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One-step preparation of nano-Fe₃O₄ modified inactivated yeast for the adsorption of patulin

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1 **One-step preparation of nano-Fe₃O₄ modified inactivated yeast for the**
2 **adsorption of patulin**

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10 **Abstract**

11 A magnetic nanoparticle (nano-Fe₃O₄) functionalized inactivated yeast (MY)
12 bio-sorbent was prepared via a simple in situ co-precipitation method for
13 easy-to-separate and cost-effective adsorption of patulin. The MY was characterized by
14 SEM, TEM, XRD, zeta potential and FTIR analysis. Adsorption test revealed that
15 compared with the commonly used two-step synthetic method, MY prepared through
16 this one-step route with the Fe₃O₄/yeast mass ratio of $0.17 \pm 0.01 \text{ g g}^{-1}$ possesses the
17 highest adsorption capacity of $2.69 \pm 0.06 \text{ mg g}^{-1}$. The effects of contact time,
18 temperature, pH and initial concentration on patulin removal by MY were investigated.
19 The adsorption process followed the pseudo-first-order kinetic model and the
20 Freundlich isotherm model. And the thermodynamic parameters indicated that the
21 adsorption is spontaneous and endothermic. Moreover, MY could be directly used for

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