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Electrochemical biosensors for the determination of analytes related to the agro alimentary: An animal health system

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Abstract

Mycotoxins are secondary metabolites produced by fungi. Their presence often provokes a serious risk to human and animal health. The most important source for incorporation is related to contaminated food. In addition, natural polyphenolic antioxidants are organic compounds widely distributed in an important variety of food and its importance becomes increasingly relevant given its benefits to human health. Moreover, the presence of estrogenic compounds is recognized as important in estrogenic cycles of women and female of the animal kingdom. Thus progressively greater significance are having the analytical methods available for the determination of analytes previously mentioned in real samples linked to actual food processing and animal health systems. The development of biosensors has emerged as an important alternative for such purpose, particularly since the methodologies involved in their use are generally simple, low cost, high sensitivity, fast, etc.. The author´s research team has developed amperometric biosensors and immunoelectrodes for the determination of ochratoxin A (OTA) and citrinin (CIT) mycotoxins (from Aspergillus and Penicillium genus), polyphenolic antioxidants and progesterone and β-estradiol hormones.

The development of electrochemical immunosensors incorporated in a micro fluidic cell for quantification of the mycotoxins CIT in rice samples and OTA in red wines, and the hormones progesterone and β-estradiol in bovine serum by square wave voltammetry on carbon screen-printed electrodes as electrochemical transduction element is described. Besides, amperometric biosensors based on peroxidases were developed to determine the total polyphenolic content in wine and tea samples, CIT in rice and OTA in red wine samples.

Biography

Professor Héctor Fernández has received his PhD in the Universidad Nacional de Río Cuarto (UNRC), Argentina (1974–1978) and was a postdoctoral research associate with Robert Osteryoung at the University of New York at Buffalo, USA. Currently, he is working as a Full Professor at the UNRC. He was Dean of the Facultad de Ciencias Exactas (UNRC, 1992-1999). He has authored more than seventy research articles and book chapters and has been the editor of a book. He is a member of the National Council of Scientific and Technological Research (CONICET, Argentina) as a Principal Researcher. He is an AAQA, AAIFQ and SIBAE fellow and he has been honoured as President of Asociación Argentina de Químicos Analíticos (AAQA, 2007-2009) and representative of AAQA in the Red Iberoamericana de Química Analítica (RIQA, 2010-2011)