

Supplementary File

Leaves													Roots												
mg/g	Unpolluted	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution	Average	mg/g	Unpolluted	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution			
	reference	variance	2ml	variance	4ml	variance	10ml	variance	16ml	variance	20ml	variance	reference	variance	2 ml	variance	4 ml	variance	16 ml	variance	20 ml	variance			
Si	0.11	0.004	0.59	0.018	0.09	0.003	0.43	0.01	0.34	0.01	0.09	0.003	Si	0.11	0.005	0.08	0.002	0.12	0.003	0.13	0.003	0.60	0.02		
Al	0.36	0.01	0.63	0.02	0.41	0.01	1.12	0.04	0.55	0.02	1.02	0.03	Al	0.54	0.02	0.64	0.02	1.00	0.03	0.69	0.02	1.42	0.04		
Mg	7.54	0.23	8.95	0.27	9.49	0.28	9.92	0.30	8.79	0.26	8.35	0.25	Mg	6.77	0.20	9.55	0.29	7.37	0.24	8.32	0.25	8.20	0.25		
Ca	28.7	0.9	31.2	0.9	36.7	1.1	40.6	1.2	33.2	1.0	33.9	1.0	Ca	26.6	0.8	28.2	0.8	34.2	1.0	32.3	1.0	33.0	1.0		
Fe	0.46	0.01	0.72	0.02	0.56	0.02	1.34	0.04	0.75	0.02	1.53	0.05	Fe	0.59	0.02	1.01	0.03	1.09	0.03	0.84	0.03	1.56	0.05		
Mn	0.04	0.001	0.05	0.002	0.05	0.002	0.06	0.002	0.06	0.002	0.07	0.002	Mn	0.03	0.001	0.05	0.002	0.04	0.002	0.04	0.002	0.06	0.002		
Ti	26.7	0.80	172	5	32.7	1.0	171	5	121	4	70.0	2.0	Ti	0.42	0.01	1.02	0.03	1.00	0.03	0.91	0.03	5.00	0.15		
Na	6.42	0.20	6.27	0.19	12.2	0.4	9.03	0.27	8.59	0.26	4.87	0.15	Na	10.6	0.3	9.02	0.27	15.6	0.5	15.6	0.5	9.86	0.30		
K	74.3	2.2	76.5	2.3	89.8	2.7	92.8	2.9	78.5	2.4	59.2	1.8	K	70.4	2.1	80.9	2.4	96.4	2.9	84.4	2.5	95.2	2.9		
P	10.5	0.3	12.6	0.4	14.3	0.4	16.6	0.5	12.8	0.4	8.75	0.26	P	13.9	0.4	18.6	0.6	16.4	0.5	15.2	0.5	16.9	0.5		
Leaves													Roots												
µg/g	Unpolluted	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution	Average	µg/g	Unpolluted	Average	Pollution	Average	Pollution	Average	Pollution	Average	Pollution	Average		
	reference	variance	2ml	variance	4ml	variance	10ml	variance	16ml	variance	20ml	variance	reference	variance	2 ml	variance	4 ml	variance	16 ml	variance	20 ml	variance			
Cr	42.3	2.1	67.2	3.4	47.6	2.4	164	8	66.3	3.3	210	10	Cr	38.0	2.9	50.2	2.5	108	5	72.6	3.6	131	6		
Co	0.80	0.04	1.23	0.06	0.92	0.05	2.94	0.15	1.17	0.06	2.66	0.13	Co	1.12	0.06	1.56	0.08	1.93	0.10	1.44	0.07	2.67	0.14		
Ni	32.0	1.6	49.5	2.5	35.0	1.8	122	6	51.7	2.6	157	8	Ni	46.6	2.3	46.2	2.3	81.7	4.1	53.0	2.6	91.9	4.6		
Cu	9.42	0.47	9.07	0.43	7.86	0.39	17.4	0.9	9.93	0.50	13.0	0.7	Cu	7.99	0.40	16.2	0.8	9.73	0.49	9.14	0.46	11.8	0.6		
Zn	102	5	134	7	147	7	207	10	140	7	211	11	Zn	135	7	172	9	138	7	177	9	256	13		
As	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	As	0.20	0.01	0.36	0.02	0.45	0.02	nd	nd	0.68	0.4		
Rb	235	12	191	10	197	10	105	5	179	9	103	5	Rb	160	8	141	7	162	8	155	8	184	9		
