toxins

MDPI

Article

Bifunctional M13 Phage as Enzyme Container for The Reinforced Colorimetric–Photothermal Dual-Modal Sensing of Ochratoxin A

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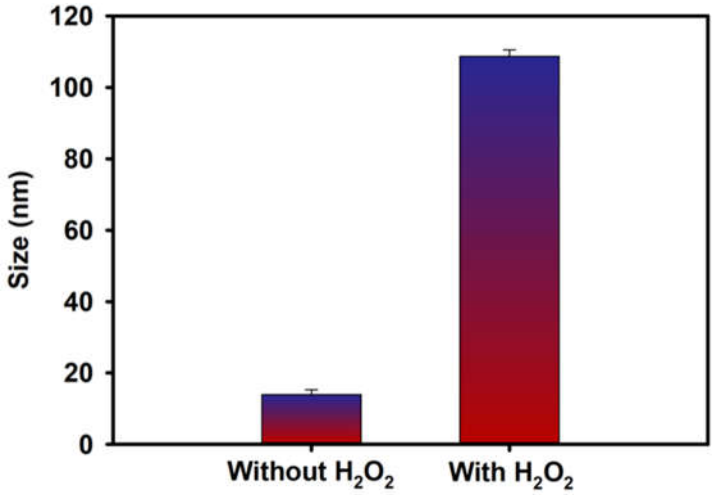

Figure S1. The particle size of AuNPs aggregation induced by HRP-H_2O_2-Tyramine system and dispersion of AuNPs in the absence of H_2O_2.

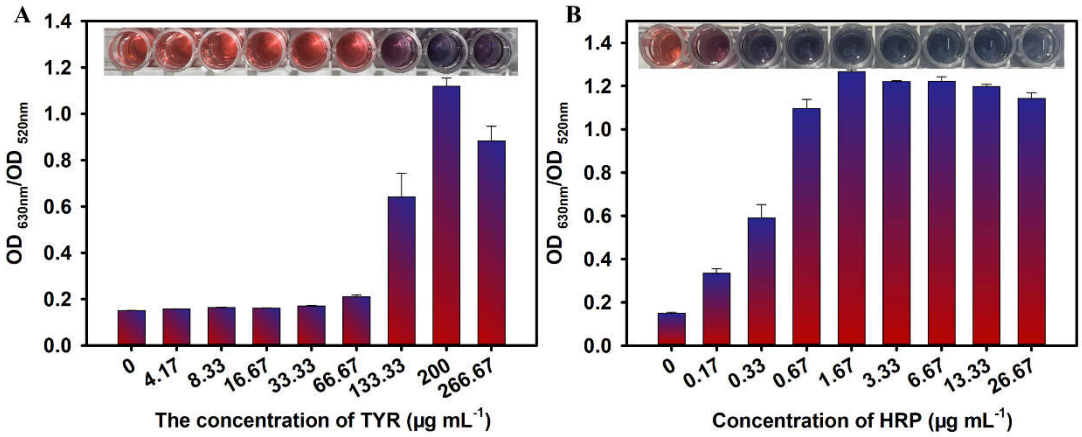

Figure S2. Optimization of the substrate solution of HRP-Tyramine-AuNPs signal transduction. (A) tyramine and (B) HRP.

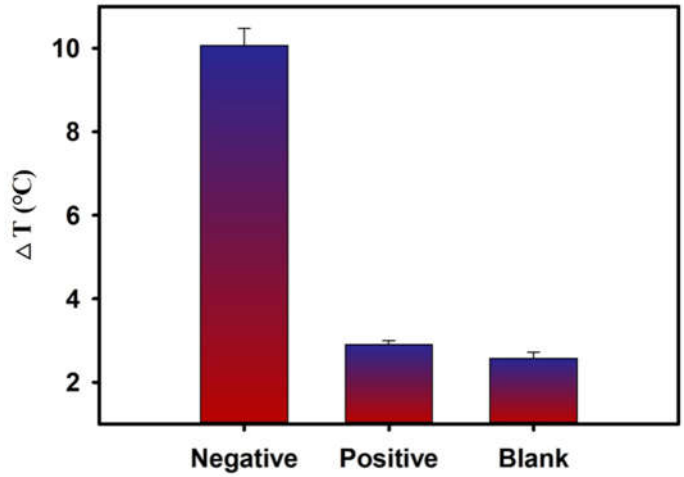

Figure S3. Feasibility to adopt the biotinylated M13OTA phage as competing antigen in the proposed dc-ppELISA for OTA detection. The blank group was conducted in the absence of biotinylated M13OTA, the negative and positive groups were conducted with OTA negative and OTA positive (1 ng mL^{-1}) samples in the presence of biotinylated M13OTA. The error bars represent the standard deviation of the three measurements.

