A Molecularly Imprinted Electrochemical Sensor Based on Polypyrrole/Carbon Nanotubes Composite for the Detection of S-ovalbumin in Egg White

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A rapid and accurate detection of S-ovalbumin is essential for determining the freshness and quality of avian egg due to the significant correlation between them. An electrochemical sensor for S-ovalbumin detection was fabricated based on molecularly imprinted polymer (MIP) on the glass carbon electrode modified with multi-walled carbon nanotubes (MWCNTs) and chitosan (CS). The modified materials were characterized by infrared spectrometry and scanning electron microscopy. The performance of the modified electrodes, the relation between response current and analyte concentrations as well as the selectivity and practicability of MIP sensor were systematically evaluated by cyclic voltammetry, differential pulse voltammetry and electrochemical impedance spectroscopy. Under the optimum operating conditions, the fabricated electrochemical sensor showed a linear current response to the target concentration in the range from 10^{-8} to 10^{-4} mg/mL with a detection limit of 2.95×10^{-9} mg/mL in S-ovalbumin detection. Additionally, the proposed sensor exhibited good selectivity, high sensitivity and desirable stability.

Keywords: Molecularly imprinted polymer; polypyrrole; electrochemical sensor; S-ovalbumin; egg white

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