

Impedimetric Detection of DNA Damage with the Sensor Based on Silver Nanoparticles and Neutral Red

Kuzin Y., Porfireva A., Stepanova V., Evtugyn V., Stoikov I., Evtugyn G., Hianik T.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. Novel electrochemical DNA-sensor based on glassy carbon electrode (GCE) modified with Ag nanoparticles, Neutral red covalently attached to its surface and native DNA adsorbed on modifier coating was developed for the estimation of DNA damage on example of model system based on Fenton reagent. As was shown, the oxidation process resulted in synchronous increase of electron transfer resistance and capacitance measured by electrochemical impedance spectroscopy (EIS). The contribution of each sensor component on the signal was specified and sensitivity estimated against similar surface coatings. The shift of EIS parameters was found to be higher than that of similar biosensors reported. The DNA sensor was tested on the estimation of antioxidant capacity of green tea infusions again the results of coulometric titration with electrogenerated bromine.

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Keywords

Antioxidant capacity, DNA sensor, Neutral red, Oxidative DNA damage, Silver nanoparticles