

## Supporting Information for

### Cellular internalisation of dissolved cobalt ions from ingested $\text{CoFe}_2\text{O}_4$ nanoparticles: *in vivo* experimental evidence

#### *Environmental Science and Technology*

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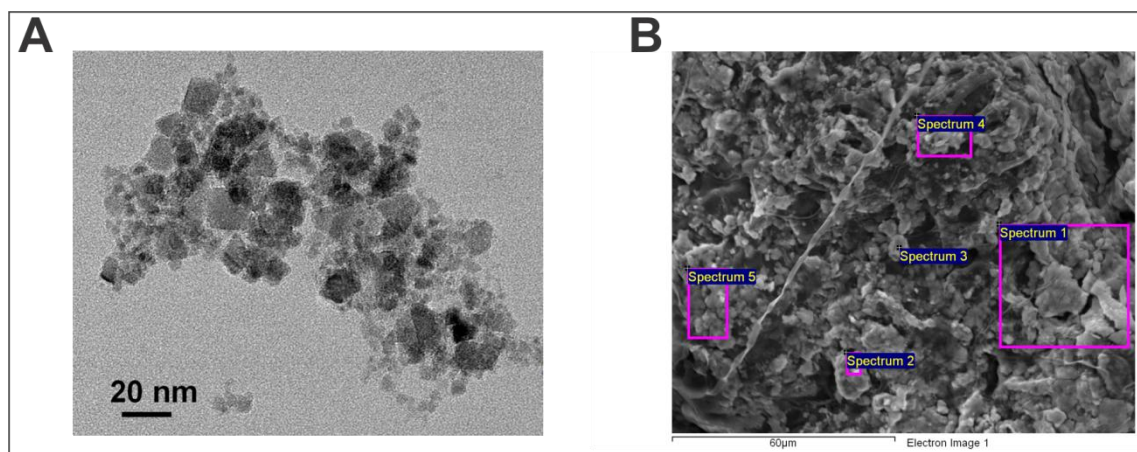
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Spectrum	C	O	Mg	Si	Ca	Fe	Co	Pd	Au	Total
Spectrum 1	21.63	32.85		0.58	1.33	27.55	15.13	0.93		100.00
Spectrum 2	15.28	38.51	6.54	1.03	15.27	14.61	7.49	1.28		100.00
Spectrum 3	19.29	27.26	0.26	0.53	1.33	32.43	16.77	1.15	0.97	100.00
Spectrum 4	45.59	34.17	0.57	1.24	2.04	9.85	5.39	1.14		100.00
Spectrum 5		38.20	0.55	1.70	2.50	36.61	18.93	1.53		100.00
Max.	45.59	38.51	6.54	1.70	15.27	36.61	18.93	1.53	0.97	
Min.	15.28	27.26	0.26	0.53	1.33	9.85	5.39	0.93	0.97	

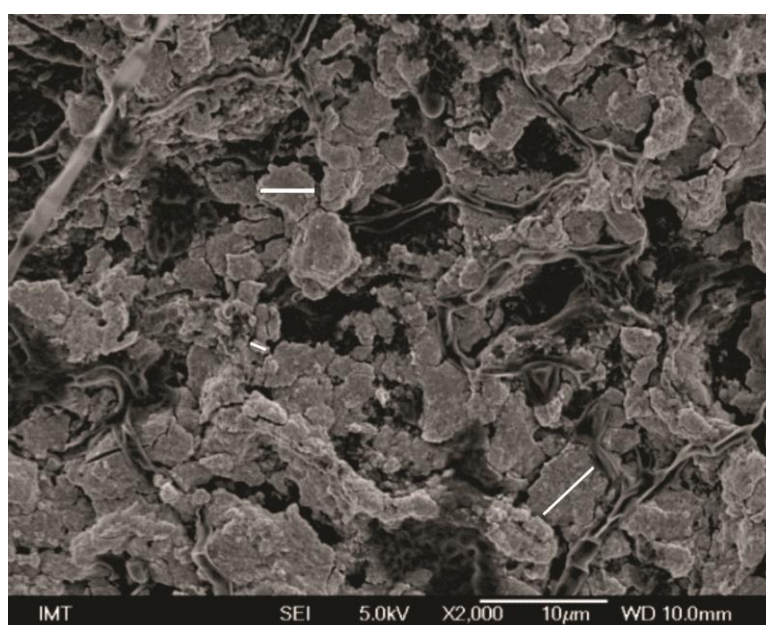
**Table S1. EDX spectra analyses of abaxial leaf surface.** EDX spectra analyses of abaxial leaf surface covered with suspension of  $\text{CoFe}_2\text{O}_4$  nanoparticles (nominal concentration 5000  $\mu\text{g/g}$ ). Analytical results in weight % for analysed elements in all five spectra taken in areas marked in Figure 1B.

