Voltammetric Determination of Caffeic Acid Using Co₃O₄ Microballs Modified Screen Printed Carbon Electrode

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Herein, we report a novel electrochemical sensor for the determination of caffeic acid based on the cobalt oxide microballs modified screen printed electrode. The cobalt oxide microballs is synthesized through a facile sonochemical strategy. Furthermore, as-synthesized Co₃O₄ microballs were systematically characterized by X-ray diffraction method (XRD), Fourier transformer infrared spectroscopy (FT-IR) and scanning electron microscope (SEM). The electrocatalytic activity of Co₃O₄ microballs modified electrode evaluated by the determination of caffeic acid using cyclic voltammetry (CV). Differential pulse voltammetry (DPV) was used to derive the analytical curve. The proposed sensor exhibited superior electrocatalytic activity towards caffeic acid determination in terms of decent sensitivity, a broad dynamic range with a lower limit of detection 48 nM. In addition, the proposed sensor offers good selectivity, good reproducibility, and decent stability. Moreover, the real sample analysis were carried out in wine samples and obtained an acceptable recovery rate.

Keywords: cobalt oxide microballs, sonochemical, caffeic acid, decent sensitivity.

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