

## Supplementary Information

### Colorimetric sensing of sinapine based on competitive interaction of papain-coated gold nanoparticles and sinapine toward Pb<sup>2+</sup>

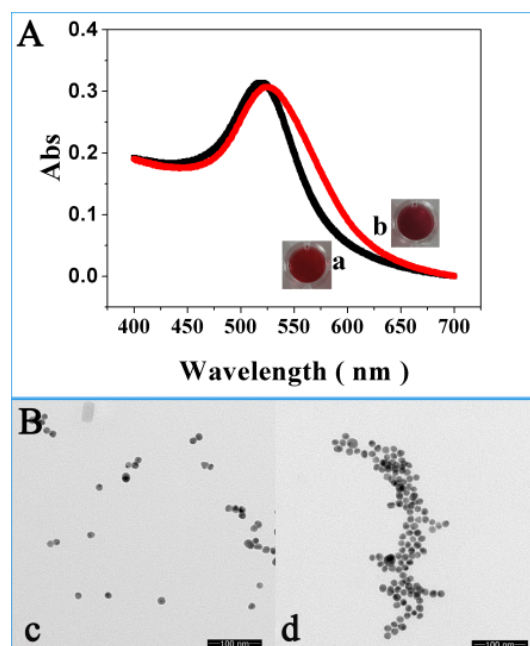
Xia Xiang,<sup>a</sup> Jianbin Shi,<sup>b</sup> Mian Guo,<sup>a</sup> Hu Jin<sup>a</sup> and Fenghong Huang <sup>\*a</sup>

<sup>a</sup>Department of Product Processing and Nutriology, Institute of OilCrops Research, Chinese Academy of Agricultural Sciences, Hubei Key Laboratory of Lipid Chemistry and Nutrition, Ministry of Agriculture Key Laboratory of Oil Crops Biology, Wuhan 430062, China.

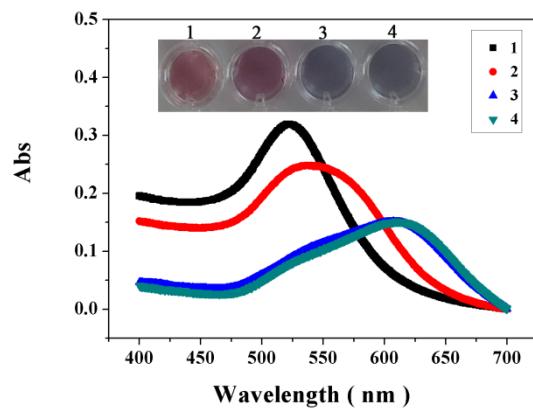
<sup>b</sup>Institute of Agro-Products Processing and Nuclear-Agricultural Technology, Hubei Academy of Agricultural Sciences, Wuhan, 430064, Hubei Province, China..

#### Corresponding Author

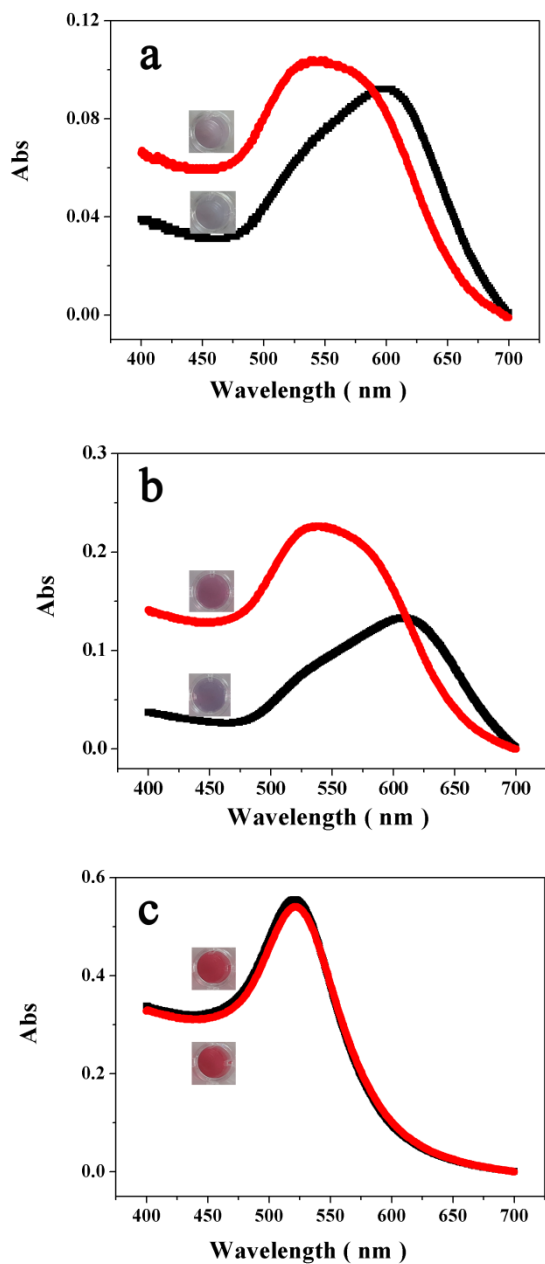
\* Email: xiangshi19850130@163.com; Phone: +86-27-86711526; Fax: +86-27-68754067.



