Detection of Hydrochlorothiazide, Sulfamethoxazole, and Trimethoprim at Metal Oxide Modified Glassy Carbon Electrodes

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Molybdenum and manganese oxides are well-known electro-catalysts in fuel cells systems, they are usually used as anodic materials for the oxidation of low molecular weight alcohols. The utilization of MoO₂ and MnO₂ as catalysts in the pharmaceutical analysis is not common yet. In this study, bare glassy carbon electrodes were modified by the oxides by means of electrochemical deposition and the modified electrodes were used as catalysts for the electrochemical oxidation of sulfamethoxazole (SMX), trimethoprim (TMP), and hydrochlorothiazide (HCT). Well-resolved anodic peaks were reported for the analyzed pharmaceuticals when the MoO₂/GCE was used for the simultaneous analysis of the SMX and TMP and when MnO₂/GCE was utilized for the analysis of HCT. Analytical performance of the modified electrodes was evaluated based on the following statistical parameters; linearity ranges, correlation coefficients, limits of detection and quantitation, and recovery values. The prepared electrodes were used for the determination of the active ingredients in their pharmaceutical formulations and the reported activity was correlated to influence of the utilized pH on both structures of the used electrodes and the detected analytes.

Keywords: Molybdenum (IV) oxide, manganese (IV) oxide, sulfamethoxazole, trimethoprim, hydrochlorothiazide

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