Sr	129	6	155	8	193	10	193	9	130	6	137	7	Sr	169	8	184	9	203	10	197	10	206	10		
Zr	0.32	0.02	0.21	0.01	0.14	0.01	0.24	0.01	0.17	0.01	0.43	0.02	Zr	0.14	0.01	0.18	0.01	0.14	0.01	0.26	0.01	0.56	0.03		
Mo	34.3	1.7	69.6	3.5	39.3	2.0	50.7	2.5	26.2	1.3	60.6	3.0	Mo	44.3	2.2	90.7	4.5	34.9	1.7	28.6	1.4	69.9	3.5		
Cd	1.20	0.06	0.50	0.03	0.35	0.03	1.04	0.05	0.62	0.03	0.72	0.04	Cd	1.13	0.06	0.59	0.03	0.57	0.03	0.63	0.03	0.95	0.05		
Ba	15.6	1.8	21.7	1.1	25.3	1.3	30.9	1.5	18.4	0.9	27.1	1.4	Ba	30.3	1.5	29.6	1.5	39.7	2.0	35.3	1.8	68.7	3.4		
Pb	1.61	0.08	2.82	0.14	1.39	0.07	3.37	0.17	1.65	0.09	5.97	0.30	Pb	1.40	0.07	2.61	0.13	1.89	0.09	2.33	0.12	3.86	0.19		
Th	0.04	0.002	0.03	0.002	0.02	0.001	0.04	0.002	0.01	0.001	0.04	0.002	Th	0.03	0.002	0.04	0.002	0.03	0.002	0.03	0.002	0.07	0.004		
U	0.02	0.001	0.02	0.001	0.02	0.001	0.04	0.002	0.02	0.001	0.05	0.003	U	0.02	0.001	0.04	0.002	0.05	0.003	0.03	0.002	0.07	0.004		
Leaves													Roots												
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	reference	variance	2ml	variance	4ml	variance	10ml	variance	16ml	variance	20ml	variance	reference	variance	2 ml	variance	4 ml	variance	16 ml	variance	20 ml	variance			
La	74.9	7.5	108	11	94.5	9.5	197	20	87.2	8.7	120	12	La	94.5	9.5	182	18	173	17	118	12	307	31		
Ce	187	19	230	23	193	19	368	36	208	21	270	27	Ce	199	20	333	33	345	34	231	23	705	71		
Pr	18.6	1.9	28.5	2.85	23.4	2.3	44.3	4.4	24.4	2.4	38.8	3.9	Pr	23.6	2.4	39.0	3.9	41.1	4.1	29.0	2.9	71.3	7.1		
Nd	74.9	7.5	120	12	101	10	189	19	99.3	9.9	118	11	Nd	101	10	168	17	175	17	122	12	299	30		
Sm	19.8	2.0	27.5	2.7	23.6	2.4	42.1	4.2	21.5	2.2	30.0	3.0	Sm	24.4	2.5	36.9	3.7	38.2	3.8	27.4	2.7	64.8	6.4		
Eu	5.24	0.53	6.96	7.00	6.18	0.62	10.5	1.0	5.44	0.55	6.30	0.65	Eu	6.84	0.68	9.33	0.93	9.73	0.97	7.53	0.75	13.6	1.4		
Gd	19.3	1.9	25.0	2.5	25.8	2.6	44.7	4.5	24.2	2.42	24.2	2.7	Gd	25.4	2.5	40.0	4.0	39.1	3.9	29.6	3.0	60.2	6.0		
Tb	2.99	0.30	3.63	0.36	3.38	0.34	5.33	0.55	3.15	0.32	3.00	0.30	Tb	3.97	0.40	5.38	0.54	5.18	0.52	4.52	0.45	8.52	0.85		
Dy	15.2	1.52	21.0	2.1	19.7	1.97	32.6	3.25	20.1	2.0	20.4	2.0	Dy	18.8	2.0	30.6	1.1	34.9	3.5	23.5	2.35	49.8	5.0		
Ho	3.42	0.34	4.17	0.42	3.75	0.38	6.32	0.63	3.42	0.34	3.90	0.40	Ho	3.81	0.38	5.64	0.56	6.27	0.63	4.57	0.46	9.77	0.98		
Er	7.81	0.78	10.2	1.00	9.56	0.96	17.5	1.8	8.93	0.89	10.8	1.1	Er	10.2	1.0	15.6	1.56	16.1	1.6	13.2	1.32	25.8	2.58		
Tm	1.23	0.12	1.23	0.12	0.91	0.09	1.32	0.14	0.94	0.01	1.10	0.11	Tm	1.01	0.10	1.82	0.18	1.64	0.16	1.34	0.13	2.50	0.25		
Yb	6.42	0.64	8.33	0.82	6.55	0.66	14.3	1.5	8.05	0.81	9.00	0.90	Yb	7.17	0.72	12.0	1.20	12.7	1.27	10.8	1.1	20.5	2.1		
Lu	1.12	0.11	0.98	0.10	0.84	0.09	1.05	0.11	0.87	0.09	0.90	0.10	Lu	1.04	0.10	1.78	0.18	1.45	0.15	1.18	0.12	2.27	0.23		

