Polyaniline/nickel Composite Film Modified Electrode for Sensitive Electrochemical Determination of Ascorbic Acid

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We have designed and fabricated a low-cost modified electrode based on polyaniline and Ni composite (PANI–Ni) for the sensitive determination ascorbic acid (AA). The composite formation was characterized by scanning electron microscopy, Energy-dispersive X-ray spectroscopy, electrochemical impedance spectroscopy and electrochemical methods. The PANI–Ni composite was used to modify the screen printed carbon electrode (SPCE) and the resulting modified electrode was used to develop AA sensor. The modified electrode shows excellent electrocatalytic activity to the oxidation of AA. An amperometric sensor was developed using PANI–Ni composite which delivered sensitive and prompt signals for AA. The linear range is 2–1210 μM , detection limit is 0.4 μM , and sensitivity is 0.479 $\mu\text{A}\mu\text{M}^{-1}\text{cm}^{-2}$. Moreover, the electrode has good repeatability, reproducibility and stability. The practical applicability of the electrode is demonstrated in human urine samples.

Keywords: Vitamin, antioxidants, biochemistry, conducting polymers, metals, electrocatalysis, electrochemical sensors

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