

Carbon Paste Electrode Prepared from Chemically Modified Multiwall Carbon Nanotube for the Voltammetric Determination of Isoprenaline in Pharmaceutical and Urine Samples

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摘要 A carbon paste electrode with added multiwall carbon nanotubes chemically modified with *N*-(3,4-dihydroxyphenethyl)-3,5-dinitrobenzamide was used as the electrochemical sensor for the determination of trace amounts of isoprenaline. The modified electrode showed good electrocatalytic activity for the anodic oxidation of isoprenaline, which was due to a substantial decrease in the anodic overpotential. Under the optimum conditions, measurements using square wave voltammetry had a linear range in the range of 0.3 to 125.0 $\mu\text{mol/L}$ of isoprenaline and a detection limit of 0.1 $\mu\text{mol/L}$. The diffusion coefficient and kinetic parameters were determined using electrochemical methods. The relative standard deviation for seven successive assays of 1.0 and 20.0 $\mu\text{mol/L}$ isoprenaline were 1.9% and 2.4%, respectively. This electrochemical sensor was successfully applied for the determination of isoprenaline in human urine and injection solution samples.

关键词: [isoprenaline](#) [carbon nanotube](#) [electrode](#) [electrocatalytic effect](#) [voltammetry](#)

Abstract: A carbon paste electrode with added multiwall carbon nanotubes chemically modified with *N*-(3,4-dihydroxyphenethyl)-3,5-dinitrobenzamide was used as the electrochemical sensor for the determination of trace amounts of isoprenaline. The modified electrode showed good electrocatalytic activity for the anodic oxidation of isoprenaline, which was due to a substantial decrease in the anodic overpotential. Under the optimum conditions, measurements using square wave voltammetry had a linear range in the range of 0.3 to 125.0 $\mu\text{mol/L}$ of isoprenaline and a detection limit of 0.1 $\mu\text{mol/L}$. The diffusion coefficient and kinetic parameters were determined using electrochemical methods. The relative standard deviation for seven successive assays of 1.0 and 20.0 $\mu\text{mol/L}$ isoprenaline were 1.9% and 2.4%, respectively. This electrochemical sensor was successfully applied for the determination of isoprenaline in human urine and injection solution samples.

Keywords: [isoprenaline](#), [carbon nanotube](#), [electrode](#), [electrocatalytic effect](#), [voltammetry](#)

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