

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

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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 (C₂H₅)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. © 2005 Pleiades Publishing, Inc.

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