Amino Acid-Functionalized Electrochemically Reduced Graphene Oxide-Modified Glassy Carbon Electrodes for the Efficient Sensing of Nitrite

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In this work, different structures of amino acid-functionalized electrochemically reduced graphene oxide-modified glassy carbon electrodes (ERGO/GCEs) were developed and applied for the determination of nitrite. L-arginine (L-Arg), L-tyrosine (L-Tyr) and L-histidine (L-His), which are aliphatic, aromatic, and heterocyclic amino acids, respectively, were selected for this work, and the corresponding electrodes were L-Arg-ERGO/GCE, L-Tyr-ERGO/GCE, and L-His-ERGO/GCE. The sensing capabilities of the modified electrodes were characterized by electrochemical impedance spectroscopy (EIS), cyclic voltammetry (CV), and differential pulse voltammetry (DPV). The comparative results indicated the outstanding performance of L-histidine with an enhanced electrochemical signal for nitrite due to its powerful imidazole groups, π - π interactions and lone pair- π interactions.

Keywords: L-arginine, L-tyrosine, L-histidine; graphene, modified electrode, nitrite

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