

Urea Amperometric Biosensor Based on Entrapment Immobilization of Urease onto a Nanostructured Polypyrrole and Multi-Walled Carbon Nanotube

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Abstract : In this paper, an amperometric biosensor based on surface modified polypyrrole (PPy) has been developed for the quantitative estimation of urea in aqueous solutions. The incorporation of urease (Urs) into a bipolymeric substrate consisting of PPy was performed by entrapment to the polymeric matrix, PPy acts as amperometric transducer in these biosensors. To increase the membrane conductivity, multi-walled carbon nanotubes (MWCNT) were added to the PPy solution. The entrapped MWCNT in PPy film and the bipolymer layers were prepared for construction of Pt/PPy/MWCNT/Urs. Two different configurations of working electrodes were evaluated to investigate the potential use of the modified membranes in biosensors. The evaluation of two different configurations of working electrodes suggested that the second configuration, which was composed of an electrode-mediator-(pyrrole and multi-walled carbon nanotube) structure and enzyme, is the best candidate for biosensor applications.

Keywords : urea biosensor, polypyrrole, multi-walled carbon nanotube, urease

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020