Iron nanoparticles increase the active ingredients of traditional Chinese Medicine *Isatis Indigotica* not carbon nanotubes: a comparative study

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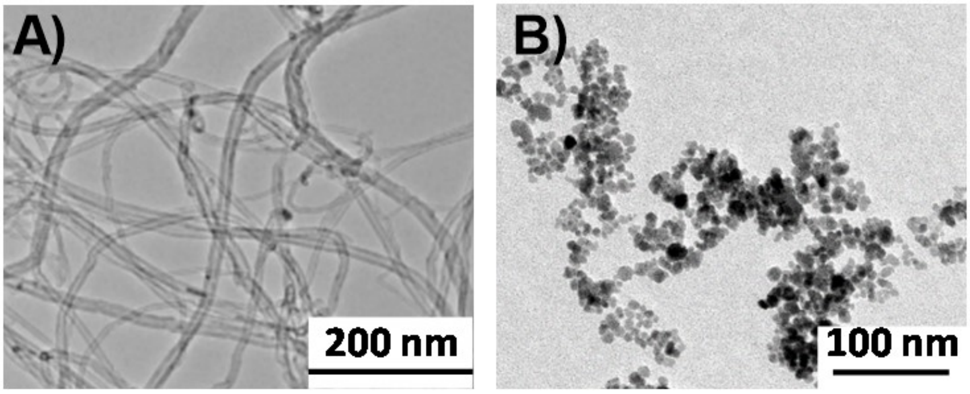

Figure S1. TEM images of MWCNTs (A) and Fe_2O_3 (B) NPs. The diameter Fe_2O_3 NPs are 29.4 ± 2.6 nm.

Table S1. Hydrodynamic size and zeta potential measurements of nanomaterials

Parameter	**MWCNTs**	**Fe_2O_3**
Zeta Potential (mV)	10.4 ± 0.3	4.3 ± 0.5
DLS (nm)	50109 ± 500	407 ± 9.6

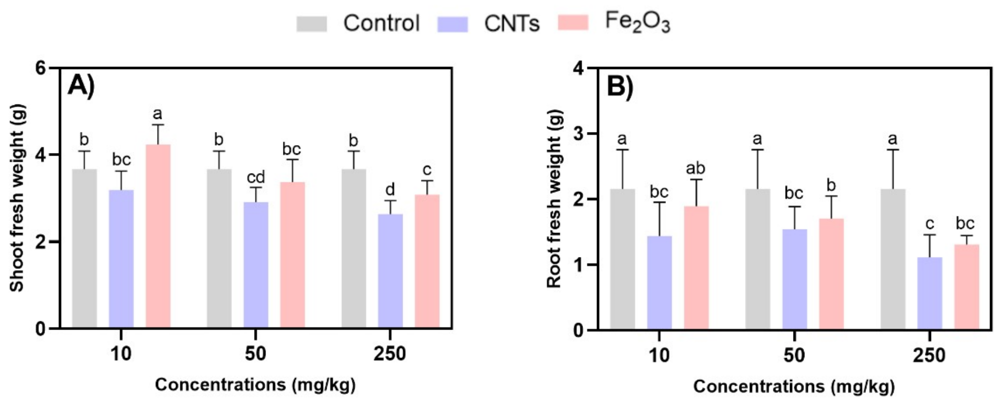

Figure S2. Shoot (A) and root (B) fresh weight of BLG exposed to nanoparticles for 60 days. Data represent mean ± SD of 6 replicates. Different lowercase letters indicate significant differences at $p < 0.05$.

