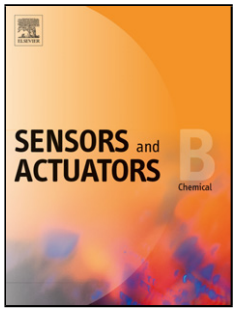

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An aptamer-based SPR-polarization platform for high sensitive OTA detection

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Highlights

- A label free and reliable method for detecting OTA using a specific sequence of ssDNA aptamer is described.
- A QCM based biosensor was used for real time monitoring of four ssDNA aptamers-OTA interactions to select the most efficient one.
- A lab-made plasmonic sensing platform based on sinusoidal gratings was fabricated and functionalized with the most efficient selected aptamer.
- The assembled platform is suitable for monitoring of food commodities, being able to detect down to OTA 0.2 ng/ml with a LOD of 0.005 ng/ml.

ABSTRACT

Conventional methods used for the determination of mycotoxins are sensitive and give both qualitative and quantitative information, although they are greatly restricted by long assay time, high cost and limited portability. As a consequence, more rapid, low cost, highly specific and portable methods for detecting these analytes are the focus of a great deal of research. In this perspective, this work describes a label free, simple and reliable method using a specific sequence of ssDNA aptamer for detecting OTA, a toxic fungal metabolite frequently occurring in a variety of foodstuffs and feeds. A piezoelectric (QCM) based biosensor was used for real time monitoring of four ssDNA aptamers-OTA interactions to select the most efficient one. Based on these results, a lab-made plasmonic sensing platform based on sinusoidal gratings was fabricated and functionalized with the most efficient selected aptamer. The sensitivity of the biosensor was found to be dependent on the aptamer immobilization strategy. In the optimized experimental conditions the biosensor was demonstrated to detect down to 0.2 ng/ml of OTA with a LOD of 0.005 ng/ml. These findings sounds very promising to produce high sensitivity, fast and potentially portable biosensors for the detection of OTA in food commodities.