APP

APP 125

Gold Nanoprobe Based Colorimetric Molecular Detection of Viable Salmonella spp

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Foodborne Salmonella outbreaks in most populations are considered as a great concern and their specific rapid detection is nowadays in the center of attention. However, available detection methods of bacteria are generally based on the time consuming conventional methods. We have designed a specific probe coupled to gold nanoparticles in order to utilize their colorimetric properties in detecting single stranded nucleic acid sequence based amplification (NASBA) product of hsp70 homologous dnaK messenger RNA. The specificity of the nanoprobe based method is successfully analysed and the sensitivity is shown to be <10 CFU. The whole detection process takes only about 3.5 hours which is comparatively much lower than similar routine approaches. Moreover, simplicity, low cost per test and low complication are among other advantages of this nanodiagnostic method. Besides, the outcome of the detection process can be differentiated with naked eyes and the procedure is applicable for rapid pathogen detection of viable Salmonella spp. in critical circumstances eg natural disasters.

Keywords: NASBA; mRNA; Gold nanoprobe; Nanodiagnosis; Salmonella

APP 126

Fabrication and Characterization of SnO_2 Nanobiosensor in the Presence of Aspergillus Niger Fungi

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In this paper, SnO_2 thin film was prepared on glass substrate by spray pyrolysis technique and nanopowder of SnO_2 were produced by sol-gel method. The film and nanopowder of SnO_2 were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Then Aspergillus Niger fungi were cultured in an appropriate medium and were exposed to the SnO_2 nano film and nanopowder. The nano-system electric resistance was measured in the presence of produced gases and the effect of time factor on nano biosensors was studied. Then, SnO_2 nanobiosensor was characterized in the presence of silicagel and $CaCO_3$.

Keywords: Nano biosensor; Aspergillus niger fungi; Spray pyrolysis technique; Sol gel method

APP 127

Surface Imprinted Polyurethane Film Contaning Nano-Pore for Detection of Ascorbic Acid

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Molecularly imprinted polymers (MIPs) are synthetic polymers containing imprinted nanocavities, which are able to specifically rebind their target. The surface of polystyrene (PS) was modified by coating an imprinted thin layer of polyaniline (PANI) by oxidizing aniline using ammonium persulfate. Ascorbic acid (AA) was used as a template (target molecules). Affinity sites for (AA) were created in the coated layer by non-covalent imprinting method. The scanning electron microscopy (SEM) and the atomic force microscopy (AFM) were used for the surface studies of the non imprinted polymer (NIP) and the imprinted polymer. The adsorbed AA was detected using the technique of Fourier transform attenuated total internal reflection infrared spectroscopy (FT-ATR-IR). The imprinted layer adsorbed AA ten times more compared to the nonimprinted surface reflecting the creation of affinity sites specific to AA on the surface. The results show that molecularly imprinted surface in combination with FT-IR is a useful approach for the sensing applications.

Keywords: Surface molecular imprinted polymer; PANI; ATR-FT-IR; Ascorbic acid

APP 128

Determination of Hydrogen Peroxide at Multi-walled Carbon Ionic Liquid Electrode Modified with Hemoglobin and Gold Nanoparticles

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A new biosensor was constructed based on immobilization of hemoglobin as a protein and gold nanoparticles at multiwalled carbon ionic liquid (MWIL) electrode. At Au nanoparticle/Hemoglobine/ionic liquid /MWIL electrode, hemoglobin retained its bioactivity and shows a direct electron transfer at the electrode surface. Surface coverage of hemoglobin at the electrode was calculated as 6.22×10^{-8} mol cm^{-2}. Also the electrode showed good electrocalalytic effects on hydrogen peroxide response and can be used for determination of H_2O_2. value for the enzymatic activity of the AuNP/Hb/IL towards H_2O_2 was determined as 11.6 µA. The linear range and detection limit for H_2O_2 were 2-314 µM and 1.35 µM, respectively.

Keywords: Hemoglobin, Gold nanoparticles, Ionic liquid, Hydrogen peroxide, Multi-walled carbon nanotube

APP 129

Non-enzymatic Electrochemical Glucose Biosensor Based on Ag Nanoparticles and 3-Amino, 5- Mercapto-1, 2, 4- triazole Modified Carbon Paste Electrode

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Developments of electrochemical non-enzymatic glucose biosensors are of considerable importance in many areas such as clinical diagnostics, biotechnology, and the food industry. In this research silver nanoparticles (AgNPs)/carbon paste electrode (CPE) was developed as non-enzymatic, sensitive and simple amperometric and differential pulse voltammetric (DPV) glucose sensors in aqueous solution. The limit of detection (LOD) of proposed amperometric and DPV methods was 3×10^{-4} M and 1.7×10^{-4} M, respectively.

Keywords: Amperometric; AgNPs; Biosensor; Glucose