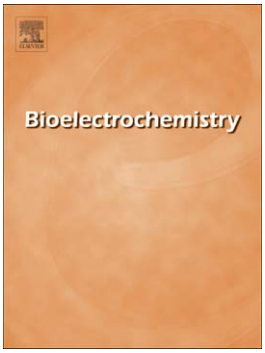

Immobilization of glucose oxidase on modified electrodes with composite layers based on poly(3,4-ethylenedioxythiophene)

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Immobilization of glucose oxidase on modified electrodes with composite layers based on poly(3,4-ethylenedioxythiophene)

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Abstract

Two modified electrodes with immobilized glucose oxidase were developed. Modification with poly(3,4-ethylenedioxythiophene) (PEDOT) and polyacrylic acid (PAA) doped with poly(4-lithium styrenesulfonic acid) (PSSLi) in a newly elaborated procedure was used in the first electrode. The second one presents innovative solution and consists of two sublayers; one of them was PEDOT doped with PSSLi and the other was composed of PEDOT and anthranilic acid (AA) doped with poly(4-styrenesulfonic acid) (PSSH). Glucose oxidase was covalently bonded with the carboxyl groups of the polymer through N-(3-dimethylaminopropyl)-N'-ethylcarbodiimide hydrochloride (WSC). The activity of immobilized enzyme was confirmed by spectrophotometry using the reaction of the produced hydrogen peroxide with *o*-dianisidine.
The procedure for immobilization was optimized. It was found that the choice of an appropriate doping agent and its concentration were significant and 0.1 M PSSLi proved to be the best doping agent. The most efficient immobilization was established for WSC and GOD concentration at the level of 4 mg/ml and 5 mg/ml respectively. In both cases, it was found that a small deviation from the concentrations determined to cause a sharp decrease in the activity of the enzyme, which was proven by spectrophotometric measurements. Prepared electrodes were active over a month with repeatable measurement results.

Keywords: electrode modification, PEDOT, glucose oxidase, immobilization, glucose.