

# Discrimination of Tea by the Electrochemical Determination of its Antioxidant Properties by a Polyaniline-DNA-Polyphenazine Dye Modified Glassy Carbon Electrode

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## Abstract

© 2019, © 2019 Taylor & Francis Group, LLC. Voltammetric sensors have been developed on the bases of polyaniline and polymeric forms of methylene blue, methylene green, and neutral red obtained by multiple cycling of the potential. The integrity of the layers and expansion of the pH range of redox activity have been achieved by intermediate adsorption of native DNA that stabilized the oxidized polyaniline form. The formation of the coating layer was confirmed by electrochemical impedance spectroscopy and scanning electron microscopy. Model oxidants (ascorbic acid, hydroquinone, and quercetin) in the concentration range from  $1 \times 10^{-6}$  to  $1 \times 10^{-3}$  mol L<sup>-1</sup> influenced the measured redox peaks of polymeric dyes with standard deviations from 2.4 to 5.5%. The peak currents were used for classification of tea brands using principal component analysis and linear discrimination analysis. The average discrimination of the tea brands purchased on local market was approximately 100%. The assessment of antioxidant properties of tea infusions was in agreement with results obtained using a coulometric bromine titration.

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## Keywords

Antioxidant assessment, electropolymerization, polyaniline, polyphenothiazine dyes, tea brand discrimination, voltammetric sensor

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