Supporting information

LC-MS/MS conditions and methods

We performed LC-MS using a Waters Quattro Premier XE equipped with an electrospray ionization (ESI) source and a BEH C18 column (150 mm × 2.1 mm, 1.7 μm). The operation conditions were as follows: flow rate, 0.3 mL/min; injection volume, 5 μL; and column temperature, 45℃. The mobile phases were 100% acetonitrile (A) and 0.1% formic acid in ultrapure water (v/v; B): 0 min, 95% B; 6 min, 5% B; 7 min, 5% B; 7.1 min, 95% B; and 10 min, 95% B. All chromatographic separation processes were carried out under a gradient elution program.

The MS detection was performed by electrospray in positive ion mode (ESI+). The ions were detected by MSE with 50–2,000 m/z. The parameters were the following, ion source block temperature, 100℃; capillary voltage, 3,500 V; desolvation gas temperature, 400℃; desolvation gas flow, 700 L/h; cone voltage, 30 V; and collision energies, 6e V and 20e V.

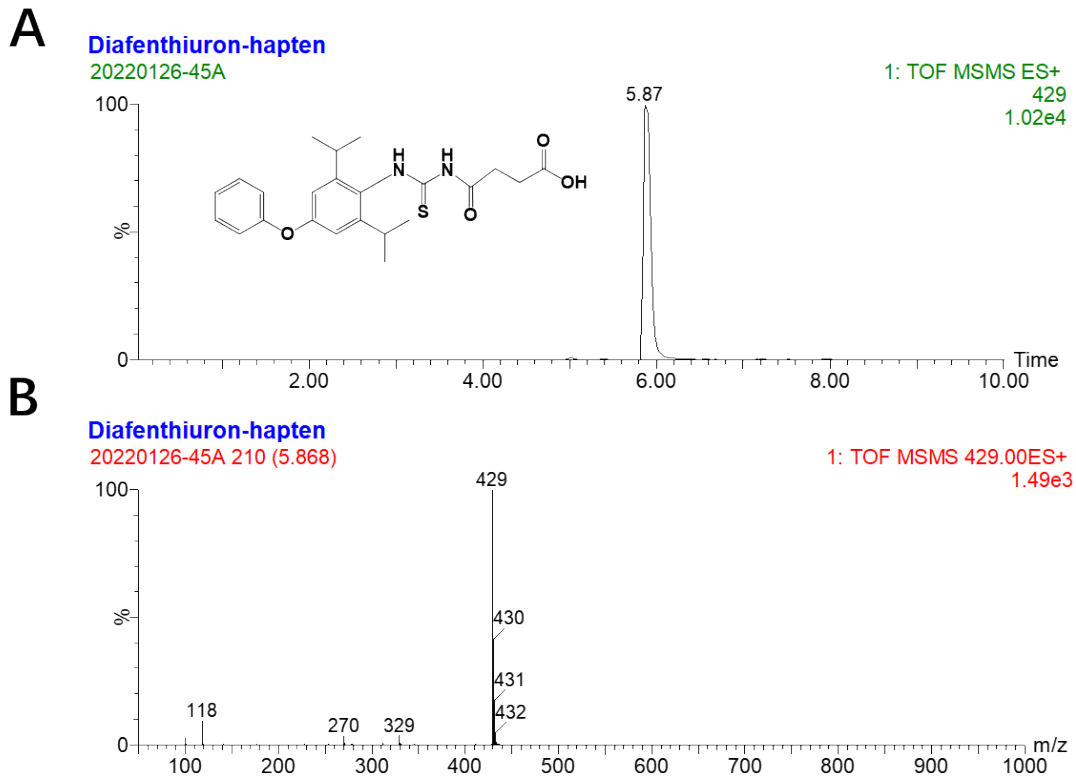

Fig. S1 Characterization of DIAF-hapten. (A) Extracted ion chromatogram of DIAF-hapten. (B) Mass spectrum of DIAF-hapten.