Average variance outlines the average of 5 analyses completed on each set of data; nd stands for not determined

Table 1: Chemical composition of roots and leaves of *Raphanus sativus* from unpolluted soil and from soils contaminated with oil. The concentrations of major and trace elements are expressed in mg/g of dried plant, and those of REEs in 10-3 µg/g. All elements analyzed five times yield an average variance provided for each.

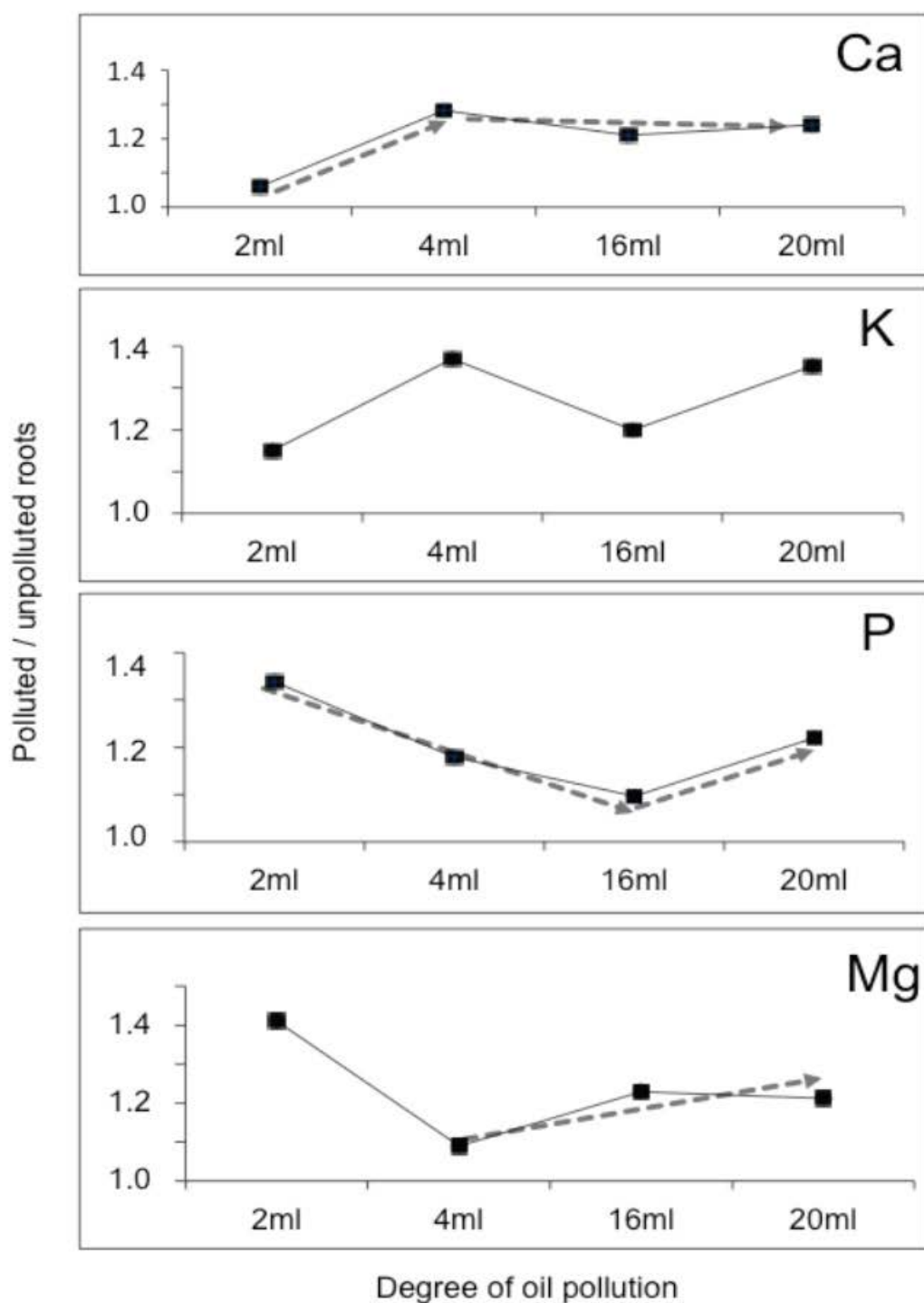


Figure 1: Ratios of some major-element concentrations in roots of *Raphanus sativus* from soils polluted by increasing crude oil pollution and the major-element concentrations in the roots of the same radishes grown in the equivalent unpolluted soil. Smaller than the size of the symbols, the relative errors are not included.

