

# Supplementary Information

For

## Using fractionation profile of potentially toxic elements in soils to investigate their accumulation in *Tilia* sp. leaves in urban areas with different pollution levels

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**Table S2.** Individual values of element concentrations ( $\text{mg kg}^{-1}$  d.w.) in *Tilia* sp. leaves and urban soils (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites.

**Table S3.** Bioaccumulation factor (BAC) for PTEs in *Tilia* sp. at selected sampling sites (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites. Levels  $> 1$  are denoted in bold.

**Table S4.** Correlation matrix for selected PTEs concentrations in leaves and corresponding soil samples at selected sampling sites (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites.

**Table S5.** The results of PCA (Varimax normalized) for selected soil samples and *Tilia* sp.

**Table S1.** Individual pH and EC values in studied urban soils.

	<b>BP-1</b>	<b>BP-2</b>	<b>BP-3</b>	<b>BU-1</b>	<b>BU-2</b>	<b>BU-3</b>	<b>RP-1</b>	<b>RP-2</b>	<b>RP-3</b>	<b>RU-1</b>	<b>RU-2</b>	<b>RU-3</b>
<b>pH</b>	7.6	7.7	7.6	7.8	7.8	7.8	7.1	6.8	6.8	6.5	6.3	6.1
	7.8	7.8	7.7	7.8	7.9	8	7.3	7.2	6.9	6.8	6.7	6.6
	7.4	7.6	7.5	7.8	7.7	7.6	6.9	6.4	6.7	6.2	5.9	5.6
<b>EC</b>	0.186	0.111	0.208	0.168	0.246	0.183	0.579	0.541	0.605	0.265	0.226	0.23
	0.201	0.12	0.228	0.173	0.276	0.203	0.62	0.573	0.65	0.285	0.236	0.245
	0.171	0.102	0.188	0.163	0.216	0.163	0.538	0.509	0.56	0.245	0.216	0.215

**Table S2.** Individual values of element concentrations (mg kg<sup>-1</sup> d.w.) in *Tilia* sp. leaves and urban soils (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites.

Element/ Sampling point	BP-1	BP-2	BP-3	RP-1	RP-2	RP-3	BU-1	BU-2	BU-3	RU-1	RU-2	RU-3
<b>B leaf</b>	224.57	231.59	228.92	80.31	83.01	79.21	92.65	96.04	88.44	36.31	37.14	36.53
	224.82	231.67	229.27	81.45	81.58	77.94	94.24	94.68	87.24	37.25	36.89	36.34
	224.39	231.29	229.14	80.84	82.34	78.64	93.45	95.34	87.78	26.69	36.72	36.45
<b>B soil</b>	62.74	56.28	64.98	48.09	54.48	59.99	64.48	69.09	73.68	22.79	19.98	19.49
	63.28	56.74	65.52	48.52	54.04	60.58	65.25	69.76	74.38	23.04	20.24	19.72
	62.14	55.85	64.48	47.58	52.97	59.38	63.89	68.48	72.97	22.68	19.78	19.34
<b>Co soil</b>	8.09	7.49	8.45	8.19	8.48	9.04	9.44	10.01	10.14	1.58	1.79	1.48
	8.14	7.72	8.17	8.25	8.54	8.92	9.18	9.54	10.45	1.82	1.48	1.92
	7.97	7.64	8.34	8.34	8.65	8.89	9.31	9.81	10.29	1.74	1.64	1.74
<b>Cr soil</b>	23.47	21.37	23.47	7.37	10.02	7.87	30.08	33.58	38.44	4.69	5.58	5.14
	22.98	20.97	22.97	8.74	8.34	8.82	29.76	34.42	37.82	5.24	4.63	5.65
	23.24	21.18	23.34	7.98	9.17	9.74	29.87	33.96	38.08	5.74	5.08	4.52
<b>Cu leaf</b>	3.91	4.32	5.64	47.71	4.53	4.29	7.65	6.72	6.44	5.34	6.19	4.79
	4.09	4.14	4.19	5.14	4.04	3.68	6.25	7.25	6.34	6.05	6.21	4.91
	4.31	4.25	4.91	4.94	5.05	4.04	6.93	7.04	6.65	5.65	6.09	5.05
<b>Cu soil</b>	21.21	18.34	21.28	34.94	38.64	38.75	22.79	23.14	23.29	6.29	6.92	6.76
	20.78	17.76	20.72	35.49	39.28	39.58	23.35	23.52	23.74	5.37	8.28	6.25
	21.04	18.04	20.98	35.18	38.85	39.18	23.09	23.34	23.46	5.85	7.58	7.34
<b>Fe leaf</b>	187.15	200.09	183.49	39.37	37.47	36.19	232.98	192.48	233.56	34.17	42.17	33.74
	188.89	199.92	183.68	38.48	37.29	35.45	233.57	190.54	234.39	34.78	42.56	34.26
	179.98	200.28	183.45	38.97	37.79	35.76	233.26	191.49	235.27	34.48	42.88	33.99
<b>Fe soil</b>	27808.86	24093.54	28073.79	11982.04	14735.89	14812.02	25604.11	26837.28	28069.71	5875.34	5511.38	5548.68
	27832.14	24059.52	28051.09	11970.72	14741.74	14813.75	25578.12	26809.26	28041.39	5882.42	5540.39	5537.87
	27855.34	24076.48	28062.45	11796.34	14738.79	14815.62	25591.14	26823.34	28055.62	5878.89	5525.93	5527.08
<b>Mn leaf</b>	15.37	15.67	15.26	308.09	304.49	295.97	27.25	27.47	27.32	365.39	371.85	371.82
	15.25	15.85	15.07	302.28	311.08	298.58	27.84	28.27	26.69	370.19	365.67	368.97
	15.09	15.48	15.15	305.19	307.84	297.34	27.49	27.94	26.98	367.77	368.82	374.74
<b>Mn soil</b>	517.82	496.49	526.42	436.48	424.54	462.78	513.98	537.32	542.29	182.64	165.69	159.32

