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Organic-inorganic hybrid matrix for electrochemical biosensing of tyrosine

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Highlights:

- In-situ electrochemical synthesis of polypyrrole (PPy) and gold nanoparticles (AuNPs) composite has been performed.
- Characterization of the composite has been done.
- Fabricated biosensor using tyrosinase enzyme.
- Performed electrochemical sensing of tyrosine and catechin using SPE/PPy–AuNPs/Tyr biosensor.

Abstract

The manuscript presents synthesis and application of organic-inorganic hybrid matrix, consisting of polypyrrole (PPy) and gold nanoparticles (AuNPs). The polypyrrole acts as conducting matrix and gold nanostructures play role of electro-catalysts. The composite of PPy-AuNPs was electrochemically synthesized on screen printed electrodes in single step and was characterized thoroughly using analytical techniques. The composite was used as matrix for immobilization of tyrosinase enzyme for tyrosine and catechin biosensing. The electrochemical measurements were performed using cyclic voltammetry (CV) and amperometry. For tyrosine, the composite based biosensor showed dynamic linearity from 10-100 nM, having sensitivity of $1.0 \times 10^{-2} \mu\text{Acm}^{-2}/\text{nM}$, and LOD of 0.3 nM. For catechin, the dynamic linearity range was from 1-20 nM. The study showed that the biosensor exhibited more sensitivity towards tyrosine estimation as compared to

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