Development of a Graphene Based Electrochemical Sensor for the Determination of 9-hydroxyrisperidone in Human Blood Plasma

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This work reports the preparation of a 9-hydroxyrisperidone amperometric biosensor using a glassy carbon electrode (GCE) modified with reduced graphene oxide wrapped hierarchical TiO₂ (RGO-TiO₂) nanohybrid. In addition, the electro catalytic behaviour of the biosensor to the oxidation of 9-hydroxyrisperidone was studied using amperometric and cyclic voltammetry (CV) measurements. The low oxidation potential and enhanced current response of the RGO-TiO₂ modified GCE resulted from the synergistic effects of TiO₂ and RGO. For the analysis of the 9-hydroxyrisperidone, the developed biosensor has a low limit of detection (LOD) of 0.52 ng/mL and a wide linear detection range of 1 to 1500 ng/mL. Therefore, our developed biosensor had the potential for use in the practical detection of 9-hydroxyrisperidone in human blood plasma specimens.

Keywords: 9-hydroxyrisperidone; TiO₂; Graphene; Human blood plasma; Electrochemical sensor

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