompatible matrix for immobilization of enzymes [3] and for the fabrication of glucose biosensors [4] based on enzymes glucose oxidase (GOx) and glucose dehydrogenase [5]. The main aim of this research was to investigate the influence of PANI layer on the sensitivity, stability and linear detection range of glucose biosensor.

In this work an amperometric biosensor suitable for the determination of glucose was developed. Lateral surface of the graphite rod (GR) electrode was isolated with a silicone tube. PANI nanofibers which were chemically synthesized through interfacial polymerization, were deposited on GR electrode surface. GOx solution was distributed on the PANI nanofiber layer. Furthermore, the prepared electrode was fixed over the glutaraldehyde solution for the crosslinking of enzyme. Michaelis–Menten kinetics of the designed biosensor in the presence of N-methylphenazonium methyl sulphate as a redox mediator was investigated. In addition, the stability of fabricated biosensor was evaluated. Lastly, the influence of PANI nanofiber layer on analytical characteristics of amperometric glucose biosensor was investigated.

References

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