	505.24	507.54	535.08	429.89	426.68	459.79	521.82	532.11	550.42	178.78	162.58	157.37
	511.54	501.98	530.76	433.24	428.92	465.68	517.94	526.89	546.28	180.68	164.07	161.11
<b>Ni leaf</b>	<DL	<DL	<DL	1.19	1.11	0.89	<DL	<DL	<DL	0.49	0.55	1.01
	<DL	<DL	<DL	1.24	1.09	1.09	<DL	<DL	<DL	0.54	0.62	0.63
	<DL	<DL	<DL	1.20	1.24	1.31	<DL	<DL	<DL	0.65	0.60	0.14
<b>Ni soil</b>	29.21	26.44	28.68	13.87	15.98	15.72	46.97	62.09	76.96	2.22	2.65	2.92
	28.24	25.87	28.54	13.66	17.28	15.48	45.94	61.42	78.38	1.97	1.99	1.94
	30.25	25.36	28.63	14.04	16.58	15.64	46.38	62.84	77.67	2.54	2.33	0.97
<b>Pb soil</b>	9.54	11.58	7.94	138.94	138.44	146.97	25.21	27.64	29.68	17.74	17.18	19.25
	8.74	9.98	7.32	237.38	137.08	145.04	25.62	27.28	30.04	19.68	18.92	17.48
	7.96	10.82	8.59	140.32	135.94	149.00	25.38	27.92	29.87	18.74	18.09	18.34
<b>Sr leaf</b>	169.72	169.96	165.33	84.49	86.67	84.11	65.48	70.18	66.85	65.96	67.74	63.97
	161.98	168.44	161.28	85.99	87.92	82.22	67.31	69.63	68.52	65.73	68.78	64.58
	165.83	171.67	163.34	85.25	87.34	83.19	66.45	70.79	67.64	65.38	68.19	64.28
<b>Sr soil</b>	10.17	6.81	8.74	46.22	44.67	49.78	23.34	31.52	38.47	5.23	4.01	3.65
	9.28	8.04	9.53	37.34	44.38	50.62	23.19	31.07	39.44	4.74	3.74	3.07
	11.25	7.44	10.28	46.82	45.09	50.18	23.45	30.84	38.96	5.70	4.44	3.43
<b>Zn leaf</b>	5.22	3.38	2.87	6.38	5.84	4.68	2.74	1.97	1.58	7.48	6.26	8.58
	5.87	3.18	3.44	5.09	8.27	5.87	2.58	1.09	1.39	6.09	7.18	7.76
	5.49	2.99	3.25	5.77	6.34	5.28	2.45	1.62	1.54	6.85	8.01	9.34
<b>Zn soil</b>	69.82	34.08	39.68	129.56	147.48	134.42	52.82	50.84	49.62	25.68	23.98	23.58
	49.28	33.82	40.67	128.98	146.98	133.92	52.31	52.08	50.11	25.82	24.41	23.21
	48.85	34.52	40.25	129.34	148.12	134.11	53.33	51.54	50.64	26.00	24.25	23.44

**Table S3.** Bioaccumulation factor (BAC) for PTEs in *Tilia* sp. at selected sampling sites (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites. Levels > 1 are denoted in bold.