		$\text{CoFe}_2\text{O}_4$ (2000 $\mu\text{g}$ Co/mL)	$\text{CoFe}_2\text{O}_4$ (5000 $\mu\text{g}$ Co/mL)	$\text{CoCl}_2$ (2000 $\mu\text{g}$ Co/mL)	$\text{CoCl}_2$ (5000 $\mu\text{g}$ Co/mL)
Concentration of Co ions ( $\mu\text{g/mL}$ ); mean $\pm$ SD, n = 3	supernatant diluted with deionized water (1:1)	0,162 $\pm 0,027$	below detection limit	2096 $\pm 14$	4451 $\pm 151$
	supernatant diluted with 1 M HCl (1:1)	0,215 $\pm 0,039$	below detection limit	2127 $\pm 48$	4904 $\pm 88$
Concentration of Fe ions ( $\mu\text{g/mL}$ ); mean $\pm$ SD, n = 3	supernatant diluted with deionized water (1:1)	0,238 $\pm 0,122$	below detection limit	Not measured	Not measured
	supernatant diluted with 1 M HCl (1:1)	0,315 $\pm 0,121$	0,099 $\pm 0,029$	Not measured	Not measured

**Table S2 Concentration of Co and Fe ions in supernatants.** Concentration of Co and Fe ions in supernatants of centrifuged suspensions of  $\text{CoFe}_2\text{O}_4$  NPs and  $\text{CoCl}_2$  solution, as measured with flame AAS.

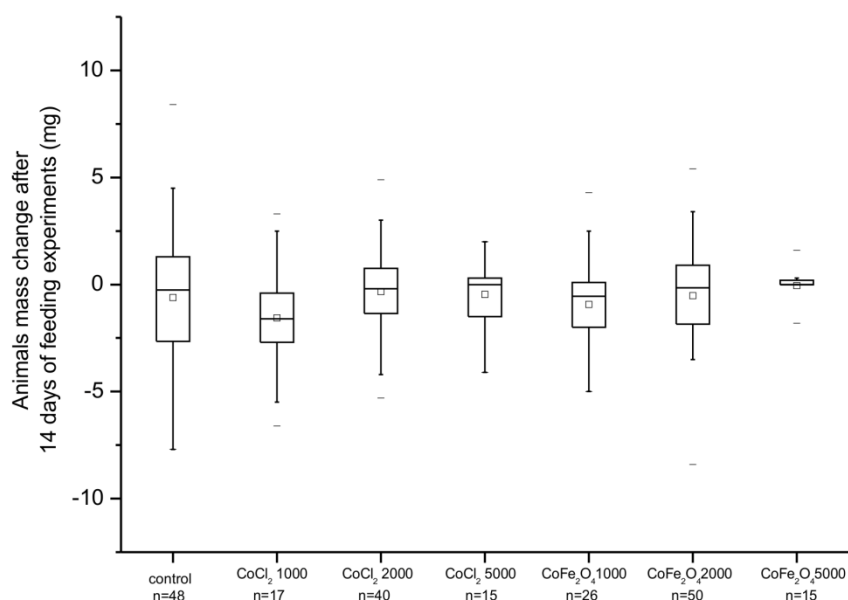


**Figure S1. SEM/EDX analyses of nanoparticles on leaves.** SEM characterization of  $\text{CoFe}_2\text{O}_4$  nanoparticles and SEM/EDX analyses of  $\text{CoFe}_2\text{O}_4$  nanoparticles on leaves from experiment D. (A) SEM micrograph of  $\text{CoFe}_2\text{O}_4$  NPs. (B) Abaxial leaf surface covered with suspension of  $\text{CoFe}_2\text{O}_4$  nanoparticles (nominal concentration 5000  $\mu\text{g/g}$ ) with marked areas where EDX spectra were taken.

