

A new approach to domoic acid detection

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The standard method for detection of marine toxins in bivalve is based on a mouse bioassay that presents several disadvantages such as its cost, non-specificity, time analysis and of course etc constraints. On the other hand regulation has been modified by the European Commission 15/2011 on January 10th, 2011, replacing Regulation (EC) No 2074/2005 and mouse bioassay will be banned from December 31, 2014. The development of new methods for a rapid screening for detection of toxins is highly needed. Electrochemical sensors are adequate for the development of user-friendly analytical methods that could therefore be used in a daily base by fisherman.

In this work, we present a new strategy for the detection of domoic acid (amnesic toxin) based on the functionalization of carbon screen printed electrodes (SPE) and SPE modified with carbon nanotubes (CNTs). The functionalization is based in the immobilization of diazonium ion generated by the 4-nitroaniline diazotization with sodium nitrite in hydrochloridric acid. Although DA is not electroactive, it can be detected by means of a redox probe $K_4(FeCN)_6$, which electrochemical response depends on the concentration of DA immobilized on a functionalized SPE. Preliminary work has shown the possibility to carry out the immobilization without the use of bifunctional agents, such as carbodiimides, n-hydroxysuccinimide, that facilitates the bond between $-NH_2$ and $-COOH$ groups simplifying the design of the sensor. Experimental variables such as pH, temperature and time were optimized. Peak potential shift and enhancement of current intensity were analyzed.

Keywords: Domoic acid, toxins, carbon screen printed electrodes, SPE modified with carbon nanotubes