Short Communication

Electrochemical non-enzymatic biosensor for tyramine detection in food based on silver-substituted ZnO nano-flower modified glassy carbon electrode

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This study focused on the preparation of Ag-substituted ZnO nano-flower modified GCE for determination of tyramine. Ag-substituted ZnO nano-flowers were synthesized through the spray pyrolysis method on GCE and their electrochemical properties of prepared electrodes were studied. Morphological analyses showed that the high porosity, high surface area and high density of nano-flower structures were synthesized on GCE. Structural analysis verified the substitution of Ag into the ZnO lattice of nano-flower which were grown in hexagonal wurtzite for ZnO and fcc phase of silver. EIS measurements showed that the *charge-transfer* resistance was decreased after the Ag substitution process which can be related to high conductivity of substituted silver on ZnO structure. CV analyses exhibited the stable response of modified GCE for determination of tyramine. The amperometry measurements displayed the fast response of Ag-substituted ZnO modified GCE to successive addition of tyramine solution which indicating the linear range, limit of detection and sensitivity were obtained 1-900 μM , 0.03 μM and 0.90281 $\mu\text{A}/\mu\text{M}$, respectively. Study on the interference effect showed selective and reliable response of Ag-substituted ZnO modified GCE for tyramine determination. Applicability of the prepared electrode was studied to determine tyramine in beer as a real sample which indicated the tyramine concentration in the real sample was 0.272 μM .

Keywords: Electrochemical impedance spectroscopy; Amperometry; Nano-flower; Silver-substituted ZnO; Tyramine detection

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