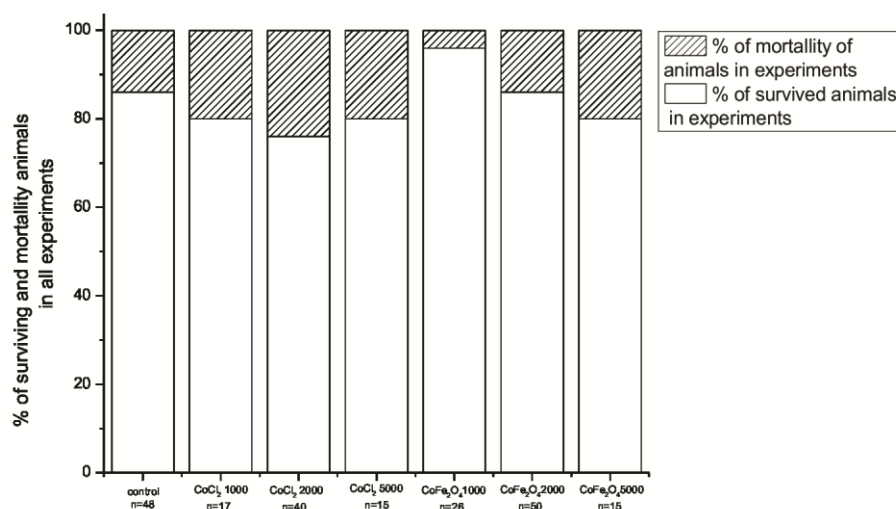


**Figure S2. SEM image of the surface of leaf covered with  $\text{CoFe}_2\text{O}_4$  nanoparticles.** The scanning electron microscope (SEM) image of the surface of leaf (food) on which suspension of  $\text{CoFe}_2\text{O}_4$  nanoparticles at a concentration 5000  $\mu\text{g/ml}$  was applied. White lines

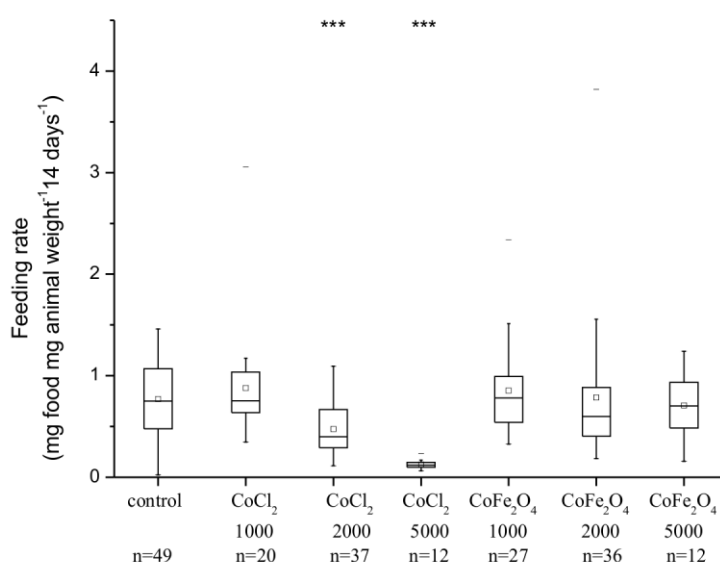
indicating some of agglomerates show that the size of individual agglomerates varied from 1 to 10  $\mu\text{m}$ .



**Figure S3. Mass change of animals after experiments.** Mass change of animals (mg) fed for 14 days on food dosed with  $\text{CoCl}_2$  or  $\text{CoFe}_2\text{O}_4$  nanoparticles. Symbols on the box plot represent minimum and maximum data values (whiskers), mean value ( $\square$ ), 75<sup>th</sup> percentile (upper edge of box), 25<sup>th</sup> percentile (lower edge of box), median (line in box) and max and min value ( - ). There was no statistically significant differences between exposed and control animals. Nominal exposure concentrations (1000, 2000 or 5000  $\mu\text{g}$   $\text{CoCl}_2$  or nano- $\text{CoFe}_2\text{O}_4/\text{g}$  of leaf) and the number of animals (n) per group are provided on the x-axis.



**Figure S4. Survival of animals after feeding experiments.** Survival of animals fed for 14 days on food dosed with CoCl<sub>2</sub> or CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. Nominal exposure concentrations (1000, 2000 or 5000 µg CoCl<sub>2</sub> or nano-CoFe<sub>2</sub>O<sub>4</sub>/g of leaf) and the number of animals (n) per group are provided on the x-axis.



**Figure S5. Feeding rate of animals fed on CoCl<sub>2</sub> or CoFe<sub>2</sub>O<sub>4</sub> nanoparticles.** Feeding rate (mg of consumed leaf per mg of animal mass) of animals fed for 14 days on food dosed with CoCl<sub>2</sub> or CoFe<sub>2</sub>O<sub>4</sub> nanoparticles. Symbols on the box plot represent minimum and maximum

data values (whiskers), mean value ( $\square$ ), 75<sup>th</sup> percentile (upper edge of box), 25<sup>th</sup> percentile (lower edge of box), median (line in box) and max and min value ( - ). Statistically significant differences between exposed and control animals are marked with \*\*\* ( $p < 0.001$ ). Nominal exposure concentrations (1000, 2000 or 5000  $\mu\text{g CoCl}_2$  or nano- $\text{CoFe}_2\text{O}_4/\text{g}$  of leaf) and the number of animals (n) per group are provided on the x-axis.