Supplementary Material

Supplementary Materials & Methods

A more detailed description of the methods used to characterize the soil appears in the article Campillo-Cora et al. (Submitted), and is summarized below.

After the soil sampling procedure, the samples were dried at room temperature and sieved using a 2 mm mesh sieve. The pH of the soil was then measured using a soil:water ratio of 1:2.5 after keeping the suspension in contact for 10 minutes. The measurement was made with a combined glass electrode (model 2001, Crison, Barcelona, 104 Spain). Organic matter was determined by weight difference after dry combustion at 550 ºC for 3 hours (Hoogsteen et al., 2015). The total amounts of carbon and nitrogen were determined in pulverized soil samples by elemental analysis (LECO CHN-1000, LECO Corporation, St. Joseph, MI, USA). To measure the dissolved organic carbon (DOC), a soil:water suspension was made (1:5 ratio), and centrifuged (3000 rpm, 25 min). DOC was measured in the supernatant using a Total Carbon Analyser Multi N/C 2100 (Mettler Toledo, Ohio, USA). The effective cation exchange capacity (eCEC) was determined as the sum (in cmol of charge per soil kilogram) of the exchangeable aluminium that was extracted with a 1M solution of KCl (Reed and Martens, 1996) and the exchangeable Na, K, Ca and Mg displaced from the soil by a 0.2M NH4Cl solution (Reed and Martens, 1996). Na and K were determined by atomic emission spectroscopy, and the rest of them by atomic absorption spectroscopy (Thermo Solaar AA, Thermo, MA, USA). The amount of available phosphorus was determined though the Bray-II method. Regarding the particle size distribution, through the pipette method (Guitián and Carballas, 1976), the percentage of sand (2-0.05 mm), silt (0.05-0.002 mm) and clay (<0.002) were determined. The forms of iron and aluminium associated with organic matter (FeOM and AlOM) were extracted from the soil using a 0.1 M Na-pyrophosphate solution (Bascomb, 1968). A 0.2 M ammonium oxalate-oxalic acid solution was used to extract the Fe and Al oxyhydroxides (FeOX and AlOX, respectively) (Blakemore, 1978). The difference between the forms associated with organic matter and the oxyhydroxides allowed determining the amount of inorganic amorphous iron and aluminium forms (FeIA and AlIA, respectively). Total free iron (FeT) was extracted with a Na-dithionite-citrate solution (Holmgren, 1967), and total free aluminium (AlT) with a 0.5 M NaOH solution. We determined the amount of iron and aluminium associated with crystalline structures (FEC and AlC, respectively) through the difference between the total free forms (FeT and AlT) and the oxyhydroxides (FeOX and AlOX).

Supplementary Tables

Table S1: Percentage of A) H_2O, B) $CaCl_2$, and C) DTPA Zn extracted with respect to the concentration added in each soil.

A)	*Soil number*									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	23.7	18.5	41.7	32.3	19.6	0.7	0.2	24.4	23.8	16.3
1000	9.0	3.9	19.4	18.6	8.1	0.3	0.1	10.6	16.5	4.7
500	0.9	0.6	10.6	6.3	1.4	< d.l.	< d.l.	3.3	8.3	0.6
250	< d.l.	< d.l.	4.8	2.0	< d.l.	< d.l.	< d.l.	0.9	1.6	< d.l.
125	< d.l.	< d.l.	< d.l.	1.5	< d.l.	< d.l.	< d.l.	< d.l.	1.9	< d.l.
62.5	< d.l.	< d.l.	< d.l.	2.5	< d.l.	< d.l.	< d.l.	< d.l.	2.4	< d.l.
31.25	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.

