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Detection and Quantification of Ochratoxin A in Food by Aptasensor

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Abstract : Governments and international instances are trying to improve the food safety system to prevent, reduce or avoid the increase of food borne diseases. This food risk is one of the major concerns for the humanity. The contamination by mycotoxins is a threat to the health and life of humans and animals. One of the most common mycotoxin contaminating feed and foodstuffs is Ochratoxin A (OTA), which is a secondary metabolite, produced by Aspergillus and Penicillium strains. OTA has a chronic toxic effect and proved to be mutagenic, nephrotoxic, teratogenic, immunosuppressive, and carcinogenic. On the other side, because of their high stability, specificity, affinity, and their easy chemical synthesis, aptamer based methods are applied to OTA biosensing as alternative to traditional analytical technique. In this work, five aptamers have been tested to confirm qualitatively and quantitatively their binding with OTA. In the same time, three different analytical methods were tested and compared based on their ability to detect and quantify the OTA. The best protocol that was established to quantify free OTA from linked OTA involved an ultrafiltration method in green coffee solution with. OTA was quantified by HPLC-FLD to calculate the binding percentage of all five aptamers. One aptamer (The most effective with 87% binding with OTA) has been selected to be our biorecognition element to study its electrical response (variation of electrical properties) in the presence of OTA in order to be able to make a pairing with a radio frequency identification (RFID). This device, which is characterized by its low cost, speed, and a simple wireless information transmission, will implement the knowledge on the mycotoxins molecular sensors (aptamers), an electronic device that will link the information, the quantification and make it available to operators.

Keywords : aptamer, aptasensor, detection, Ochratoxin A
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