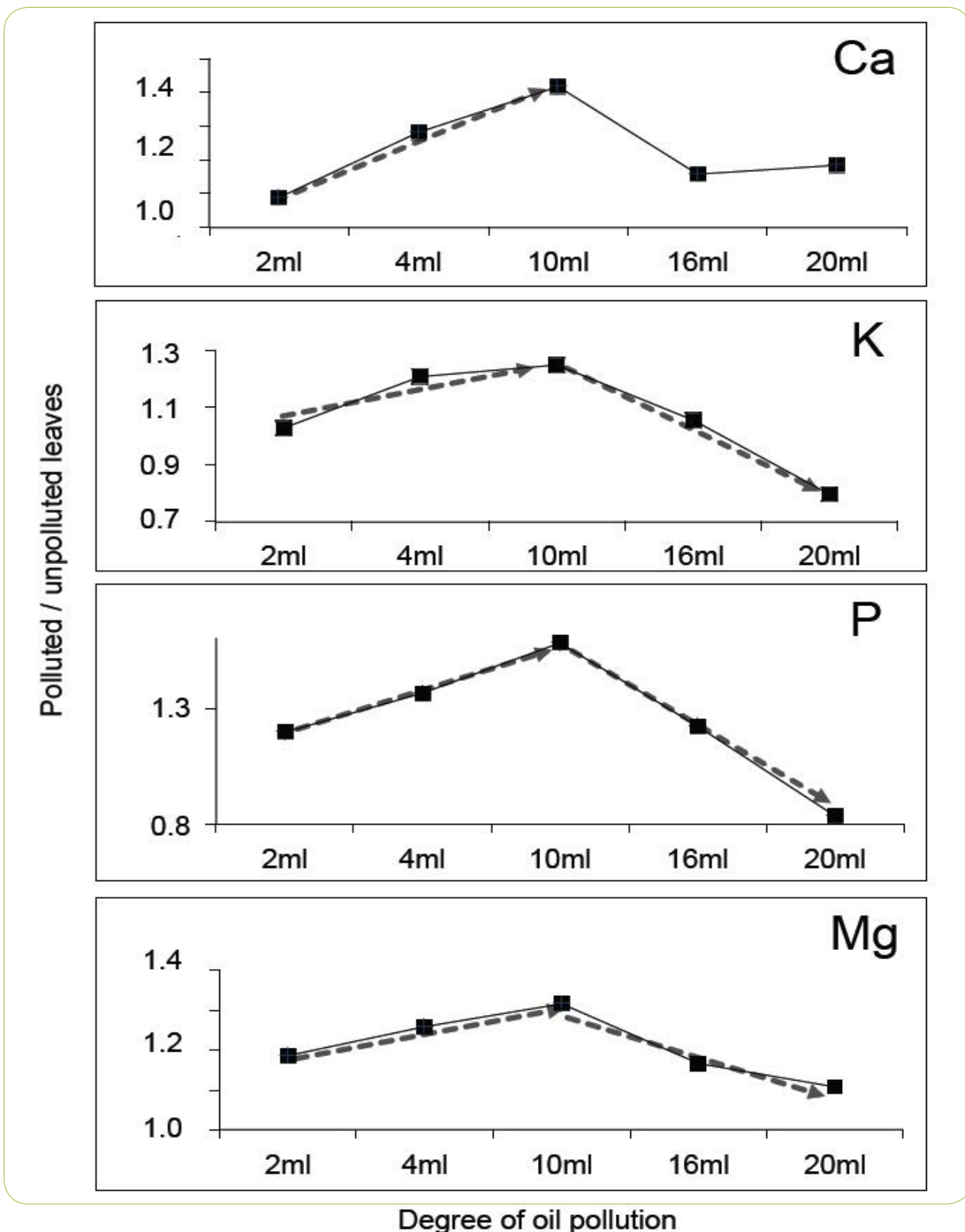


Figure 2: Ratios of some major-element concentrations in leaves of *Raphanus sativus* from soils polluted by increasing crude oil and the major-element concentrations in the leaves collected from the same radishes grown in the equivalent unpolluted soil. Smaller than the size of the symbols, the relative errors are not included.

