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Biosensor with Protective Membrane for the Detection of DNA Damage and Antioxidant Properties of Fruit Juices

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Abstract

With the purpose to prepare a DNA biosensor protected with an outer-sphere membrane against high molecular weight interferences, a carbon film electrode was layer-by-layer modified with dsDNA and chitosan. Using cyclic and square-wave voltammetry and impedance spectroscopy, the oxidative damage of DNA by the hydroxyl and superoxide anion radicals was detected which consists of opening of the helix structure followed by deep DNA chain degradation. The biosensor has been applied to the detection of the antioxidant effect of apple and orange juices. The investigation of the novel biosensor with a protective membrane represents a significant contribution to the field of DNA biosensors utilization. © 2012 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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Keywords

Antioxidants, Biosensors, DNA damage, Electrochemistry, Protective membrane