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Hydrogen peroxide biosensor based on the immobilization of horseradish peroxidase onto a gold nanoparticle-adsorbed poly (brilliant cresyl blue) film

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An amperometric hydrogen peroxide (H_2O_2) biosensor was developed based on the immobilization of horseradish peroxidase (HRP) onto gold nanoparticle (GNP) adsorbed conducting poly (brilliant cresyl blue) (PBCB) film. The modification process was characterized by scanning electron microscope (SEM) and electrochemical impedance spectroscopy (EIS). The effects of experimental parameters such as the concentration of the mediator (hydroquinone, HQ), pH of the solution, and the working potential were investigated for optimum analytical performance. In the presence of the mediator, the immobilized HRP showed an excellent electrocatalytic activity towards the reduction of H_2O_2. The linear dynamic range from 5 to 150 μM with the regression coefficient of 0.99 was obtained. The detection limit was calculated to be 0.5 μM based on a signal-to-noise ratio of 3. The reproducibility and stability of the biosensor were studied with satisfactory results. The biosensor performance was evaluated with respect to possible interferences and the application to real sample analysis.

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Preparation of chitosan nano-particles by method of chemical hydrolysis

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Due to the vital contribution of Nanotechnology science in advancement of various industries, its necessary role in textile and medical industries cannot be ignored also. One of the bio-compatible polymers with biodegradability and non-toxicity is Chitosan. Chitin and Chitosan are natural amino poly saccharin, according to the unique structure and high-performance of its multi-dimensional characteristics, it have brilliant and workable usage in various industries, particularly in the medical, textile, surface modifying, tissue engineering, wound healing and drug delivery that have been focused on it mostly during recent years. If mentioned polymer transmits to Nano-phase in range of Nano surface it will cover up the surfaces with very small amounts of the substance. We are facing at pioneer research on the preparation of Chitosan Nano-particles to enhance the ratio of surface area to volume and increased use of bio-polymer at mentioned industries. To prepare the Nano-chitosan, Chitosan was hydrolyzed in acidic medium molecular weight and particle size by TEM and SEM has been confirmed. Chitosan crystalline particles were analyzed by X-ray diffraction XRD also.

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