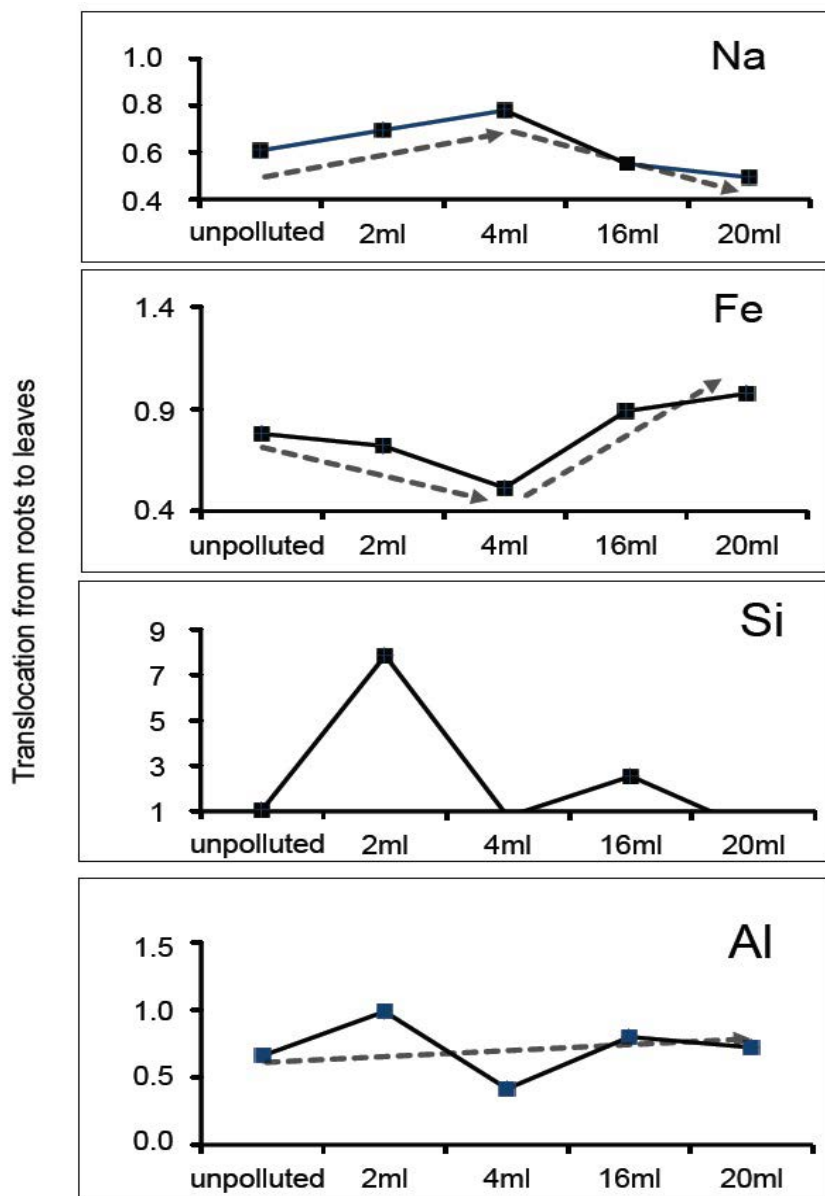


Figure 3: Translocation ratio of some major elements from roots to leaves of *Raphanus sativus* grown in the unpolluted soil and in progressively polluted soils. The relative errors are plotted in the diagrams when larger than the symbols.

