

Electrochemical aptasensor for the determination of ochratoxin A at the Au electrode modified with Ag nanoparticles decorated with macrocyclic ligand

Evtugyn G., Porfireva A., Sitdikov R., Evtugyn V., Stoikov I., Antipin I., Hianik T.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

An electrochemical aptasensor for ochratoxin A (OTA) detection has been developed on the base of a gold electrode covered with electropolymerized neutral red and silver nanoparticles obtained by chemical reduction with macrocyclic ligands bearing catechol fragments. Thiolated aptamers against OTA were covalently attached to silver nanoparticles via Ag-S bonding. The interaction with OTA induced the conformational switch of the aptamer, which caused increase of the charge transfer resistance measured by EIS in the presence of ferricyanide ions. The LOD achieved (0.05nM) was comparable to other electrochemical aptasensors employing sophisticated assembling technique and enzyme amplification of the signal. The aptasensor was validated in spiked beer samples. The recovery of the OTA determination was found to be $66.3 \pm 14.1\%$ for light beer and $64.3 \pm 1.8\%$ for dark beer. © 2013 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

<http://dx.doi.org/10.1002/elan.201300164>

Keywords

Aptasensor, DNA aptamer, Electrochemical impedance spectroscopy, Ochratoxin A, Silver nanoparticles