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SUPPLEMENTARY INFORMATION

Determining the content of toxic elements (Pb, Cd, and As) in herbal plants collected from different sites in northern Vietnam

Table S1. Collected locations of analytical herbal plants in various provinces in Vietnam

Nr	Herbal plants	Samples	Location	
1	*Artemisia vulgaris* L.	AVL1	21°41'43.70"N	106° 4'26.59"E
2		AVL2	21° 7'13.65"N	106°34'37.08"E
3		AVL3	21° 6'21.44"N	106°35'40.25"E
4		AVL4	21° 6'25.11"N	106°35'4.22"E
5		AVL5	20°36'0.77"N	105°17'1.55"E
6		AVL6	22°27'16.57"N	105°44'33.02"E
7		AVL7	21°26'11.61"N	105°54'13.16"E
8		AVL8	21°56'6.71"N	105°48'1.09"E
9		AVL9	21°28'37.77"N	105°53'38.18"E
10		AVL10	21°11'12.77"N	106° 0'58.60"E
11		AVL11	21°12'18.51"N	106° 2'7.94"E
12		AVL12	21°36'20.67"N	105°48'48.52"E
13	*Plantago asiatica* L.	PAL1	21°41'18.58"N	106° 4'51.75"E
14		PAL2	21°35'47.60"N	105°49'45.51"E
15		PAL3	21°26'50.67"N	106° 2'4.66"E
16		PAL4	20°42'12.10"N	106°29'43.71"E
17		PAL5	20°49'5.60"N	106°34'20.81"E
18		PAL6	20°39'21.87"N	106°26'1.64"E
19		PAL7	21° 0'20.04"N	106°33'1.12"E
20		PAL8	20° 8'23.45"N	106° 2'37.05"E
21	*Wedelia chinensis* (Osbeck) Merr	WCM1	21°12'13.14"N	106° 0'9.13"E
22		WCM2	21°12'7.82"N	105°58'32.38"E
23		WCM3	21°11'42.28"N	105°59'38.89"E
24		WCM4	21°12'36.07"N	106° 1'2.35"E
25		WCM5	21°12'47.91"N	106° 1'2.64"E
26		WCM6	21°12'8.84"N	105°57'49.51"E
27		WCM7	21°33'46.07"N	105°49'42.47"E
28		WCM8	21°40'36.96"N	105°50'51.46"E
29		WCM9	21°41'46.73"N	106° 4'20.92"E
30		WCM10	21°36'25.76"N	105°49'33.18"E
31		WCM11	21°26'55.51"N	106° 2'2.26"E
32		WCM12	21° 7'10.59"N	106°34'36.14"E
33		WCM13	21° 6'20.64"N	106°35'40.25"E
34		WCM14	21° 6'26.13"N	106°35'4.22"E
35		WCM15	21°56'5.73"N	105°47'59.81"E
36	*Eleusine indica* L.	EI1	21°09'29.9"N	106°07'49.1"E
37		EI2	21°11'58.6"N	105°59'03.8"E
38		EI3	21°02'52.3"N	106°03'30.1"E
39		EI4	21°02'14.5"N	106°03'30.5"E
40		EI5	21°03'34.5"N	106°06'19.2"E
41		EI6	21°03'49.7"N	106°05'12.5"E
42		EI7	20°49'22.4"N	106°33'32.7"E
43		EI8	20°50'24.0"N	106°44'19.0"E
44		EI9	20°48'45.7"N	106°45'09.5"E
45		EI10	20°51'39.3"N	106°43'02.2"E
46		EI11	20°51'23.1"N	106°42'25.7"E
47		EI12	21°37'43.10"N	105°53'58.18"E
48		EI13	21°41'18.58"N	106° 4'51.75"E

Nr	Herbal plants	Samples		Location
49		EI14	21°35'47.60"N	105°49'45.51"E
50		EI15	21°26'50.67"N	106° 2'4.66"E
51	*Phyllanthus urinaria* L.	PUL1	21°11'43.93"N	105°59'33.30"E
52		PUL2	21°12'4.75"N	106° 0'30.68"E
53		PUL3	20°42'12.10"N	106°29'43.71"E
54		PUL4	20°49'5.60"N	106°34'20.81"E
55		PUL5	20°39'21.87"N	106°26'1.64"E
56		PUL6	21° 0'20.04"N	106°33'1.12"E
57		PUL7	20° 8'23.45"N	106° 2'37.05"E
58		PUL8	21°37'43.10"N	105°53'58.18"E

Table S2. The operating parameters of ICP-MS Agilent 7900 for detecting Pb, Cd, As in herbal samples

