Enzyme Free Square Wave Voltammetry Determination of Bisphenol A at zinc Hydroxide Nitrate Sodium Dodecylsulfate Bispyribac–Chitosan Modified Electrode in Environmental Water

Illyas Md Isa
Department of Chemistry, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak, Malaysia

Mohamad Syahrizal Ahmad
Department of Chemistry, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak, Malaysia

Nor Mahani Ismail
Sekolah Menengah Kebangsaan Khir Johari, 35900 Tanjong Malim, Perak, Malaysia

Abstract

An electrochemical chemical sensor for the detection of bisphenol A (BPA) with a broad working range and high sensitivity was done by a multiwall carbon nanotube modified with zinc hydroxide nitrate sodium dodecylsulfate bispyribac chitosan nanocomposite (ZHN-SDS BP Chi/ MWCNT). The conductivity of MWCNT has increased with the addition of ZHN-SDS BP Chi as a conducting matrix. Scanning electron microscopy was used to characterize the morphology of ZHN-SDS BP Chi/MWCNT, and square wave and cyclic voltammetry were used to study the electrochemical behaviour of BPA and $K_3[Fe(CN)_6]$ at the paste electrode of the ZHN-SDS BP Chi/MWCNT, respectively. By presenting a small amplitude square wave voltage to a scanning potential between -0.3 and +1.0 volts, square wave voltammetry can be carried out with a high sensitivity and fast response time. Under the optimized experimental circumstances, the electrode established linear plot for BPA doses 1.0×10^{-7} M to 7.0×10^{-4} M ($R^2 = 0.9904$) and limit of detection was calculated to be 4.28×10^{-8} M (S/N = 3). Urine samples and lake water were successfully treated with the manufactured ZHN-SDS BP Chi/MWCNT electrode, which demonstrated good stability and repeatability and proved valuable for analytical applications.

Keywords

Modified MWCNT, zinc hydroxide nitrate sodium dodecylsulfate bispyribac Chi, bisphenol A.