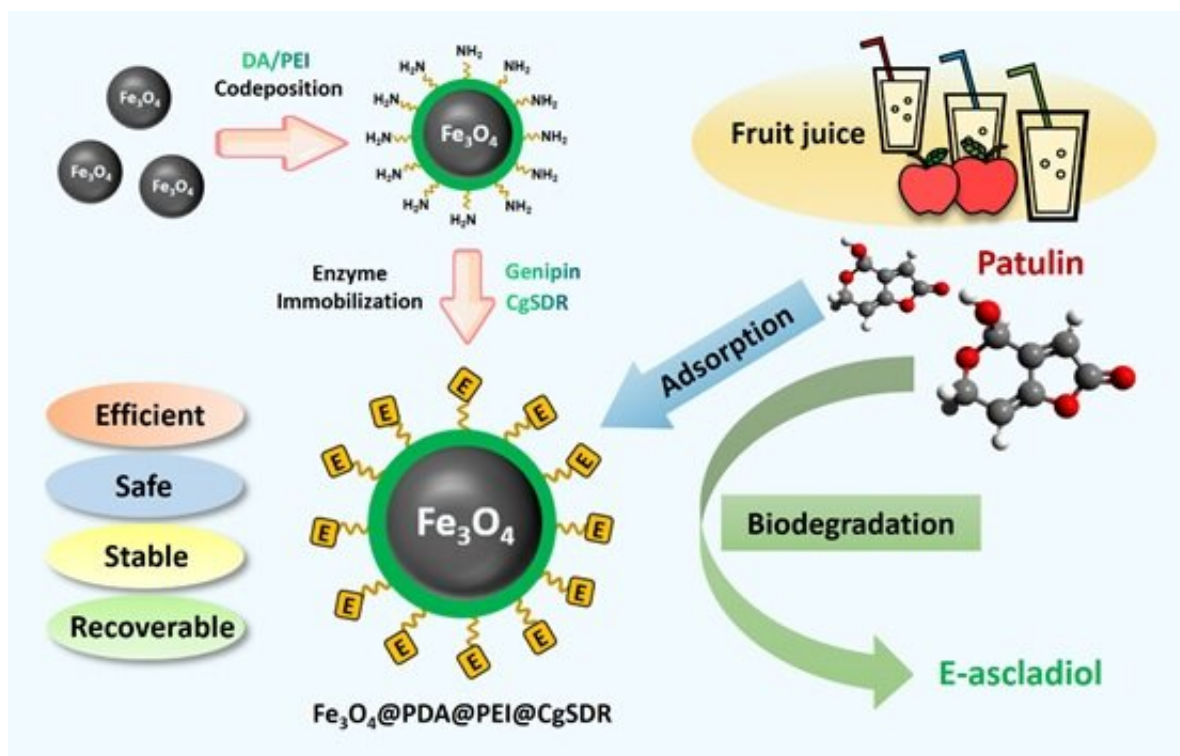


Magnetic recoverable enzyme formulation removes mycotoxin from fruit-derived products

March 9 2023, by Zhang Nannan



Application of a magnetically recoverable enzyme formulation in patulin detoxification in fruit derived products. Credit: Li Boqiang

A research team led by Prof. Li Boqiang from the Institute of Botany of the Chinese Academy of Sciences has developed an immobilized enzyme preparation with high efficiency, stability, safety and easy

separation, which can degrade patulin in contaminated apple juice without any adverse effect on juice quality.

The study was published in *Journal of Hazardous Materials*.

Patulin is one of the most important mycotoxins contaminating fruit-derived products and causing acute or chronic toxicity in humans. However, methods to reduce patulin by adsorption, irradiation and chemical modification suffer from potential limitations such as [safety issues](#) and loss of nutritional quality. Biodegradation based on [microbial enzymes](#) is considered one of the promising ways to control patulin contamination.

The researchers have previously identified a short-chain dehydrogenase/reductase (CgSDR) with the function of degrading patulin. In the present study, a novel patulin-degrading enzyme preparation was further constructed by covalently linking CgSDR to dopamine/polyethyleneimine co-deposited magnetic Fe_3O_4 particles.

The researchers found that the immobilized enzyme possessed combined effects of patulin adsorption by Fe_3O_4 particles and biological degradation by CgSDR, and exhibited a detoxification rate of 100% in phosphate-buffered saline and a detoxification rate of more than 80% in apple juice.

In addition, they demonstrated that compared with the free enzyme, the immobilized CgSDR significantly improved thermal and storage stability, proteolysis resistance, and reusability.

"Notably, this novel patulin-degrading enzyme can be easily separated from apple juice by [external magnetic field](#) and retains more than 50% detoxification rate after seven consecutive reuse cycles, which significantly reduces the cost in future application," said Prof. Tian

Shiping, corresponding author of the study.

More information: Mengyang Xing et al, Immobilized short-chain dehydrogenase/reductase on Fe₃O₄ particles acts as a magnetically recoverable biocatalyst component in patulin bio-detoxification system, *Journal of Hazardous Materials* (2023). [DOI: 10.1016/j.jhazmat.2023.130986](https://doi.org/10.1016/j.jhazmat.2023.130986)

Provided by Chinese Academy of Sciences

Citation: Magnetic recoverable enzyme formulation removes mycotoxin from fruit-derived products (2023, March 9) retrieved 25 April 2024 from <https://phys.org/news/2023-03-magnetic-recoverable-enzyme-mycotoxin-fruit-derived.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.