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Electrochemical Biosensors Based on Native DNA and Nanosized Mediator for the Detection of Anthracycline Preparations

Evtugyn G., Porfireva A., Stepanova V., Budnikov H.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim. A novel electrochemical DNA-sensor based on glassy carbon electrode (GCE) modified with electropolymerized Neutral red (NR) and polycarboxylated thiaca[4]arene with covalently attached mediator and electrostatically adsorbed DNA was developed for sensitive detection of anthracycline preparations. Intercalation of doxorubicin, daunorubicin and idarubicin into DNA increases the charge transfer resistance and decreases the electron exchange resulted in decay of the cathodic peak of NR reduction. The DNA-sensor developed makes it possible to determine down to 0.05nM doxorubicin, 0.1nM doxorubicin and 0.5nM idarubicin. The DNA-sensor was tested on detection of doxorubicin in pharmaceuticals and artificial blood plasma with 95-100% recovery.

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Keywords

Anthracycline pharmaceuticals, DNA sensor, Electrochemical impedance, Nanosized mediator, Poly(Neutral red)