

Highly sensitive and efficient voltammetric determination of resorcinol in pharmaceutical and biological samples employing nanostructured carbon paste electrode

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Abstract

Introduction: Resorcinol (RC) used extensively for the treatment of chronic skin diseases such as psoriasis, hidradenitis suppurative, and eczema of a sub-acute character. RC as a phenolic compound with high toxicity causes giddiness, deafness, salivation, sweating, and convulsions. It is noteworthy to mention that, RC can be easily absorbed through the gastric tract and human skin and caused dermatitis, catarrh, cyanopathy, and even death. The current work deals with fabrication of a high sensitive modified carbon paste electrode employing ZnFe₂O₄ nanoparticles and 1-butyl-3-methylimidazoliumtetrafluoroborate (B3M) for determination of trace amount of RC using cyclic voltammetry and square wave voltammetry techniques.

Methods and Results: The modified carbon paste electrode (B3M/ZnFe₂O₄/NPs/MCPE) was prepared by hand mixing of 0.80 g of graphite powder, 0.20 g ZnFe₂O₄/NPs plus 0.90 g paraffin and 0.10 g B3M as an ionic liquid for 120 min until a uniformly wetted paste was obtained. The proposed sensor revealed good electrocatalytic activity towards RC in aqueous solution. The obtained results revealed that the electro-oxidation peak current was proportional to the RC concentration in the range of 3-500 μM with the detection limit of 1.46 μM.

Conclusions: The excellent properties of the B3M/ZnFe₂O₄/NPs/MCPE make it a promising tool for application to the real sample analysis. The proposed modified carbon paste electrode (B3M/ZnFe₂O₄/NPs/MCPE) was applied successfully for analysis of trace amount of RC in some pharmaceutical and biological samples.

Key words: Resorcinol, Voltammetric sensor, Modified carbon paste electrode, Ionic liquid, ZnFe₂O₄ nanoparticles.