عنوان مقاله:

Fabrication and Evaluation of non-Enzymatic Biosensors Based on Reduced Graphene Oxide/Cobalt Oxide/Silver Nanocomposites for Detection of Urea Based on Cyclic Voltammetry

محل انتشار:

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خلاصه مقاله:

Urea is a toxic substance in the blood that is formed by the metabolism of nutrients in thebody. This toxin is excreted only through the kidneys. Increased urea in the body causes kidneydisease and liver damage in the long run, so its concentration should be controlled. There aredifferent methods for measuring urea. In the present work, new electrochemical biosensorswere developed to detect and measure urea. The nanocomposite of reduced graphene oxidemodified by the cobalt oxide and silver nanoparticles (rGOx/Co3O4/Ag) was manufactured by ahydrothermal method in the two-step process. The manufactured nanomaterials werecharacterized and identified by X-ray diffraction, Fourier Transform Infrared Spectroscopy,Mapping-EDX spectroscopy, Scanning Electron Microscopy, and UV-Vis spectroscopy. Theelectrochemical performance of the modified electrode by this nanocomposite was evaluated bycyclic voltammetry (CV) for urea detection. High electro-catalytic activity towards ureaoxidation in basic solution was exhibited, which is non-enzymatic biosensor forelectrochemical detection. The designed biosensor was linear in the range of 100 nM – 1 µM,and the limit of detection of the method was 17.35 nM. Therefore, the designed biosensorshows a good performance for simple, sensitive, and quantitative detection of urea in the realsample. This method is an excellent prospect for the development of non-enzymatic biosensorsand other electrochemical devices.

کلمات کلیدی:

Electrochemical Performance, Cyclic Voltammetry, Reduced Graphene Oxide, Non- Enzymatic Biosensors, Urea