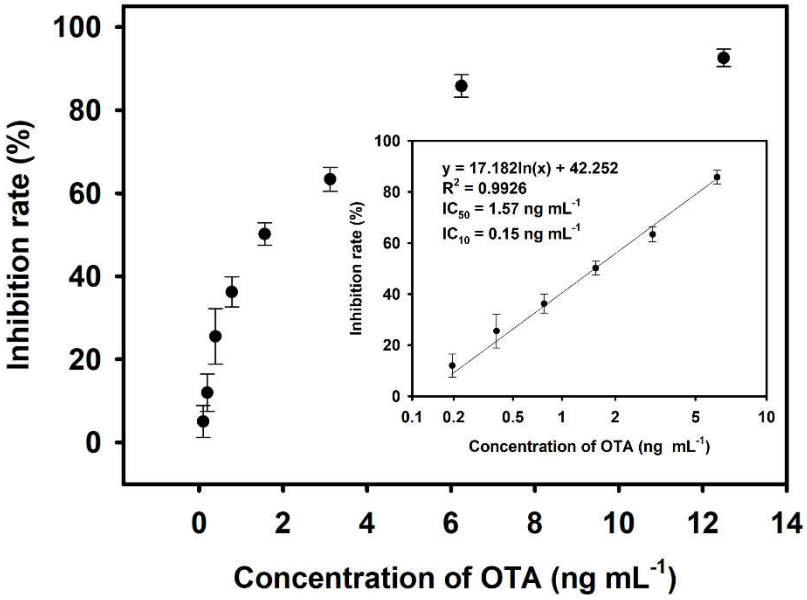

Figure S4. Calibration curve of conventional HRP-based ELISA, the inset shows a dynamic linear range of OTA concentrations from 0.098 ng mL^{-1} to 3.125 ng mL^{-1}. Each independent experiment was repeated 3 times.

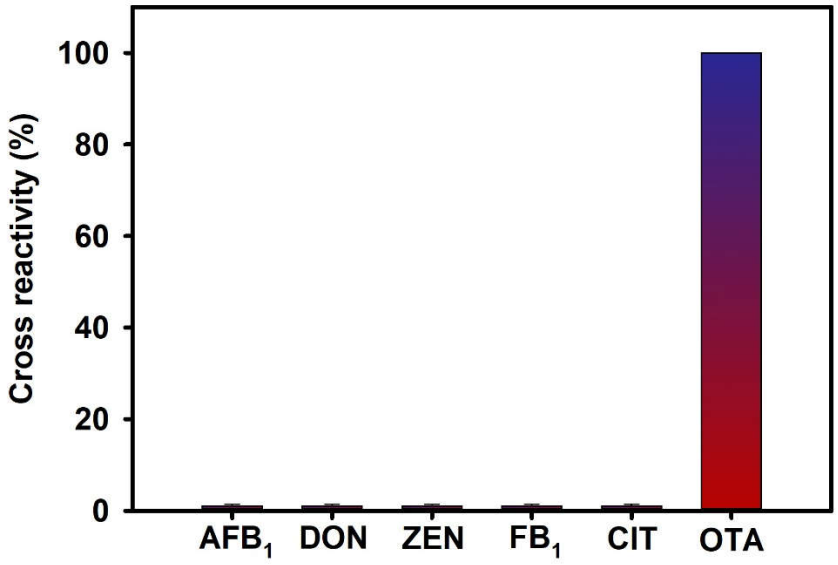

Figure S5. Cross-reactivity of the proposed dc-ppELISA toward other common mycotoxins. The samples detected are AFB_1, DON, ZEN, FB_1, CIT, and OTA. Error bars represent the standard deviation based on three measurements.

Table S1. Optimization of the working conditions of coating antibody and biotinylated $M13_{OTA}$ phage using checkerboard method.

Concentration of anti-OTA ascitic fluids (μg mL^{-1})	Concentration of Bio-phage (pfu mL^{-1})			
	4×10^9	2×10^9	1×10^9	5×10^8
3.00	52.52	54.07	65.48	70.66
1.50	79.17	75.00	65.74	66.59
0.75	75.20	82.41	76.54	38.58
0.38	75.60	67.43	45.05	68.02