www.elsevier.com/locate/talanta

A novel bioassay based on aptamer-functionalized magnetic nanoparticle for the detection of zearalenone using time resolved-fluorescence $NaYF_4$: Ce/Tb nanoparticles as signal probe

Sobia Niazi, Xiaole Wang, Imran Pasha, Imran Mahmood Khan, Sen Zhao, Muhammad Shoaib, Shijia Wu, Zhouping Wang

PII: S0039-9140(18)30358-8
DOI: https://doi.org/10.1016/j.talanta.2018.04.013
Reference: TAL18552

To appear in: *Talanta*

Received date: 2 August 2017
Revised date: 27 March 2018
Accepted date: 7 April 2018

Cite this article as: Sobia Niazi, Xiaole Wang, Imran Pasha, Imran Mahmood Khan, Sen Zhao, Muhammad Shoaib, Shijia Wu and Zhouping Wang, A novel bioassay based on aptamer-functionalized magnetic nanoparticle for the detection of zearalenone using time resolved-fluorescence $NaYF_4$: Ce/Tb nanoparticles as signal probe, *Talanta,* https://doi.org/10.1016/j.talanta.2018.04.013

A novel bioassay based on aptamer-functionalized magnetic nanoparticle for the detection of zearalenone using time resolved-fluorescence $NaYF_4$: Ce/Tb nanoparticles as signal probe

Sobia Niazi[a,b,e], Xiaole Wang[a,b], Imran Pasha[c], Imran Mahmood Khan[a,b], Sen Zhao[a,b,d], Muhammad Shoaib[a,b], Shijia Wu[a,b,d,e], Zhouping Wang [a,b,d,e *]

[a]State Key Laboratory of Food Science and Technology, Jiangnan University, Wuxi, China.. [b]School of Food Science and Technology, Jiangnan University, Wuxi, China. [c]National Institute of Food Science and Technology, University of Agriculture, Faisalabad, Pakistan. [d]International Joint Laboratory on Food Safety, Jiangnan University, Wuxi, China. [e]Synergetic Innovation Center of Food Safety and Quality Control of Jiangsu Province, Jiangnan University, Wuxi, China.

Abstract

Zearalenone (ZEN) is a non-steroidal estrogenic mycotoxin produced by fungi on stored grains. The earlier detection methods used for ZEN rely on expensive equipment, time-consuming sample preparation and temperature sensitive antibodies. The current work, proposed a novel strategy based on ZEN aptamer labeled with amine-functionalized magnetic nanoparticle (MNPs) as a capture probe and time-resolved fluorescence (TRFL) nanoparticles labeled with complementary DNA (cDNA) as a signal probe. Under the optimized conditions, TRFL intensity at 544 nm was used to measure ZEN (R^2 = 0.9920) in the range of 0.001-10 ng mL^{-1} and limits of detection（LOD）for proposed method was 0.21 pg mL^{-1}. The specificity of bioassay was also determined by using other mycotoxins (OTA, AFB_2, DON and Patulin) and results showed that