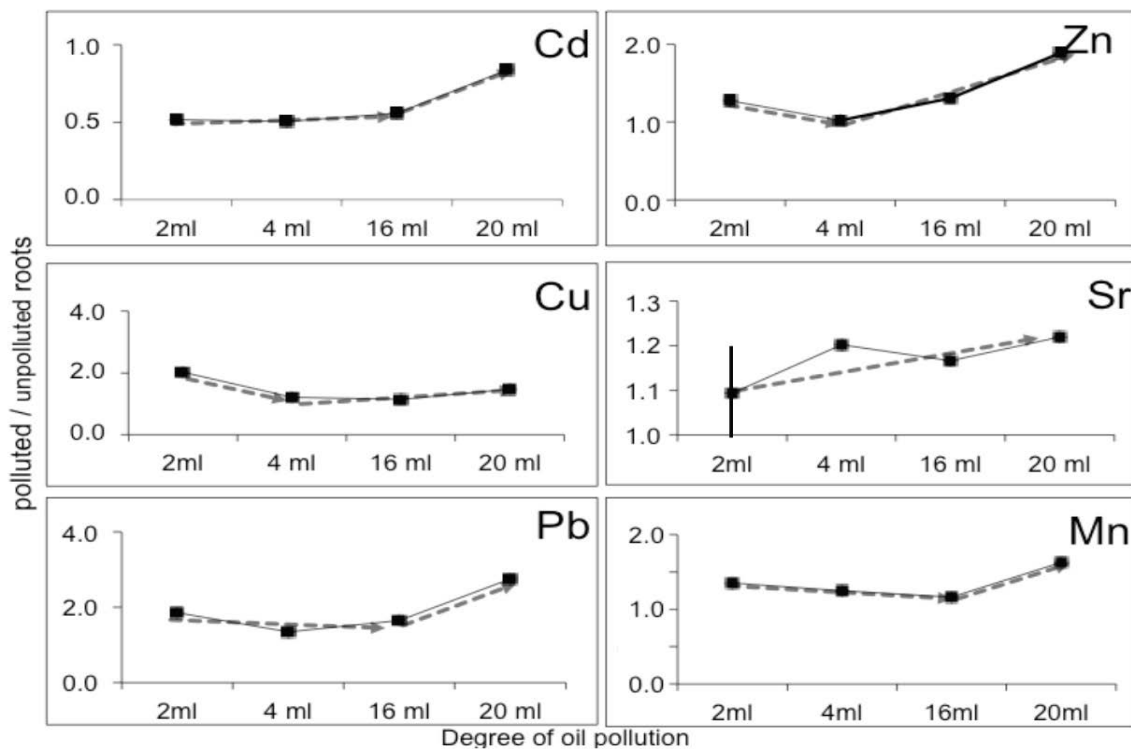


Figure 4: Ratios of some trace-element concentrations in roots of *Raphanus sativus* from polluted soils relative to increasing crude oil pollution and of the same trace-element concentrations in the radishes from unpolluted soils. The relative errors are plotted in the diagrams when larger than the symbols.

