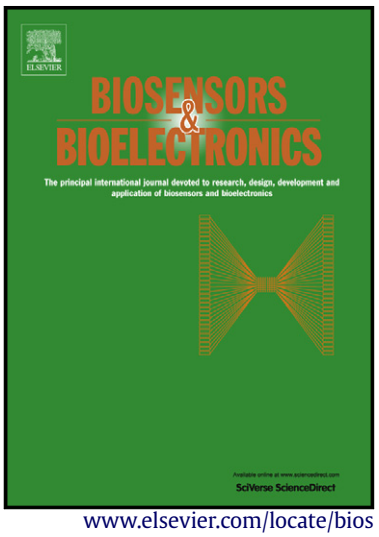

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Electrochemical affinity biosensors for detection of mycotoxins: a review

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Abstract:

This review discusses the current state of electrochemical biosensors in the determination of mycotoxins in foods. Mycotoxins are highly toxic secondary metabolites produced by molds. The acute toxicity of these results in serious human and animal health problems, although it has been only since early 1960s when the first studied aflatoxins were found to be carcinogenic. Mycotoxins affect a broad range of agricultural products, most important cereals and cereal-based foods. A majority of countries, mentioning especially the European Union, have established preventive programs to control contamination and strict laws of the permitted levels in foods. Official methods of analysis of mycotoxins normally requires sophisticated instrumentation, e.g. liquid chromatography with fluorescence or mass detectors, combined with extraction procedures for sample preparation. For about 16 years, the use of simpler and faster analytical procedures based on affinity biosensors has emerged in scientific literature as a very promising alternative, particularly electrochemical (i.e., amperometric, impedance, potentiometric or conductimetric) affinity biosensors due to their simplicity and sensitivity. Tipically, electrochemical biosensors for mycotoxins use specific antibodies or aptamers as affinity ligands, although recombinant antibodies, artificial receptors and molecular imprinted polymers show potential utility. This article deals with recent advances in electrochemical affinity biosensors for mycotoxins and covers complete literature from the first reports about sixteen years ago.

Keywords:

Mycotoxins; Electrochemical affinity biosensors; Immunosensor; Aptasensor; Amperometry; Electrochemical Impedance Spectroscopy.