Operating conditions of ICP-MS Agilent 7900	
High-Frequency Power (w)	~1600
Sampling depth (mm)	~10
Carrier gas flow rate (L/min)	~0,7
Auxiliary gas flow rate (L/min)	~0,3
Peristaltic nebulizer (concentric glass)	MicroMist
Spray chamber temperature (°C)	2
Helium gas flow rate (mL/min)	~4,3
Hydrogen gas flow rate (mL/min)	~4,2
Peristaltic pump speed	0,1 (0,5 mL/min)
Internal standard	^{115}In
Isotopes	^{208}Pb, ^{111}Cd, ^{75}As

Table S3: Concentration of Pb, Cd, As in the five investigated herbal plants determined by ICP_MS

Samples	Pb		Cd		As	
	Mean	SD	Mean	SD	Mean	SD
AVL1	1.354	0.142	0.324	0.021	0.336	0.024
AVL2	0.613	0.091	0.183	0.068	0.361	0.032
AVL3	0.870	0.102	0.068	0.065	0.381	0.050
AVL4	0.247	0.021	0.105	0.031	0.378	0.021
AVL5	0.509	0.081	0.108	0.011	0.435	0.023
AVL6	0.977	0.092	0.205	0.040	0.149	0.028
AVL7	2.924	0.059	0.209	0.021	0.463	0.031
AVL8	3.294	0.081	0.171	0.023	0.309	0.045
AVL9	2.872	0.085	0.244	0.011	0.180	0.032
AVL10	1.390	0.071	0.106	0.032	0.199	0.021
AVL11	1.621	0.102	0.389	0.021	0.498	0.012
AVL12	1.021	0.110	0.234	0.041	0.421	0.019
Min	0.247		0.068		0.149	
Max	3.294		0.389		0.498	
Mean	1.474		0.196		0.343	
SD	1.018		0.095		0.114	
PAL1	6.181	1.041	0.063	0.012	1.522	0.109
PAL2	8.312	0.024	0.078	0.005	1.255	0.005
PAL3	4.996	0.316	0.117	0.001	1.802	0.018
PAL4	8.583	0.127	0.191	0.006	2.119	0.017
PAL5	4.087	0.042	< LOD	-	1.819	0.029
PAL6	5.532	0.010	< LOD	-	1.573	0.016
PAL7	4.931	0.036	< LOD	-	1.514	0.022
PAL8	4.686	0.060	< LOD	-	1.418	0.013
Min	4.087		< LOD		1.255	
Max	8.583		0.191		2.119	
Mean	5.913		0.112		1.628	

SD	1.679		0.057		0.272	
WCM1	0.580	0.142	0.161	0.021	nd	
WCM2	0.890	0.091	0.139	0.068	nd	
WCM3	0.762	0.102	0.188	0.065	nd	
WCM4	0.481	0.210	0.178	0.031	nd	
WCM5	0.519	0.081	0.171	0.011	nd	
WCM6	0.680	0.092	0.206	0.040	nd	
WCM7	1.116	0.059	0.209	0.021	nd	
WCM8	1.426	0.081	0.270	0.023	nd	
WCM9	1.081	0.085	0.303	0.011	nd	
WCM10	0.780	0.071	0.211	0.032	nd	
WCM11	1.290	0.102	0.125	0.021	nd	
WCM12	1.102	0.110	0.242	0.041	nd	
WCM13	1.126	0.058	0.241	0.021	nd	
WCM14	1.628	0.094	0.297	0.025	nd	
WCM15	1.191	0.098	0.340	0.053	nd	
Min	0.481		0.125			
Max	1.628		0.340			
Mean	0.977		0.219			
SD	0.341		0.063			
EI1	1.390	0.068	0.032	0.012	0.162	0.030
EI2	0.670	0.052	0.035	0.009	0.165	0.019
EI3	0.720	0.045	0.062	0.010	0.249	0.031
EI4	1.120	0.125	0.024	0.008	0.103	0.013
EI5	0.550	0.230	0.024	0.002	0.283	0.025
EI6	0.440	0.041	0.016	0.006	0.280	0.021
EI7	1.170	0.049	0.057	0.008	0.199	0.020
EI8	1.050	0.093	0.040	0.005	0.267	0.013
EI9	1.430	0.074	0.053	0.004	0.088	0.003
EI10	0.520	0.053	0.030	0.005	0.199	0.013
EI11	0.690	0.049	0.036	0.007	0.179	0.021
ẸI12	1.210	0.154	0.042	0.001	0.144	0.013
EI13	0.550	0.052	0.041	0.002	0.262	0.014
EI14	0.465	0.038	0.036	0.004	0.040	0.005
EI15	0.471	0.021	0.078	0.006	0.113	0.020
Min	0.440		0.016		0.040	
Max	1.430		0.078		0.283	
Mean	0.830		0.040		0.182	
SD	0.358		0.016		0.076	
PUL1	32.080	1.689	0.501	0.010	0.247	0.030
PUL2	17.433	0.336	0.470	0.010	0.321	0.019
PUL3	8.965	0.122	1.099	0.015	0.503	0.031
PUL4	10.833	0.142	1.014	0.013	0.021	0.013
PUL5	12.358	0.550	0.249	0.008	0.231	0.025
PUL6	7.153	0.102	0.236	0.077	0.277	0.021
PUL7	8.499	0.059	0.166	0.008	0.312	0.020
PUL8	9.818	0.104	0.167	0.004	0.450	0.013
Min	7.153		0.166		0.021	
Max	32.080		1.099		0.503	
Mean	13.392		0.488		0.295	
SD	8.180		0.374		0.146	

