Short Communication

Detection of Residual Methomyl in Vegetables with an Electrochemical Sensor based on a glassy carbon electrode modified with Fe₃O₄/Ag composite

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doi: 10.20964/2019.02.43

Received: 10 October 2018 / Accepted: 29 November 2018 / Published: 5 January 2019

A magnetic Fe₃O₄/Ag composite with a core-shell structure was synthesized using a combination of Fe₃O₄ nanoparticle coprecipitation and the reduction of Ag⁺ on the surface of the Fe₃O₄ nanoparticles by trisodium citrate. The as prepared Fe₃O₄/Ag composites was characterized by ultraviolet-visible absorption spectroscopy, and scanning/transmission electron microscopy (SEM and TEM). An electrochemical sensor was prepared by attaching the Fe₃O₄/Ag composites to the surface of a glassy carbon electrode (GCE) using chitosan (CS) as linking molecules. The concentration of methomyl in vegetables was measured using cyclic voltammetry (CV). The linear relationship was achieved in the concentration range of $3.47 \times 10^{-5} \sim 3.47 \times 10^{-4} \text{ mol} \cdot \text{L}^{-1}$, with a correlation coefficient R^2 of 0.99707 and a detection limit of $2.97 \times 10^{-5} \text{ mol} \cdot \text{L}^{-1}$.

Keywords: Fe₃O₄ Magnetic Nanoparticles; Fe₃O₄/Ag composites; Electrochemical Sensor; Methomyl; Residual Quantity.

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