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Electrochemical sensors based on stationary electrodes and immobilized DNA or its fragments and the assessment of their analytical potentials

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Abstract

Amperometric biosensors were developed on the basis of stationary mercury-film and glassy-carbon electrodes and DNA or its fragments, oligodeoxynucleotides (ODNs), immobilized in a nitrocellulose matrix. Taking into account the high affinity of Cu(II) and Fe(III) ions to denatured DNA ($(19.1 \pm 0.1) \times 10^5$ and $(1.4 \pm 0.3) \times 10^5$ L/mol, respectively), a procedure was proposed for the voltammetric determination of these ions in natural materials and blood serum at a level of $n \times 10^{-11}$ M. This procedure involves analyte pre-concentration on a DNA-containing biosensor. An ODN-containing biosensor (DNA probe) was used in the study of DNA hybridization for the highly specific determination of its nucleotide sequence. © 2005 Pleiades Publishing, Inc.

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