B)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	53.2	42.3	23.4	25.5	62.7	4.2	0.4	7.5	43.8	30.7
1000	35.1	35.9	23.1	28.5	64.8	1.3	< d.l.	6.8	32.4	16.9
500	45.1	32.1	23.0	34.1	38.9	< d.l.	< d.l.	11.7	29.0	17.1
250	43.3	23.3	20.9	38.5	31.7	< d.l.	< d.l.	14.6	23.7	12.1
125	42.1	28.0	24.5	37.8	24.2	< d.l.	< d.l.	17.1	21.0	8.7
62.5	41.2	27.6	5.7	41.2	15.1	< d.l.	< d.l.	7.7	17.9	5.3
31.25	33.6	21.3	< d.l.	32.5	< d.l.	< d.l.	< d.l.	< d.l.	9.7	< d.l.

C)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	89.1	83.8	56.9	70.5	56.1	43.6	30.3	69.5	68.7	46.0
1000	86.1	69.5	47.0	61.4	46.4	39.2	39.1	47.4	48.9	41.6
500	67.8	68.4	41.0	68.6	45.2	32.0	40.4	55.2	53.5	38.8
250	82.3	76.5	33.3	72.1	40.1	20.4	36.0	54.8	46.2	33.8
125	71.0	77.7	28.2	59.4	26.2	21.4	32.4	38.3	34.0	33.5
62.5	86.6	68.7	19.6	60.9	28.0	13.9	27.8	47.4	42.6	35.3
31.25	76.9	72.9	3.1	72.5	13.2	4.2	20.9	45.1	40.4	26.7

(< d.l., below detection limit).

Table S2: Percentage of A) H_2O, B) $CaCl_2$, and C) DTPA Ni extracted with respect to the concentration added in each soil.

A)	*Soil number*									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	18.2	19.7	37.0	32.3	11.5	1.4	0.5	34.8	32.8	23.3
1000	7.9	6.5	32.3	28.0	17.0	0.3	< d.l.	22.7	22.6	11.7
500	1.0	1.1	16.2	13.2	2.5	< d.l.	< d.l.	4.7	7.9	1.1
250	1.3	0.6	6.3	4.0	< d.l.	< d.l.	< d.l.	1.4	2.7	0.3
125	1.2	1.2	6.4	1.2	< d.l.	< d.l.	< d.l.	0.2	1.2	0.3
62.5	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	1.5	< d.l.
31.25	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	1.3	0.5

B)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	48.2	48.8	64.9	71.5	37.4	6.4	1.9	52.8	43.8	35.0
1000	52.0	40.9	35.6	57.9	33.5	3.3	0.8	42.6	39.3	25.8
500	39.9	32.9	41.1	51.6	18.5	1.2	< d.l.	27.3	24.6	12.1
250	33.8	22.8	29.5	38.5	16.3	0.1	< d.l.	26.3	13.9	13.3
125	34.2	20.6	25.8	37.1	12.3	< d.l.	< d.l.	20.0	16.3	10.3
62.5	27.7	14.8	20.6	36.3	10.8	< d.l.	< d.l.	18.1	13.9	8.2
31.25	21.7	12.1	12.2	22.7	4.6	< d.l.	< d.l.	9.1	6.4	2.9

C)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	67.8	63.1	65.3	66.6	39.8	37.2	21.4	49.4	50.9	39.1
1000	66.9	59.3	53.1	66.5	28.2	31.7	19.4	51.3	39.0	31.7
500	59.9	58.5	48.8	63.3	35.0	24.7	14.5	46.1	41.1	35.0
250	54.5	49.0	41.9	57.7	37.1	26.8	16.8	18.2	39.0	33.2
125	61.5	53.3	48.7	47.1	34.7	20.9	12.1	26.8	37.2	42.4
62.5	62.8	54.6	46.1	65.8	35.6	18.7	9.7	29.1	39.4	33.3
31.25	56.4	53.8	40.0	60.1	16.3	12.3	3.3	26.9	31.3	21.6

(< d.l., below detection limit).

Table S3: Percentage of A) H_2O, B) $CaCl_2$, and C) DTPA Cu extracted with respect to the concentration added in each soil.