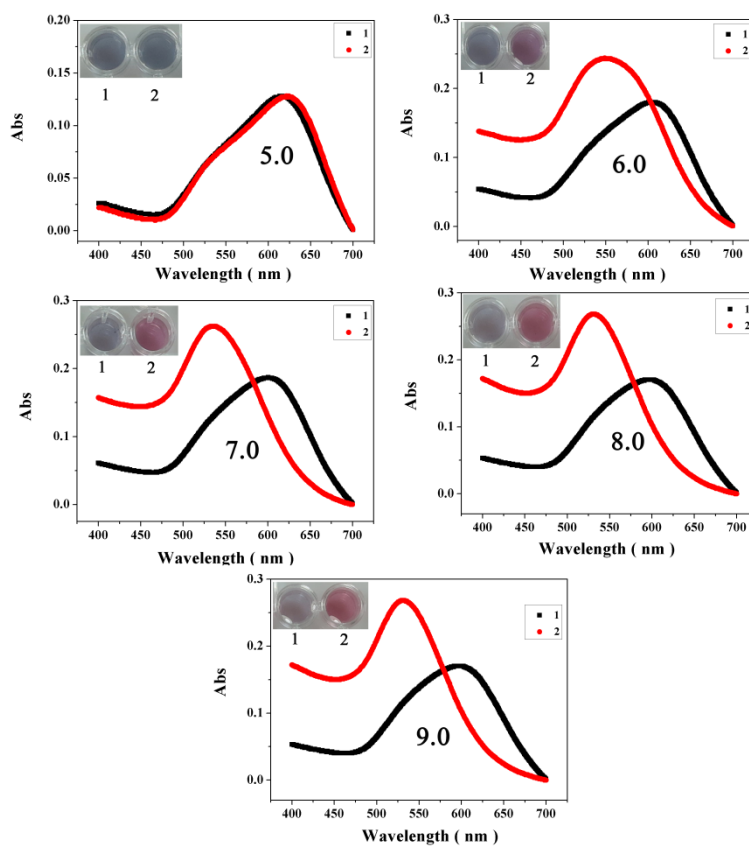
**Fig. S1.** (A) UV-vis spectra and photographs of the citrate-AuNPs (13 nm) (a), P-AuNPs (13 nm) (b); (B) TEM images of citrate-AuNPs (13 nm) (c) and P-AuNPs (13 nm) (d).



