

## **Nanostructure biosensor for fumonisin b1 based on paramagnetic beads and monoclonal antibodies**

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Analytical methods for the determination of mycotoxins are usually based on high pressure liquid chromatography (HPLC) with fluorescence detection (FLD). Many of these methods have been validated by the AOAC (Association of Official Analytical Chemists). The chronoamperometric immunosensor with disposable screen-printed electrodes (SPCEs) are a valuable analytical tool that can be used in portable systems for in situ determination of mycotoxins, with a sensitivity and selectivity comparable or superior to that obtained by traditional ELISA methods but with a much better reagent consumption and less time of determination. Specifically, this immunosensor was successfully developed for the detection of ochratoxin A. In our previous work are explained in detail all the steps necessary to optimize and develop this sensor.

**Fumonisin B1** is a mycotoxin produced by several *Fusarium* fungi, classified as possible human carcinogen by the IARC in Group 2B. Fumonisin is similar structurally to sphingosine therefore interfere and disrupt sphingolipid metabolism, specifically inhibit ceramide synthase. In animals, these mycotoxins cause diseases such as equine leukoencephalomalacia (ELEM) in horses and pulmonary oedema (PE) in pigs. Other toxic effects include carcinogenicity, hepatotoxicity, nephrotoxicity and effects on the immune system. In humans, ingestion of these toxins is linked to high rate of esophageal cancer in areas of South Africa and China. Therefore the European Commission suggests that the maximum tolerable intake of Fumonisin is 2 µg/kg body weight.

We have developed different strategies of immunosensors for Fumonisin B1, using monoclonal antibodies and magnetic particles functionalized with tosyl group, which allows different stages of the immunoassay in solution and SPCE sensor surface allows a good electrochemical detection, avoiding problems of nonspecific adsorption on the electrode or electroactive interference.