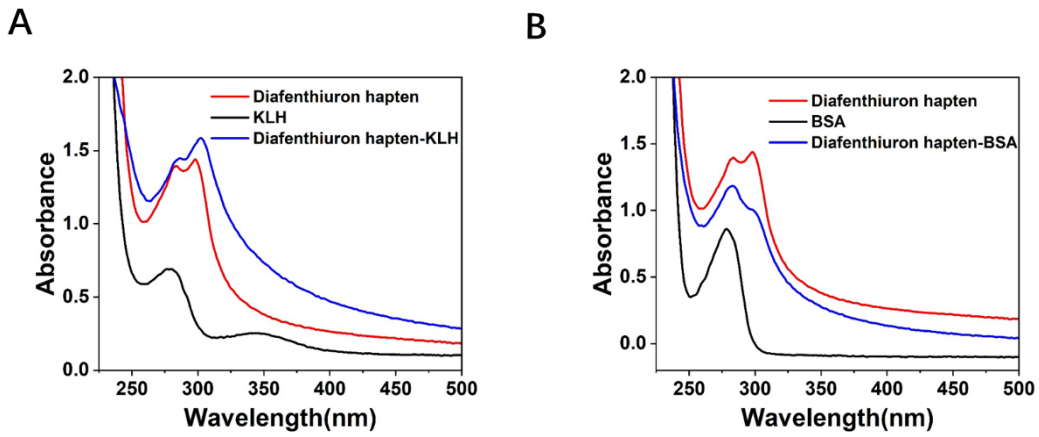

Fig. S2 Characterization of compete antigen. (A) Ultraviolet absorbance spectra of KLH, DIAF, DIAF -KLH; (B) Ultraviolet absorbance spectra of BSA, DIAF, DIAF – BSA.

