Supplementary Information

Gold nanoparticle-based lateral flow immunoassay for the

rapid detection of flumetralin in orange
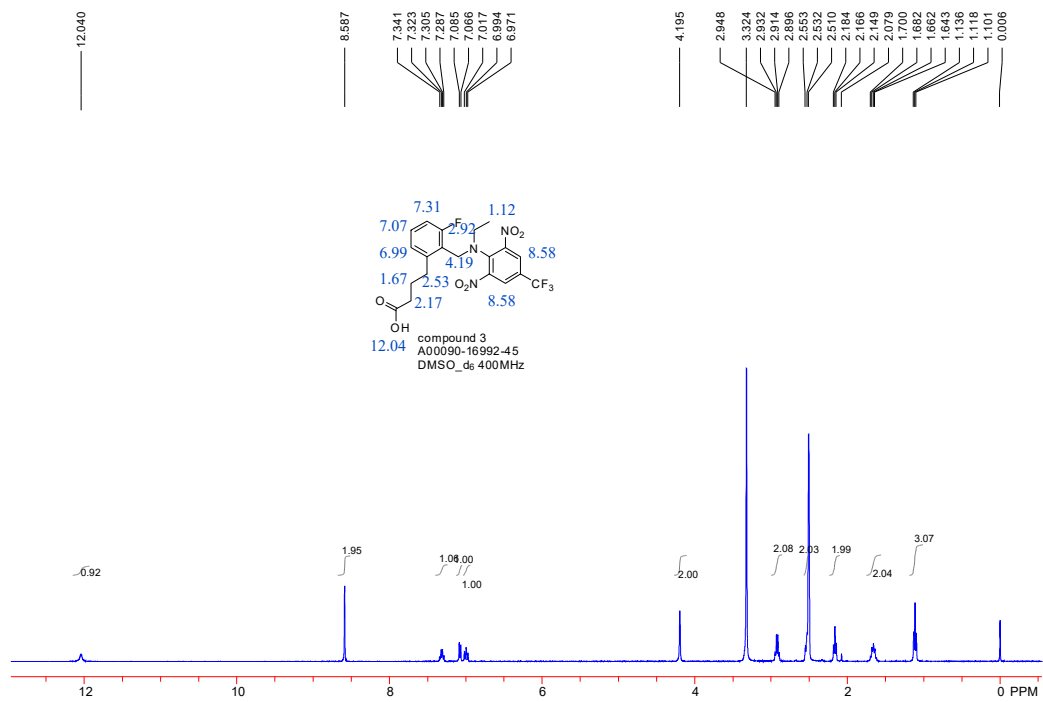
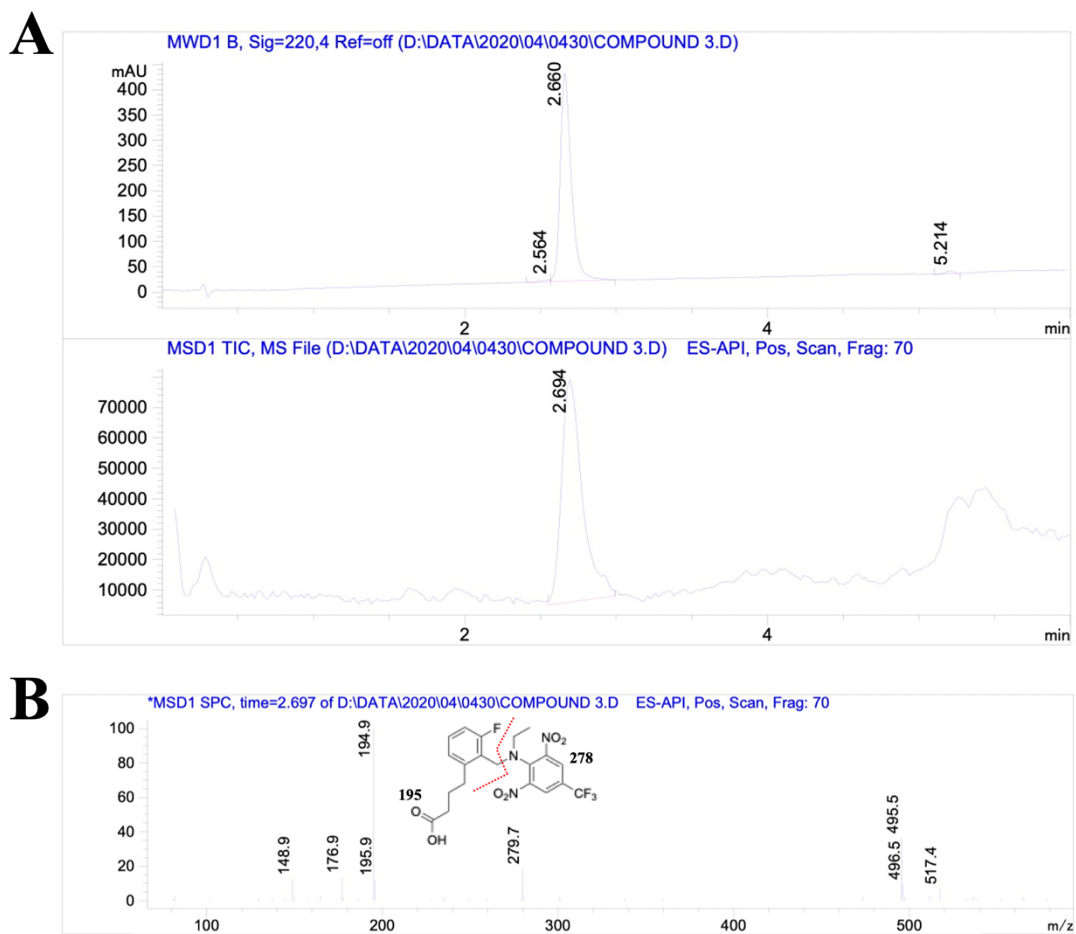**Figure S1.** ^{1}H NMR of the flumetralin hapten.

