Novel sensor for sensitive electrochemical determination of luteolin based on In2O3 nanoparticles modified glassy carbon paste electrode

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Abstract:

A novel In2O3 nanoparticles modified glassy carbon paste electrode (In2O3NPs/GCPE) was prepared and applied for selective and sensitive electrochemical determination of luteolin (LU). Scanning electron microscopy (SEM) was used for the characterization of In2O3NP modifier and its morphology on the surface of GCPE. The modified electrode showed excellent electrocatalytic activities with respect to LU oxidation, with good reproducibility. The electrochemical parameters such as surface concentration ($\Theta$), electron transfer coefficient ($\alpha$) and the standard rate constant ($ks$) of LU at the modified electrode were calculated. Under the optimized experimental conditions, the proposed sensor exhibited a rapid response to LU in a linear range from $9.98 \times 10^{-9}$ M to $8.84 \times 10^{-8}$ M LU and a low detection limit was found to be $1.99 \times 10^{-10}$ M LU. The analytical performance of this sensor was evaluated for the detection of LU in spiked human biological fluids and in thyme as a real sample with good accuracy and precision.

Keywords:

In2O3 nanoparticles Luteolin Biological fluids Thyme Modified electrode Voltammetry

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