

Carboxylic Acid-Functionalized Multi-Walled Carbon Nanotubes-Polyindole/Ti2O3 Nanocomposite: Electrochemical Nanomolar Detection of α -Lipoic Acid in Vegetables

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Abstract : A highly sensitive, and selective α -Lipoic acid (ALA) sensor based on a functionalized multi-walled carbon nanotubes-polyindole/Ti2O3 (f-MWCNTs-PIN/Ti2O3) nanocomposite modified glassy carbon electrode (GCE) was developed. The fabricated f-MWCNTs-PIN/Ti2O3/GCE displayed an enhanced voltammetric response for oxidation towards ALA relative to that of a f-MWCNTs/GCE, f-MWCNTs-PIN/GCE, Ti2O3/GCE, and a bare GCE. Under optimum conditions, the f-MWCNTs-PIN/Ti2O3/GCE showed a wide linear range at ALA concentrations of 0.39-115.8 μ M. The limit of detection of 12 nM and sensitivity of about 6.39 μ A μ M⁻¹cm⁻². The developed sensor showed anti-interference, reproducibility, good repeatability, and operational stability. Applied possibility of the sensor has been confirmed in vegetable samples.

Keywords : f-MWCNT, polyindole, Ti2O3, Alzheimer's diseases, ALA sensor

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