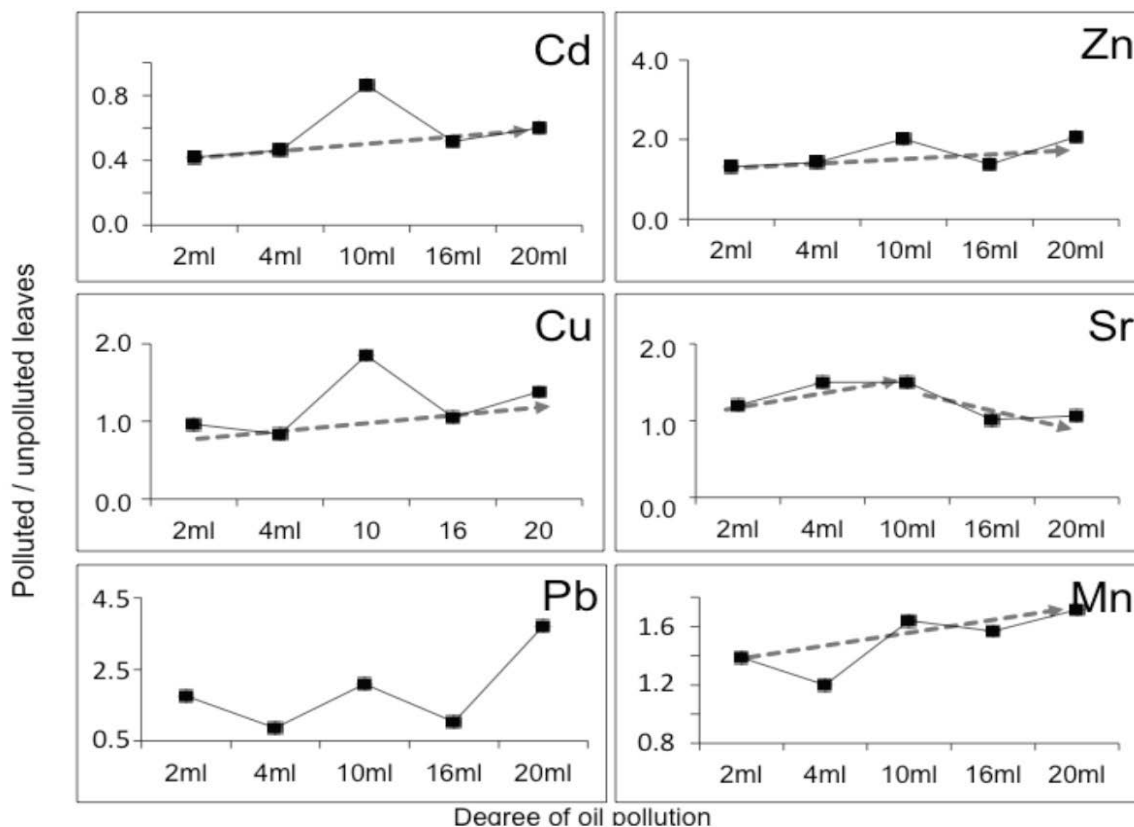


Figure 5: Ratios of some trace-element concentrations in leaves of *Raphanus sativus* from polluted soils relative to increasing crude oil pollution and of the same trace-element concentrations in the radishes from unpolluted soils. Smaller than the size of the symbols, the relative errors are not included.

