

Electrochemical Determination of Carbendazim in Water Base on Carbon Dots Modified Glassy Carbon Electrode

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Through the urea and sodium citrate electrochemical carbonizing, one-pot method which is convenient and economical, is employed to fabricate the water soluble carbon dots (designated as C-Dots). By developing electrochemical sensor with high sensitivity, where the glassy carbon electrode was decorated by C-Dots, the carbendazim was then determined by different pulse voltammetry. The $[\text{Fe}(\text{CN})_6]^{3-/4-}$ was used as an electrochemical probe to investigate the electrochemical specific property of the decorated electrode. The electron transfer on larger surface of electrode demonstrated faster rate in C-Dots/GCE than that on electrode with any functionalization. On the decorated electrode, the cycle voltammetry was employed to investigate the electrochemical carbendazim actions. The excellent performance in electrochemically oxidizing carbendazim is exhibited by C-Dots/GCE. With optimized condition, excellent linearity was observed in the well-established sensor of C-Dots/GCE by combining the peak current and carbendazim concentration, where the 10 nM was considered to be the limitation with the range (0.1-10 μM). The carbendazim can be successfully and effectively determined in the water sample by using this proposed sensor.

Keywords: Carbon dots; Electrochemical sensor; Oxidation; One-pot; Electroanalysis

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