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Simultaneous determination of N-acetylcysteine and acetaminophen at carbon paste electrode

modified with silica nano particles and 4,4'- Dihydroxybiphenyl (DHB): Potentiality of PARAFAC

approaches for analysis of second-order data obtained from differential pulse voltammetry

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## ABSTRACT

N-acetylcysteine (N-AC) has widespread application such as pharmaceutical drug and nutritional supplement. Its adverse effects are rash, urticaria, and itchiness and large doses of N-AC could potentially cause damage to the heart and lungs. Therefore, in this work, a sensitive voltammetric sensor based on a carbon paste electrode modified with silica nano particles (i.e. Mobil Composition of Matter (No. 41) modified with Boron Trifluoride or  $\text{BF}_3\text{@MCM-41}$ ) with a combination of 4, 4'-dihydroxybiphenyl (DHB) ( $\text{BF}_3\text{@MCM-41/DHB/CPE}$ ) was designed for determination of N-AC. The electrochemical oxidation of N-AC was examined using various techniques such as cyclic voltammetry (CV), chronoamperometry and differential pulse voltammetry (DPV). Under the optimum conditions, some parameters such as electron transfer coefficient ( $\alpha$ ) and heterogeneous rate constant ( $k_s$ ) were estimated for N-AC. Due to the use of N-AC for the treatment of acetaminophen (AC) overdose, the application of modified electrode was investigated for the simultaneous determination of N-AC and AC in blood serum and tablet samples. Since, the signals of these species overlap and due to the presence of interfering species in blood samples, the simultaneous

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