L Micheli et al., Insights in Analytical Electrochemistry, 3:2
DOI: 10.21767/2470-9867-C1-003

A flow-inection immunoassay for saxitoxin determination in sea water

L Micheli [1,2], **K. Petropoulos**[1], **A. Sarra** [1], **S. Felici** [1], **M. Ottaviani**[1], and **G. Palleschi**[1,2]
[1]Università di Roma "Tor Vergata", Italy
[2]Consorzio Interuniversitario Biostrutture e Biosistemi "INBB", Italy

One of the most lethal non-protein toxins (LD50 9 µg Kg-1) is Saxitoxin (STX). It is the only marine natural product that has been declared chemical weapon. Contamination of shellfish with STX has been associated with harmful algal blooms throughout the world. STX has the ability to bioaccumulate up trophic levels. Ingestion of infected marine organisms, by humans, induces a lethal disease known as Paralytic Shellfish Poisoning (PSP) that is currently without antidote or detoxification pathway. This family of toxins acts blocking the sodium channels on cells and cause very serious symptoms varying from a slight tingling sensation to fatal respiratory paralysis. The maximum tolerance levels, as established by the European Union and according with the Food and Drug Administration, refer to 40 - 80 µg PSP x 100 g edible portion of fresh, frozen or tinned shellfish.

Presently, laborious and expensive mouse assay and HPLC methods are used to detect the presence of STX in fish [3]. The goal of this work is based on a flow injection immunoassay system (FI-IA) with colorimetric detection. The method consists in an off-line incubation of the sample containing STX (Ag) with fixed amounts of anti-STX antibody (Ab) and STX labelled with peroxidase (Ag*) until the equilibrium is established. In this mixture, a competition between Ag and Ag* for the Ab occurs. The mixture is then injected into a flow system where the separation of the free Ag* and the antibody-bound tracer (AbAg*) is performed in a column with immobilized protein G. In the column all the antibodies due to the protein G affinity for the constant (Fc) of the antibody are retained. The activity of the enzyme labelled Ag* is measured spectrofotometrically using the TMB substrate (ready to use). The immunoanalytical system was optimised, characterised and tested in sea water.

Biography

Laura Micheli was a Associate Professor in Analytical Chemistry at the University of Rome Tor Vergata; 2002-2014: Senior Researcher in Analytical Chemistry; 1999: PhD Fellowship at the School of Chemical Sciences of Dublin City University (Ireland); 1998-2001: PhD in Chemistry Science; 1997: Master degree 110/110 cum laude in Industrial Chemistry. Research. Her research activity is focalized on the study and development of disposable electrochemical tools for seafood toxins, development of immunosensors and interference-free biosensors based on screen printed electrodes (SPEs) in the field of environmental, cultural heritage, clinical and food analysis, using for their validation spectrophotometric and chromatographic methods. She has been involved in the She collaborates from 2006 until now with the Department of CEMIS-OULU of the University of Oulu. She received People-exchange-Marie Curie International Research Staff Exchange Scheme IRSES-PEOPLE-2008 at the School of Chemistry University of Melbourne (Australia). Her research work had been presented at several national and international scientific meetings. 7 chapters on international books, 38 on international scientific papers, 12 proceedings.

laura.micheli@uniroma2.it

Notes: