Using nano-scale  $Fe^0$  particles and organic waste to improve the nutritional status of tree seedlings growing in heavy metal-contaminated soil

iForest – Biogeosciences and Forestry – doi: 10.3832/ifor3821-014

## **Supplementary Material**

**Tab. S1** - Results of two-way ANOVA for the effect of different levels of heavy metal levels, soil amendments and their interactions on soil pH and electrical conductivity (EC) in heavy metal polluted soil. (1): degree of freedom; (\*): p < 0.05; (\*\*): p < 0.01; (ns): not significant.

Parameter	Source	DF¹	Lead		Cadmium	
			Mean square	F	Mean square	F
pН	Heavy Metal (HM)	2	0.016	7.33**	0.029	12.55**
	Soil Amendments (SA)	6	0.128	58.23**	0.134	57.95**
	$HM \times SA$	12	0.001	0.342ns	0.001	$0.175^{\rm ns}$
EC	Heavy Metal (HM)	2	0.019	0.423 <sup>ns</sup>	0.023	$0.015^{\rm ns}$
	Soil Amendments (SA)	6	5.052	112.89**	6.76	151.62**
	$HM \times SA$	12	0.048	1.08 <sup>ns</sup>	0.054	1.217 <sup>ns</sup>

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**Tab. S2** – Results of two-way ANOVA for the effect of different levels of heavy metal levels, soil amendments and their interactions on leaf nutrient concentrations. (1): degree of freedom; (\*): p < 0.05; (\*\*): p < 0.01; (ns): not significant.

Heavy metal	Source	DF <sup>1</sup>	Lead		Cadmium	
			Mean square	F	Mean square	F
Nitrogen	Heavy Metal (HM)	2	0.36	20.89**	0.36	29.03**
	Soil Amendments (SA)	6	0.33	18.67**	0.34	27.01**
	$HM \times SA$	12	0.001	0.39 <sup>ns</sup>	0.001	1.16 <sup>ns</sup>
Phosphorus	Heavy Metal (HM)	2	0.015	50.36**	0.006	7.21**
	Soil Amendments (SA)	6	0.33	114.48**	0.024	30.39**
	$HM \times SA$	12	0.001	3.69 <sup>ns</sup>	0.001	1.49 <sup>ns</sup>
Potassium	Heavy Metal (HM)	2	9.407	22.42**	15.65	39.17**
	Soil Amendments (SA)	6	1.00	2.39*	3.61	9.04**
	$HM \times SA$	12	0.364	$0.86^{\rm ns}$	0.35	$0.87^{\rm ns}$

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**Tab. S3** - Results of two-way ANOVA for the effect of different levels of heavy metal levels, soil amendments and their interactions on heavy metal concentrations in plant organs. (1): degree of freedom; (\*): p < 0.05; (\*\*): p < 0.01; (ns): not significant.

Organ	Source	DF¹	Lead		Cadmium	
			Mean square	F	Mean square	F
Leaf	Heavy Metal (HM)	2	113.73	249.9**	0.19	117.78**
	Soil Amendments (SA)	6	51.52	113.2**	1.19	723.81**
	$HM \times SA$	12	1.39	30.59**	0.034	20.68**
Stem	Heavy Metal (HM)	2	79.20	521.33**	0.37	230.13**
	Soil Amendments (SA)	6	54.58	359.33**	0.34	207.19**
	$HM \times SA$	12	1.77	11.67**	0.023	14.21**
Root	Heavy Metal (HM)	2	415.44	942.48**	0.25	64.34**
	Soil Amendments (SA)	6	206.83	469.23**	0.90	226.54**
	$HM \times SA$	12	5.70	12.93**	0.022	5.44**

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**Tab. S4** - Results of two-way ANOVA for the effect of different levels of heavy metal levels, soil amendments and their interactions on heavy metal translocation factor. (1): degree of freedom; (\*): p < 0.05; (\*\*): p < 0.01; (ns): not significant.

TF	Source	$\mathbf{DF^1}$	Lead		Cadmium	
			Mean square	F	Mean square	F
TF of Leaf	Heavy Metal (HM)	2	0.055	833.34**	0.018	128.84**
	Soil Amendments (SA)	6	0.021	32.85**	0.114	795.49**
	$HM \times SA$	12	0.001	10.75**	0.002	13.31**
TF of Stem	Heavy Metal (HM)	2	0.018	66.50**	0.025	69.74**
	Soil Amendments (SA)	6	0.015	55.81**	0.008	22.81**
	$HM \times SA$	12	0.002	7.92**	0.003	8.21**