

Polyquercetin/MWNT-modified Electrode for the Determination of Natural Phenolic Antioxidants

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Abstract

© 2017 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim Novel highly sensitive voltammetric method for the gallic acid, catechin and epigallocatechin gallate (EGCG) quantification has been developed using glassy carbon electrode modified with multi-walled carbon nanotubes and polyquercetin (polyquercetin/MWNT/GCE). The effect of electropolymerization parameters (number of cycles, monomer concentration and polarization window) on the electrode characteristics has been evaluated. The electrode surface has been characterized with SEM, CV and EIS. The linear dynamic ranges of 0.50–10 and 10–750 μM for gallic acid, 0.10–10 and 10.0–250 μM for catechin and 0.050–10 and 10–100 μM for EGCG have been obtained in differential pulse mode with the detection limits of 0.10, 0.024 and 0.014 μM , respectively. The approach has been successfully applied for the tea antioxidant capacity evaluation (AOC). The positive correlations with antioxidant activity towards DPPH • and total phenolics ($r=0.7845$ and 0.7658 at $r_{\text{crit}}=0.4227$, $n=22$) have been obtained.

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Keywords

Antioxidants, Electropolymerization, Food analysis, Nanotubes, Voltammetry

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