

Determination of Sterically Hindered Phenols and α -Tocopherol by Cyclic Voltammetry

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Abstract

Sterically hindered phenols (2,6-di-tert-butyl-4-methylphenol (BHT) and its derivatives) are irreversibly oxidized at +0.96-1.30 V on glassy carbon electrode (GCE) in 0.1 M LiClO₄ in acetonitrile in accordance to cyclic voltammetry data. α -Tocopherol gives oxidation step at +0.4 V on voltammograms under the same conditions. Oxidation process leads to formation of corresponding quinoid derivatives. Calibration graphs linearity is 1.5-2 order for all compounds under investigation. Limits of detection are in the range 9.6-44.3 μ M. The approach has been applied for determination of BHT and α -tocopherol in vegetable and lubricating oils as well as pharmaceuticals and cosmetics using preliminary single extraction of analytes with acetonitrile for 15 min at oil/extractant ratio of 1:2.5. © 2012 Copyright Taylor and Francis Group, LLC.

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Keywords

α -Tocopherol, BHT, Cyclic voltammetry, Food analysis, Lubricating oils, Pharmaceutical analysis, Sterically hindered phenolic antioxidants