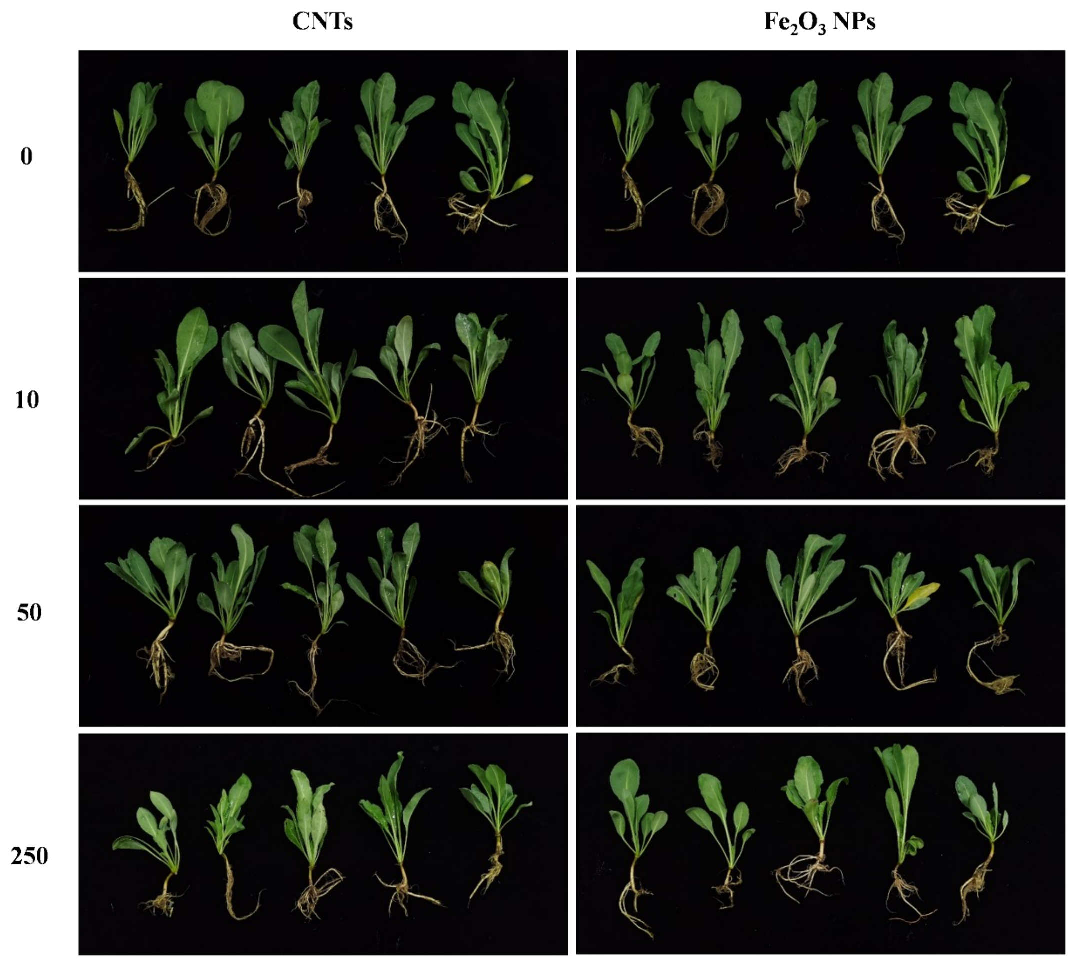

Figure S3. Images of BLG morphology. The left column is the CNTs group, and the right column is the Fe_2O_3 group

Table S2. Comparison of the effects of NMs on medicinal plants and crops

Plant species	NMs type	Concentration	Variation of shoot biomass	Ref
Isatis Indigotica	Fe_2O_3 NPs CNTs	10 mg/kg	14% -16%	Current Research
Peanut	Fe_2O_3 NPs	10 mg/kg	15.6%	[1]
Tomato	CNTs	10 mg/kg	9.93%	[2]
Phaseolus vulgaris L.	CNTs	20 ug/L	Fresh weight 130% Dry weight 66.7%	[3]
Dracocephalum kotschyi Boiss	Fe_2O_3 NPs	25 mg/L	Fresh weight 47.4%	[4]
	Fe_2O_3 NPs	50 mg/L	Fresh weight 69.6%	
Watermelon	Fe_2O_3 NPs	400 ppm	-6.7%	[5]
Non-transgenic rice	Fe_2O_3 NPs	20 mg/L	1.7%	[6]
Transgenic rice		20 mg/L	-0.6%	
		200 mg/L	-8.2%	
Wheat	Fe_2O_3 NPs	50 mg/kg	-12.2%	[7]
Maize	CNTs	100 mg/L	Fresh weight 22.2% Dry weight 32.6%	[8]

References:

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Table S3. Soil characteristics

Index	Mean Value
Soil property	Silty loam
Dry unit weight (g cm^{-3})	1.29
pH	7.7
Electrical conductivity (dS M^{-1})	0.16
Rapidly available N (mg kg^{-1})	20.37
Rapidly available P (mg kg^{-1})	11.21
Rapidly available K (mg kg^{-1})	73.64
Organic matter (g kg^{-1})	11.31
CEC (mol kg^{-1})	14.27
$CaCO_3$ (g kg^{-1})	43.19
Rapidly available Fe (mg kg^{-1})	22.91
Rapidly available Mn (mg kg^{-1})	12.77
Rapidly available Cu (mg kg^{-1})	3.17
Rapidly available Ni (mg kg^{-1})	2.24

Table S4. Limit of detection, precision and recovery data for ICP-MS for the selected elements. CRM indicates certified reference material

Elements	List of detection (µg/L)	Spiking recovery (%)	Recovery from CRM (%)	Correlation coefficient (R^2)	Correlation variance (%)
Ca	0.080	98.2	98.3	0.9999	3.91
Cu	0.099	98.1	101.2	0.9998	1.72
Fe	0.064	101.6	101.7	0.9999	2.31
K	0.103	98.3	97.9	0.9999	2.71
Mg	0.114	101.2	99.3	0.9999	2.23
Mn	0.063	103.0	102.1	0.9997	2.45
Na	0.099	98.1	101.2	0.9998	1.72
Zn	0.134	97.9	98.1	0.9998	1.76
P	0.182	97.8	97.6	0.9997	2.89