BAF	BP-1	BP-2	BP-3	BU-1	BU-2	BU-3	RP-1	RP-2	RP-3	RU-1	RU-2	RU-3
<b>B</b>	<b>3.582</b>	<b>4.115</b>	<b>3.524</b>	<b>1.447</b>	<b>1.380</b>	<b>1.191</b>	<b>1.681</b>	<b>1.539</b>	<b>1.309</b>	<b>1.608</b>	<b>1.841</b>	<b>1.869</b>
	<b>3.551</b>	<b>4.083</b>	<b>3.493</b>	<b>1.445</b>	<b>1.377</b>	<b>1.189</b>	<b>1.677</b>	<b>1.537</b>	<b>1.307</b>	<b>1.615</b>	<b>1.834</b>	<b>1.855</b>
	<b>3.614</b>	<b>4.147</b>	<b>3.555</b>	<b>1.450</b>	<b>1.383</b>	<b>1.194</b>	<b>1.686</b>	<b>1.540</b>	<b>1.312</b>	<b>1.601</b>	<b>1.848</b>	<b>1.883</b>
<b>Cu</b>	0.194	0.233	0.232	0.300	0.299	0.274	0.139	0.115	0.102	0.971	0.808	0.720
	0.202	0.237	0.195	0.325	0.305	0.276	0.145	0.127	0.109	0.954	0.754	0.677
	0.186	0.230	0.269	0.274	0.292	0.271	0.134	0.102	0.095	0.991	0.873	0.772
<b>Fe</b>	0.007	0.008	0.007	0.009	0.007	0.008	0.003	0.003	0.002	0.006	0.008	0.006
	0.007	0.008	0.007	0.009	0.007	0.008	0.003	0.003	0.002	0.006	0.008	0.006
	0.007	0.008	0.007	0.009	0.007	0.008	0.003	0.003	0.002	0.006	0.008	0.006
<b>Mn</b>	0.030	0.031	0.029	0.053	0.052	0.049	0.705	0.721	0.643	2.035	2.247	2.335
	0.030	0.031	0.028	0.053	0.053	0.050	0.706	0.725	0.641	2.027	2.244	2.326
	0.030	0.031	0.029	0.053	0.052	0.049	0.703	0.717	0.644	2.043	2.250	2.344
<b>Ni</b>	0	0	0	0	0	0	0.087	0.069	0.073	0.233	0.254	0.295
	0	0	0	0	0	0	0.086	0.067	0.085	0.232	0.239	0.349
	0	0	0	0	0	0	0.087	0.070	0.059	0.235	0.275	0.134
<b>Sr</b>	<b>16.243</b>	<b>22.977</b>	<b>17.209</b>	<b>2.853</b>	<b>2.256</b>	<b>1.737</b>	<b>1.822</b>	<b>1.953</b>	<b>1.657</b>	<b>12.655</b>	<b>16.842</b>	<b>19.200</b>
	<b>15.208</b>	<b>21.381</b>	<b>15.704</b>	<b>2.877</b>	<b>2.249</b>	<b>1.739</b>	<b>1.818</b>	<b>1.950</b>	<b>1.661</b>	<b>11.661</b>	<b>15.699</b>	<b>17.745</b>
	<b>17.490</b>	<b>24.870</b>	<b>18.983</b>	<b>2.828</b>	<b>2.263</b>	<b>1.734</b>	<b>1.827</b>	<b>1.955</b>	<b>1.653</b>	<b>13.847</b>	<b>18.188</b>	<b>20.931</b>
<b>Zn</b>	0.112	0.094	0.079	0.049	0.030	0.030	0.044	0.039	0.040	0.265	0.296	0.366
	0.119	0.100	0.071	0.051	0.039	0.031	0.049	0.043	0.044	0.290	0.330	0.396
	0.106	0.088	0.086	0.046	0.021	0.029	0.040	0.036	0.035	0.239	0.261	0.336

**Table S4.** Correlation matrix for selected PTEs concentrations in leaves and corresponding soil samples at selected sampling sites (i.e. polluted and unpolluted sites in Belgrade and Reading). BP and RP represent polluted, while BU and RU represent unpolluted sampling sites.

	BP	BU	RP	RU
<b>B</b>	-0.572	-0.671*	-0.578	0.286
<b>Cu</b>	0.198	0.271	-0.503	0.415
<b>Fe</b>	-0.975**	0.023	-0.824**	-0.475
<b>Mn</b>	-0.542	-0.244	-0.829**	-0.366
<b>Ni</b>	/	/	-0.181	0.906**
<b>Pb</b>	/	/	/	-0.009
<b>Sr</b>	-0.409	0.417	-0.864**	0.262
<b>Zn</b>	0.893**	0.881**	0.183	-0.558

\*p< 0.05; \*\*p<0.01

**Table S5.** The results of PCA (Varimax normalized) for selected soil samples and *Tilia* sp.

Element	Soil		Plant	
	PC1	PC2	PC1	PC2
<b>B</b>	0.940	0.316	-0.514	0.852
<b>Co</b>	0.858	0.508	/	/
<b>Cr</b>	0.963	-0.201	/	/
<b>Cu</b>	0.337	0.933	-0.506	-0.829
<b>Fe</b>	0.974	-0.056	-0.977	0.143
<b>Mn</b>	0.917	0.326	0.937	-0.318
<b>Ni</b>	0.922	-0.037	0.886	-0.110
<b>Pb</b>	-0.215	0.975	/	/
<b>Sr</b>	0.267	0.911	-0.282	0.946
<b>Zn</b>	-0.027	0.994	0.895	0.039
<b>Variance %</b>	<b>60.301</b>	<b>35.379</b>	<b>62.066</b>	<b>30.265</b>
<b>Cumulative %</b>	<b>60.301</b>	<b>95.680</b>	<b>62.066</b>	<b>92.331</b>