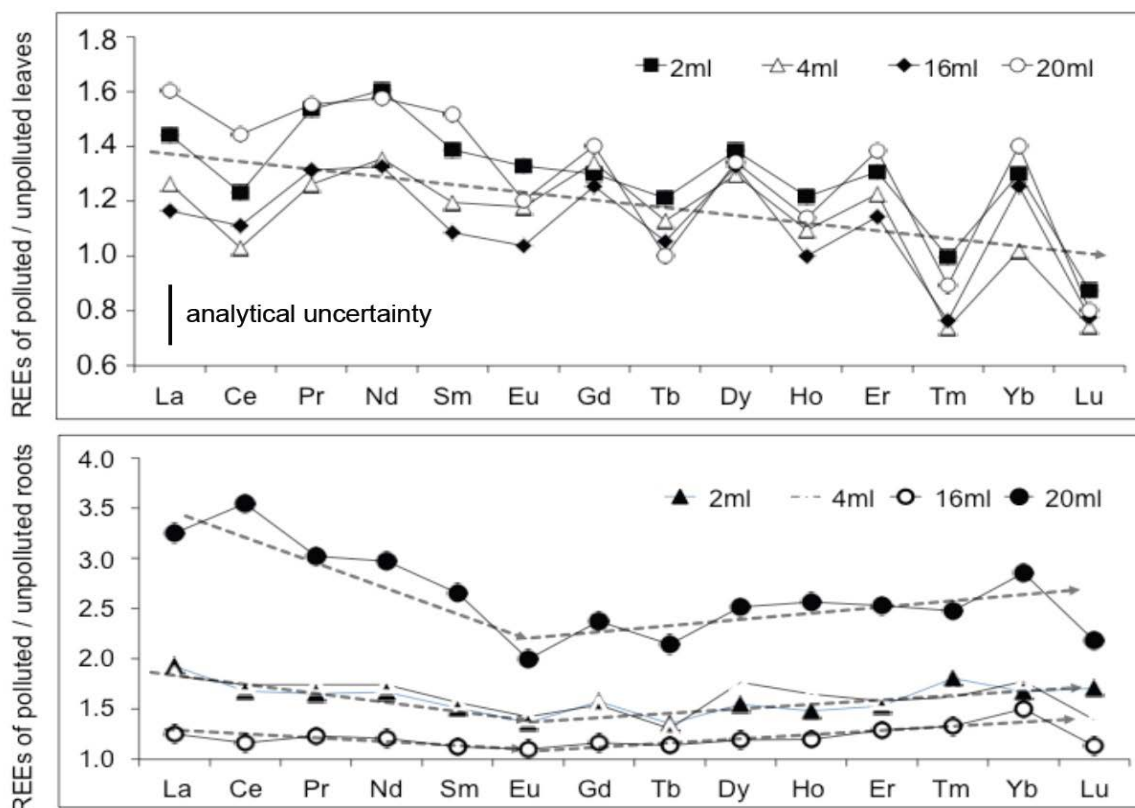


Figure 6: REE distribution patterns of leaves and roots of *Raphanus sativus* from polluted soils with crude oil normalized to the REE patterns in the corresponding leaves and roots of the same radishes of the unpolluted soil. The analytical uncertainty is drafted in the upper

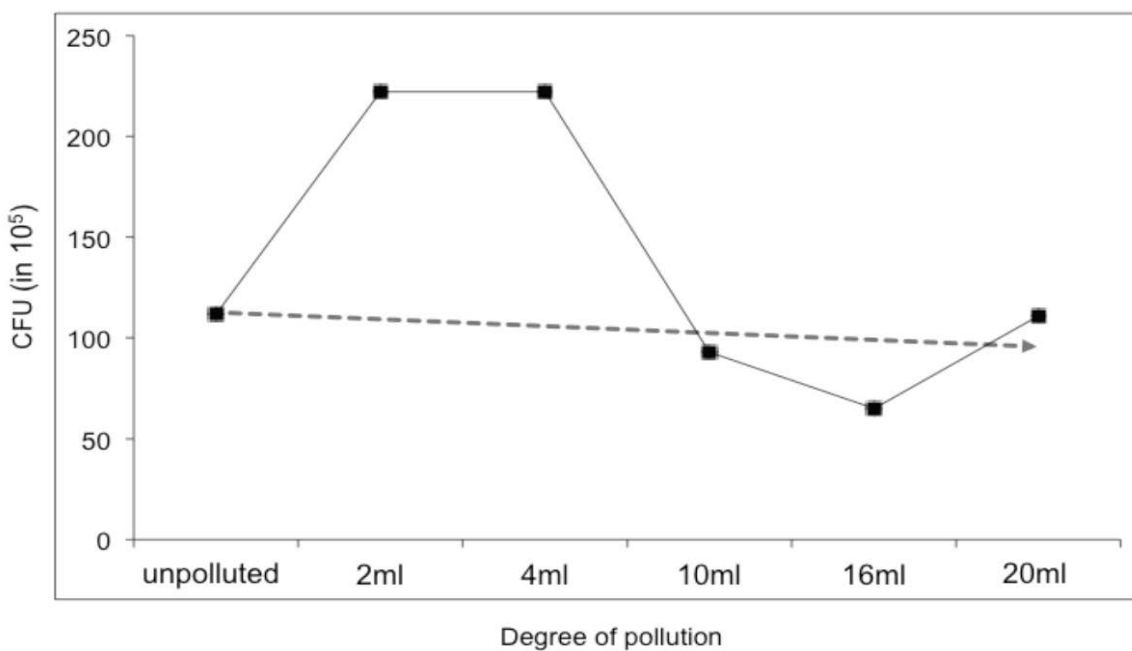


Figure 7: Total bacterial Colony Forming Unit (CFU) of the unpolluted and soils polluted progressively by crude oil.