A)	*Soil number*									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	7.4	6.3	18.8	13.4	10.2	0.2	< d.l.	9.3	4.9	2.9
1000	0.1	1.1	9.9	11.7	2.9	< d.l.	< d.l.	2.2	1.3	0.6
500	< d.l.	0.5	3.0	1.2	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
250	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
125	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
62.5	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
31.25	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.

B)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	14.3	10.1	12.3	11.6	10.0	0.1	< d.l.	7.7	6.1	1.1
1000	7.0	4.5	5.9	11.2	3.7	0.1	< d.l.	3.5	2.2	0.4
500	4.0	1.3	2.9	5.2	0.9	< d.l.	< d.l.	1.1	0.5	0.3
250	1.6	0.3	0.8	2.3	0.4	< d.l.	< d.l.	0.5	< d.l.	0.1
125	1.1	< d.l.	< d.l.	1.7	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.1
62.5	0.5	< d.l.	< d.l.	0.6	0.1	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
31.25	< d.l.	< d.l.	< d.l.	0.8	< d.l.	< d.l.	< d.l.	0.1	< d.l.	< d.l.

C)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	52.2	43.1	29.1	40.1	40.6	43.2	40.2	39.5	33.3	27.9
1000	44.5	42.0	31.1	46.7	46.4	42.8	42.2	40.8	33.4	22.4
500	46.2	41.2	33.5	39.4	23.7	32.1	36.6	36.3	29.6	25.7
250	36.9	30.8	16.6	31.9	37.7	36.3	32.8	33.4	26.6	24.0
125	37.0	32.5	25.1	38.3	34.9	30.2	35.8	33.0	25.0	23.7
62.5	35.9	29.2	27.3	39.8	31.9	25.5	31.4	30.3	21.8	19.3
31.25	27.7	23.8	31.0	32.8	24.1	20.8	25.1	25.9	17.8	19.3

(< d.l., below detection limit).

Table S4: Percentage of A) H_2O, B) $CaCl_2$, and C) DTPA Pb extracted bioavailable with respect to the concentration added in each soil.

A)	*Soil number*									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	< d.l.	< d.l.	< d.l.	0.4	< d.l.	< d.l.	< d.l.	0.3	0.3	0.1
1000	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.2	0.1	< d.l.
500	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.3	< d.l.	0.2
250	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.2	< d.l.	0.5
125	< d.l.	0.2	0.2	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	1.2
62.5	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
31.25	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.

B)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	3.0	0.9	5.0	5.0	1.0	< d.l.	< d.l.	1.9	1.0	0.6
1000	1.9	0.5	1.9	2.7	0.3	< d.l.	< d.l.	1.0	0.8	0.1
500	1.8	0.2	0.9	1.7	< d.l.	< d.l.	< d.l.	0.3	0.4	< d.l.
250	1.5	< d.l.	0.3	1.6	< d.l.	< d.l.	< d.l.	0.1	< d.l.	< d.l.
125	1.2	< d.l.	< d.l.	1.2	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
62.5	0.4	< d.l.	< d.l.	0.3	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.
31.25	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.

C)	Soil number									
Concentration added (mg kg^{-1})	1	2	3	4	5	6	7	8	9	10
2000	43.0	45.4	37.9	42.7	27.6	42.9	34.0	34.8	34.4	26.4
1000	46.5	48.2	38.9	48.6	34.1	40.0	38.0	37.1	33.7	24.6
500	56.0	51.6	36.4	49.2	29.2	38.3	32.3	39.4	32.9	23.5
250	53.0	51.7	35.2	47.1	26.0	38.4	33.2	36.6	31.7	23.4
125	41.6	53.7	37.9	40.5	25.2	30.2	31.4	31.9	29.2	22.8
62.5	42.9	41.9	21.4	46.4	21.5	31.1	30.7	30.3	28.6	19.5
31.25	47.9	57.1	25.9	37.0	20.9	31.0	24.2	26.0	27.0	14.8

(< d.l., below detection limit).