Short Communication

B, N dual-doped Graphene/Au@Pt Nanomaterials as Sensor for Determination of Aflatoxin B₁

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In this study, B, N dual-doped graphene/Au@Pt nanomaterials (BN-G/Au@Pt NRs) was prepared by high pressure hydrothermal approach with the mass ratios of graphemes oxide (GO), urea (CH₄N₂O) and B₂O₃ were 1:25:30. BN-G/Au@Pt NRs have plenty of monolayer nanosheets with large-area and maintain the characteristic three dimension porous structure of grapheme. More importantly, the as-synthesized BN-G/Au@Pt NRs present advantageous biocompatibility and multivalent affinity interactions with anti-AFB₁, which can amplify immunoreactions. Therefore, the designed immunosensor of BN-G/Au@Pt NRs/anti-AFB₁/BSA/AFB₁/GCE can be used to determinate AFB₁ under optimal condition and exhibit excellent sensitivity with a wide linear range from 0.025 ng·mL⁻¹ to 25.00 ng·mL⁻¹ and low the detection limits of 0.017 ng·mL⁻¹. Moreover, the designed BN-G/Au@Pt NRs/anti-AFB₁/BSA/AFB₁/GCE immunosensor was successfully applied for AFB₁ determination in rice samples with acceptable recovery range of 98.0-101.1 %, which demonstrated that the proposed method could be a suitable candidate for AFB₁ detection in food industries.

Keywords: Aflatoxin B₁; B, N dual-doped grapheme (BN-G); BS-G/Au@Pt NRs; Electrochemical immunosensor

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