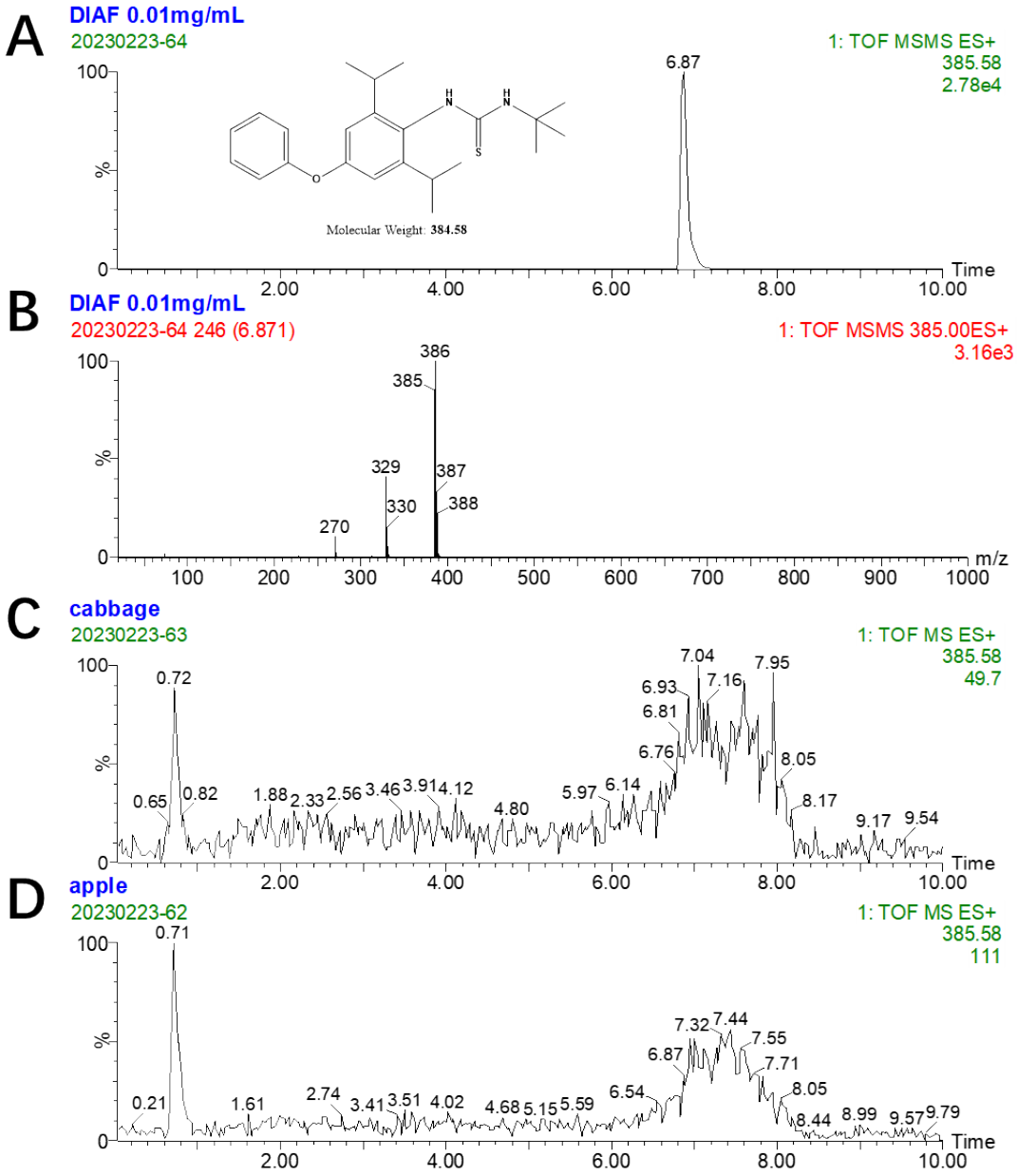

Fig. S3 Characterization of negative cabbage and apple samples. (A) Extracted ion chromatogram of DIAF. (B) Mass spectrum of DIAF. (C) Extracted ion chromatogram of negative cabbage sample. (D) Extracted ion chromatogram of negative apple sample.

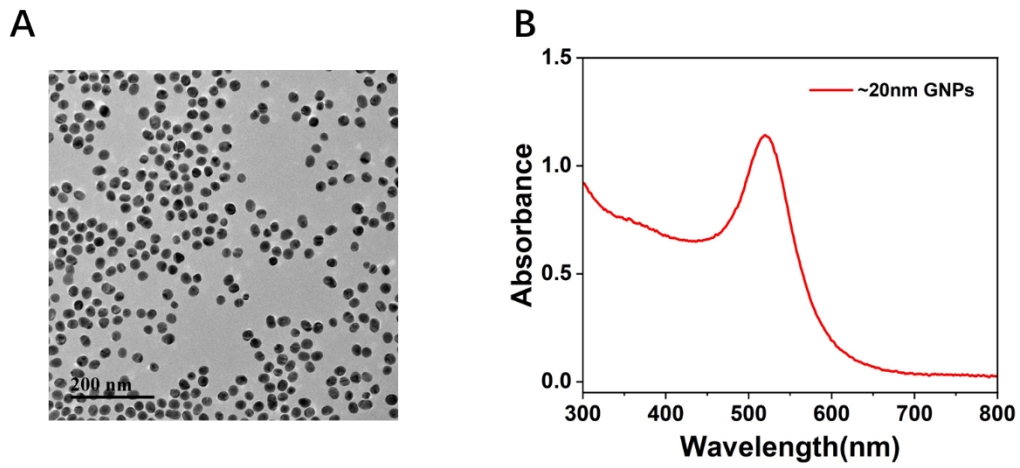

Fig. S4 Characterization of GNPs. (A) The TEM image of GNPs. (B) The UV/Vis spectrum of GNPs solution.