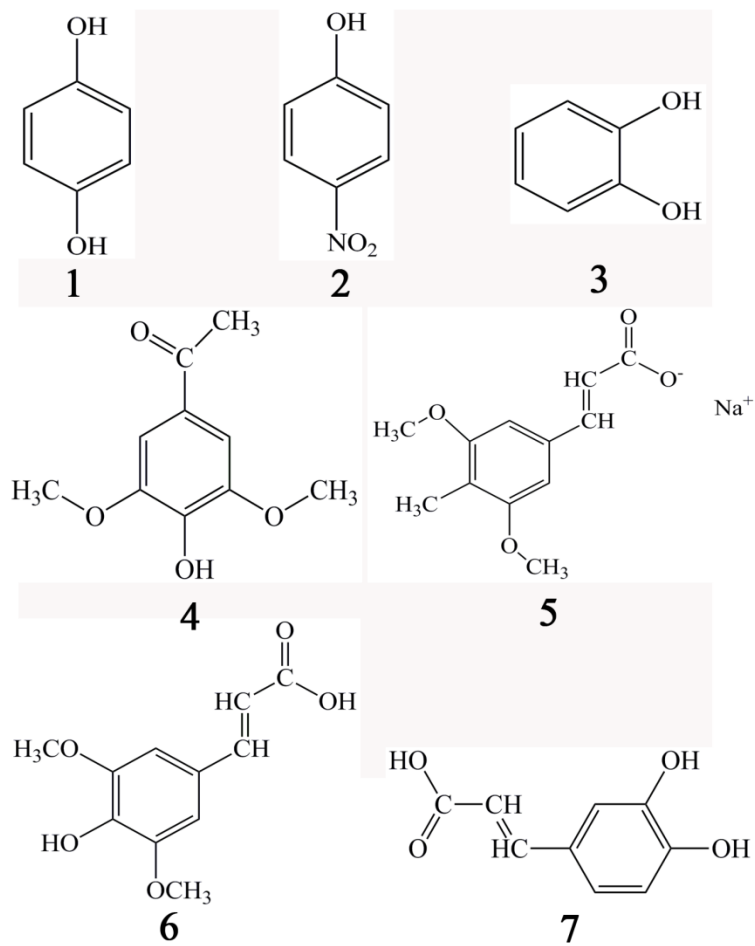
**Fig. S2.** Effects of Pb<sup>2+</sup> concentration on UV-vis spectra and color-response of P-AuNPs: 1) 0; 2) 2.5 × 10<sup>-6</sup> M; 3) 4 × 10<sup>-6</sup> M; 4) 5 × 10<sup>-6</sup> M.



**Fig. S3.** Effects of P-AuNPs concentration on UV-vis spectra and color-response of P-AuNPs: a) 0.75; b) 1.5; c) 2.1 nM. The black and red lines were the UV-vis absorption of P-AuNPs/Pb<sup>2+</sup> solution and P-AuNPs/Pb<sup>2+</sup>/SA solution, respectively. The concentrations of Pb<sup>2+</sup> and SA were  $4 \times 10^{-6}$  M and  $3.68 \mu\text{g mL}^{-1}$ , respectively.



**Fig. S4.** Effects of pH on UV-vis spectra and color-response of P-AuNPs: 1 and 2 were the UV-vis absorption of P-AuNPs/Pb<sup>2+</sup> solution and P-AuNPs/Pb<sup>2+</sup>/SA solution, and their corresponding photographs, respectively. The concentrations of the P-AuNPs, Pb<sup>2+</sup> and SA were 1.5 nM, 4 × 10<sup>-6</sup> M and 3.68 μg mL<sup>-1</sup>, respectively.



**Fig. S5.** The structures of control compounds: 1) HQ; 2) NP; 3) PA; 4) AS; 5) STR; 6) SAA; 7) CA.

**Table S1** Determination of SA in practical rapeseed samples

Sample No	AuNPs-colorimetric method ( $\mu\text{g mL}^{-1}$ ) <sup>a</sup>	RSD <sup>b</sup> (%) n=3	HPLC method ( $\mu\text{g mL}^{-1}$ ) <sup>a</sup>	RSD <sup>c</sup> (%) n=3	Added ( $\mu\text{g mL}^{-1}$ )	Found ( $\mu\text{g mL}^{-1}$ )	Recovery (%)
1	426.89	4.6	443.38	1.3	0.37	0.34	91.8
2	131.57	6.2	142.15	0.9	0.55	0.56	102

<sup>a</sup> These data are averages from three independent measurements.

<sup>b</sup> RSD for the AuNPs-colorimetric method.

<sup>c</sup> RSD for the HPLC method.