Simultaneous Determination of Bisphenol A and Bisphenol S Using Multi-Walled Carbon Nanotubes Modified Electrode

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A simple and sensitive electrochemical sensor based on multi-walled carbon nanotubes (MWCNTs) modified glassy carbon electrode was developed for the simultaneous determination of bisphenol A (BPA) and bisphenol S (BPS). The electrochemical behavior and electro-oxidation of BPA and BPS were investigated by cyclic voltammetry (CV) and differential pulse voltammetry (DPV). Experimental parameters such as pH of the buffer solution, accumulation time and scan rate have been optimized. The modified electrode exhibited outstanding electrocatalytic activity towards the oxidation of BPA and BPS and provided two separate oxidation current peaks enough to quantify BPA and BPS in mixture. The peak currents in DPV of BPA and BPS increased linearly with their concentrations in the ranges of 2×10^{-6} to 3×10^{-5} mol L⁻¹ for BPA and 2×10^{-5} to 8×10^{-5} mol L⁻¹ for BPS. The detection limits were 5×10^{-7} mol L⁻¹ for BPA and 4×10^{-6} mol L⁻¹ for BPS (S/N=3), respectively. Furthermore, the developed sensor was successfully applied in determination of BPA and BPS in river water and thermal paper samples.

Keywords: Bisphenol A; Bisphenol S; Simultaneous determination; Multi-walled carbon nanotubes

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