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Reactions of superoxide anion radical with antioxidants and their use in voltammetry

Ziyatdinova G., Gil'metdinova D., Budnikov G.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Kinetic parameters were calculated for the electrochemical reduction of oxygen at a glassy-carbon electrode with the generation of superoxide radical anions in a 0.05 M solution of (C2 H5)4NI in dimethylformamide in the presence of fat-soluble antioxidants, retinol and α-tocopherol. A procedure based on the protonation of the radical anion with antioxidant molecules is proposed for the voltammetric determination of antioxidants to determine milligram amounts of retinol and α-tocopherol in model solutions (RSD = 1-2%). The calibration graphs for retinol and α-tocopherol are linear in the concentration ranges 9.7 × 10 -5-2.3 × 10-3 and 6.2 × 10-4-3.1 × 10-3 M, respectively. The detection limits for retinol and α-tocopherol are 4.8 × 10-5 and 4.1 × 10 -4 M, respectively. The procedure was applied to the determination of the active component (retinol and α-tocopherol) in pharmaceuticals.

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