Accepted Manuscript

One-step preparation of nano-Fe_3O_4 modified inactivated yeast for the adsorption of patulin

Yue Qiu, Hong Guo, Chunfeng Guo, Jianzi Zheng, Tianli Yue, Yahong Yuan

PII: S0956-7135(17)30475-9

DOI: 10.1016/j.foodcont.2017.10.005

Reference: JFCO 5814

To appear in: *Food Control*

Please cite this article as: Yue Qiu, Hong Guo, Chunfeng Guo, Jianzi Zheng, Tianli Yue, Yahong Yuan, One-step preparation of nano-Fe_3O_4 modified inactivated yeast for the adsorption of patulin, *Food Control* (2017), doi: 10.1016/j.foodcont.2017.10.005

One-step preparation of nano-Fe_3O_4 modified inactivated yeast for the adsorption of patulin

Yue Qiu [a,b,c], Hong Guo [a,b,c], Chunfeng Guo [a,b,c], Jianzi Zheng [a,b,c], Tianli Yue [a,b,c], Yahong Yuan [a,b,c] *

[a] College of Food Science and Engineering, Northwest A&F University, Yangling, 712100, China

[b] Laboratory of Quality & Safety Risk Assessment for Agro-products (Yangling), Ministry of Agriculture, Yangling, 712100, China

[c] National Engineering Research Center of Agriculture Integration Test (Yangling), Yangling, 712100, China

Abstract

A magnetic nanoparticle (nano-Fe_3O_4) functionalized inactivated yeast (MY) bio-sorbent was prepared via a simple in situ co-precipitation method for easy-to-separate and cost-effective adsorption of patulin. The MY was characterized by SEM, TEM, XRD, zeta potential and FTIR analysis. Adsorption test revealed that compared with the commonly used two-step synthetic method, MY prepared through this one-step route with the Fe_3O_4/yeast mass ratio of 0.17 ± 0.01 g g^{-1} possesses the highest adsorption capacity of 2.69 ± 0.06 mg g^{-1}. The effects of contact time, temperature, pH and initial concentration on patulin removal by MY were investigated. The adsorption process followed the pseudo-first-order kinetic model and the Freundlich isotherm model. And the thermodynamic parameters indicated that the adsorption is spontaneous and endothermic. Moreover, MY could be directly used for