Figure S2. LC-MS analysis of the flumetralin hapten. (A) The liquid chromatogram. (B) The mass spectrum.
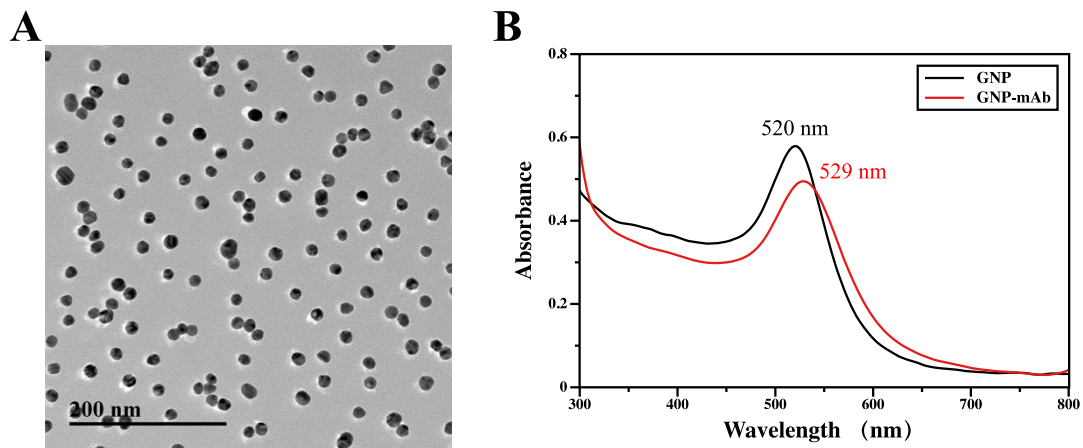
Figure S3. Characterization of the GNP and GNP-mAb. (A) TEM of the GNP. (B) UV spectroscopy of the GNP and GNP-mAb.
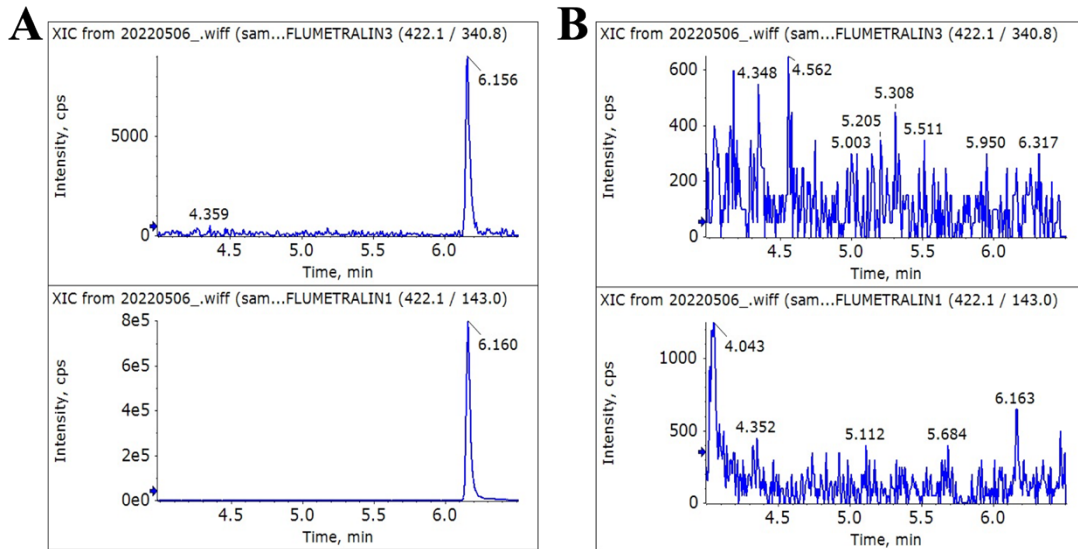
Figure S4. LC-MS/MS analysis of flumetralin standard (A) and flumetralin-negative orange sample (B).

Table S1. Instrument condition for flumetralin detection.

Instrument conditions	AB SCIEX QTRAP 5500 system
Spectrum Column	Waters BEH C18 (2.1×50 mm, 1.7 μm)
	Column temperature: 40 ℃
Mobile Phase	A: 0.1% Formic acid in water
	B: acetonitrile
Gradient Profile	

Time (min)	Percentage A (%)	Percentage B (%)	Flow rate (mL/min)
0.0	90	10	0.3
1	90	10	0.3
7	0	90	0.3
7.1	90	10	0.3
9	90	10	0.3

Injection Volume	5 μL
Mass Parameters	ESI Ion Source
	Curtain gas: 35 psi
	Ion source gas 1: 60 psi
	Ion source gas 2: 60 psi
	Source Temperature: 550 ℃
	Polarity: Positive
	Ionspray voltage: 5500 V
Precursor ion	422.1
Product ion	143.0, 340.8
CE/V	25, 25
DP/V	100
CXP/V	13

Table S2. Different methods for the detection of flumetralin.

Methods	Matrices	LODs	Advantages	References
GC-MS	Wastewater	4.2 ng/mL		1
GC-MS	Tap water and wastewater	0.38 ng/mL		2
GC-MS/MS	Traditional Chinese medicines	0.1 ng/g	Highly sensitive, specific, precise	3
GC-MS/MS	*Panax notoginseng*	0.38 ng/g		4
HPLC-MS/MS	Apples and tomatoes	0.03 ng/g		5
LFIA	Orange	33.26 ng/g	Simple, quick, user-friendly, specific, portable, high throughput	This work

References

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