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Simultaneous determination of TBHQ and BHA on a MWNT-Brij® 35 modified electrode in micellar media

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Abstract

© 2015 The Royal Society of Chemistry. A voltammetric method for the simultaneous detection and quantification of tert-butylhydroquinone (TBHQ) and butylated hydroxyanisole (BHA) was developed using a multi-walled carbon nanotube (MWNT)-Brij® 35 modified glassy carbon electrode in Brij® 35 micellar medium. Significant improvements of TBHQ and BHA voltammetric characteristics were observed on the modified electrode. Electrochemical oxidation of TBHQ and BHA is a diffusion-controlled process that is confirmed by the linear dependence of peak currents on $v^{1/2}$ with $R^2 = 0.9983$ and 0.9901 , respectively, and involves two electrons corresponding to the formation of p-quinones. Under conditions of differential pulse voltammetry, a linear dynamic range of 1.0 - $1000 \mu\text{mol L}^{-1}$ for TBHQ and 0.50 - 7.50 and 10.0 - $750 \mu\text{mol L}^{-1}$ for BHA were obtained with the detection limits of 0.26 and $0.15 \mu\text{mol L}^{-1}$, respectively. The approach developed was successfully applied for the quantification of TBHQ and BHA in linseed oil samples with recoveries from 99% to 103% after a simple and rapid extraction with Brij® 35 micellar medium.

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