nd: not detected; unit: mg kg^{-1}; n = 3.

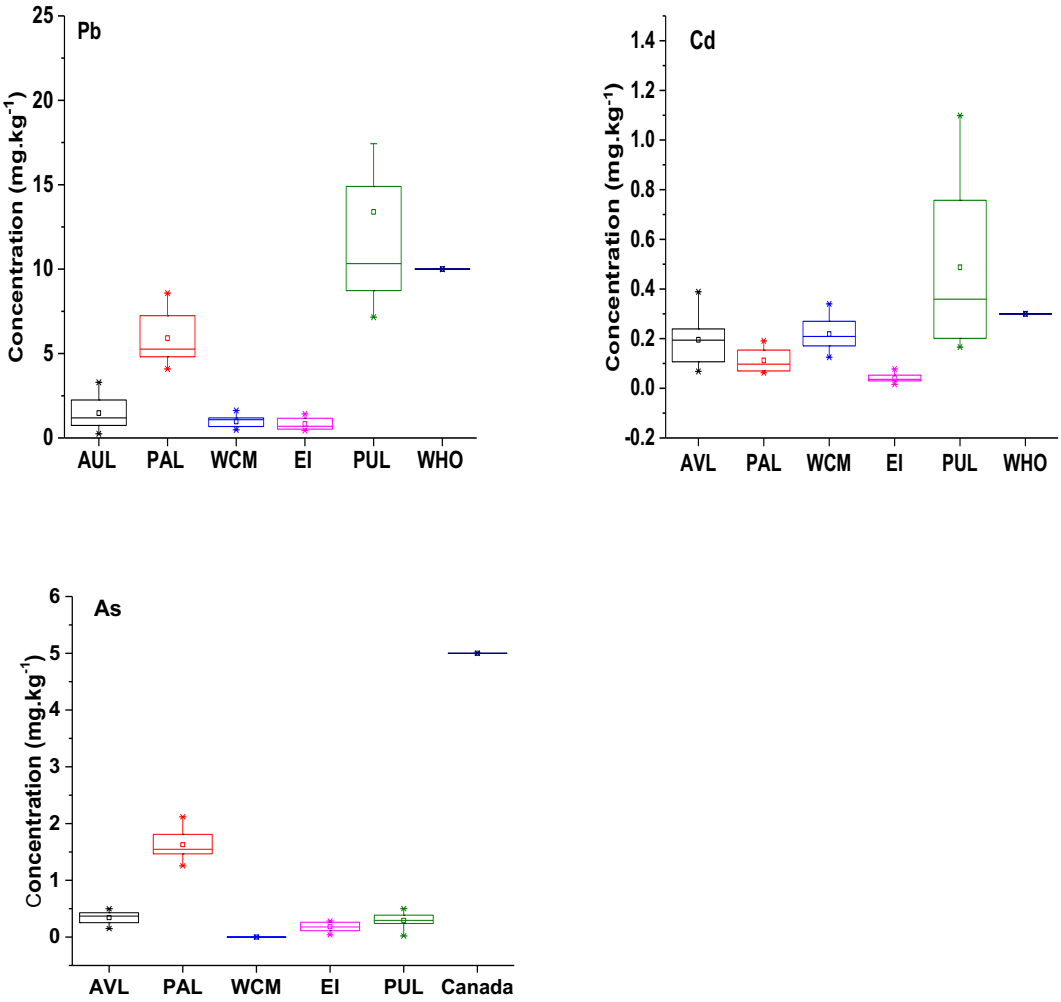

Figure S1. The concentration of Pb, Cd, As in the five selected plants in comparison with the permissible limit set by WHO and Canada (AIL: *Artemisia vulgaris* L.; PAL: *Plantago Asiatica* L.; WCM: *Wedelia Chinensis (Osbeck) Merr;* EI: *Eleusine indica* L.*;* PUL: *Phyllanthus Urinaria* L.; WHO: the limit standard set by the World Health Organization; Canada: national standard of Canada)