Construction of resorcinol voltammetric nanobiosensor

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A voltammetric study of resorcinol (RS), 1,3-dihydroxybenzene, was carried out at the surface of carbon paste electrode (CPE) modified with silver nanoparticles (AgNPs) and DNA, using cyclic and differential pulse voltammetry (CV and DPV). Resorcinol (RS) is one kind of phenolic compounds with high toxicity. It can be easily absorbed through the gastric tract and human skin, which can cause dermatitis, catarrh, convulsion, cyanopathy, and even death . At present, various methods have been employed for RS determination, including spectrophotometric, high-performance liquid chromatography with diode array detection, microchip capillary electrophoresis with end channel amperometric detection, quartz crystal microbalance, flow injection chemiluminescence, surface Plasmon resonance, fluorescence and spectrofluorimetric. Electrochemical methods offer unique characteristics such as low maintenance costs, high accuracy, and excellent sensitivity. Electrochemical processes have been proposed also for the prevention and the remedy of pollution problems such as treatment of wastewater, phenolic compounds pollutants, insecticides and pesticides. Different kinds of solid electrodes such as metal and carbon electrodes have been employed as the transducers for electrochemical DNA biosensors. Among these solid electrodes, carbon paste electrodes (CPEs) have some specific advantages that include a wide potential window, low background current, and ease of fabrication. Most important, CPEs can be easily endowed with specific properties by introduction of functional materials. Moreover, the surface of the electrode is polishable and renewable. Under the optimum conditions, results demonstrated that the new nanobiosensor could be used for resorcinol determination. Under the optimum conditions (pH = 3, scan rate = 0.2 Vs-1), results demonstrated that the new nanobiosensor could be used for resorcinol determination at LOD = 3.38 × 10-4 mol L-1 and LOQ = 1.13 × 10-3 mol L-1.

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