Sensitive and Selective Determination of Uric Acid Using Polyaniline and Iron Composite Film Modified Electrode

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doi: 10.20964/2016.10.63

Received: 31 June 2016 / Accepted: 29 August 2016 / Published: 6 September 2016

We demonstrated a simple and low-cost composite composed of polyaniline and iron composite (PANI-Fe) for the determination uric acid (UA). The successful composite formation was confirmed through scanning electron microscopy, electrochemical impedance spectroscopy and electrochemical methods. The PANI-Fe composite was used to modify the surface of glassy carbon electrode (GCE) and the resulting modified electrode (PANI-Fe/GC) displayed good electrocatalytic activity to the oxidation of UA. The kinetics of the electrocatalysis and effect of scan rate were investigated. The amperometric sensor was developed based on PANI-Fe film modified electrode which delivered quick and sensitive responses to UA. The linear range is 0.05–3860 µM, detection limit is 21.5 nM, and sensitivity is 0.2981 µAµM⁻¹ cm⁻². The electrode is highly selective for UA detection. Besides, the electrode has good repeatability and reproducibility. The real-time applicability is verified in human urine samples which displayed recoveries in acceptable range.

Keywords: Conducting polymers, metals, electrocatalysis, electrochemical sensors, metabolite, Uric acid

FULL TEXT

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