## NUMERICAL DATA

### Assessment of Metalloid and Metal Contamination in Soils from Hainan, China.(2018)

**Table: 1 Statistics of studied elements (mg•kg$^{-1}$) in soils (0–20 cm) of Hainan Island**

| | As | Cd[a] | Cr | Cu | Hg[a] | Ni | Pb | Se | Zn |
|---|---|---|---|---|---|---|---|---|---|
| **N** | 8713 | 8713 | 8713 | 8713 | 8713 | 8713 | 8713 | 8713 | 8713 |
| **Minimum** | 0.01 | 2 | 0.1 | 0.25 | 1 | 0.1 | 1 | 0.02 | 2 |
| **Maximum** | 988.04 | 3064 | 860.3 | 192.9 | 3540 | 327.1 | 619.6 | 4.68 | 800 |
| **Geometrical mean** | 2.17 | 60.19 | 26.50 | 9.43 | 33.34 | 8.74 | 22.20 | 0.26 | 39.64 |
| **Variation coefficient** | 4.05 | 1.16 | 1.58 | 1.35 | 1.77 | 1.91 | 0.67 | 0.88 | 0.74 |
| **Std. Deviation** | 21.42 | 93.61 | 96.32 | 23.34 | 75.20 | 48.18 | 17.51 | 0.30 | 37.91 |
| **Skewness** | 24.91 | 10.52 | 2.65 | 2.35 | 29.30 | 2.74 | 7.79 | 3.39 | 2.51 |
| **Kurtosis** | 858.68 | 219.08 | 7.09 | 4.97 | 1127.52 | 6.93 | 191.20 | 22.67 | 22.31 |
| **China BK[b]** | 9.20 | 74.00 | 53.90 | 20.00 | 40.00 | 23.40 | 23.60 | 0.22 | 67.70 |
| **Threshold of the first grate[c]** | 15 | 200 | 90 | 35 | 150 | 40 | 35 | | 100 |
| **Canadian soil quality guidelines[d]** | 12 | 10000 | 64 | 63 | 6600 | 45 | 140 | 1 | 200 |
| **Target value of Dutch soil guidelines[e]** | 29 | 800 | 100 | 36 | 300 | 35 | 85 | | 140 |

[a] µg.kg$^{-1}$; [b]Background values of Chinese soils, A layer (0–20 cm), more than 4000 samples; [c]Class I value of the Environmental Quality Standard for Soils in China; [d] Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (Residential); [e] Values for soil remediation proposed by Dutch Ministry of Housing, Spatial Planning and Environment.

**Source:** https://www.mdpi.com/1660-4601/15/3/454

# Heavy Metals bio-adsorption by *Hibiscus Sabdariffa* l. from contaminated water.(2018)

| Mean Cd content (mg/L) | Time of contact | | | | | |
|---|---|---|---|---|---|---|
| | 1 min | 5 min | 10 min | 15 min | 30 min | 40 min |
| sepal + 1 % black tea residue | | | | | | |
| 0.2 % bio-adsorbent H. sabdariffa L. | 48.04 [a] | 42.338 [b] | 33.217 [c] | 32.574 [c] | 32.111 [c] | 26.788 [d] |
| sepal + 2 % black tea residue | | | | | | |
| 0.3 % bio-adsorbent H. sabdariffa L. | 47.03 [a] | 38.195 [b] | 32.067 [c] | 28.974 [c] | 26.571 [c] | 17.454 [d] |
| sepal + 3 % black tea residue | | | | | | |
| 0.5 % bio-adsorbent H. sabdariffa L. | 44.12 [a] | 34.187 [b] | 30.107 [c] | 27.651 [c] | 14.092 [d] | 8.732 [d] |
| sepal + 3 % black tea residue | | | | | | |
| untreated contaminated Effluent | 50.032 [a] | 50.021 [a] | 49.868 [a] | 49.866 [a] | 49.964 [a] | 49.866 [a] |
| Mean Co content (mg/L) | 1 min | 5 min | 10 min | 15 min | 30 min | 40 min |
| 0.1 % bio-adsorbent H. sabdariffa L. | 103.42 [a] | 97.106 [a] | 95.602 [a] | 93.116 [a] | 93.217 [a] | 91.181 [b] |
| sepal + 1 % black tea residue | | | | | | |
| 0.2 % bio-adsorbent H. sabdariffa L. | 100.88 [a] | 98.419 [a] | 94.333 [a] | 91.018 [b] | 89.806 [b] | 88.112 [b] |
| sepal + 2 % black tea residue | | | | | | |
| 0.3 % bio-adsorbent H. sabdariffa L. | 100.01 [a] | 90.154 [b] | 89.094 [b] | 86.731 [b] | 80.556 [c] | 78.667 [c] |
| sepal + 3 % black tea residue | | | | | | |
| 0.5 % bio-adsorbent H. sabdariffa L. | 98.65 [a] | 87.28 [b] | 86.564 [b] | 83.211 [b] | 78.444 [c] | 70.193 [c] |
| sepal + 3 % black tea residue | | | | | | |
| untreated contaminated Effluent | 110.21 [a] | 110.45 [a] | 109.89 [a] | 109.88 [a] | 110.23 [a] | 110.35 [a] |
| Mean Ni content (mg/L) | 1 min | 5 min | 10 min | 15 min | 30 min | 40 min |
| 0.1 % bio-adsorbent H. sabdariffa L. | 106.52 [a] | 100.03 [a] | 95.556 [b] | 93.213 [b] | 90.617 [b] | 82.187 [c] |
| sepal + 1 % black tea residue | | | | | | |
| 0.2 % bio-adsorbent H. sabdariffa L. | 102.89 [a] | 97.632 [a] | 92.206 [b] | 90.111 [b] | 85.345 [c] | 78.432 [d] |
| sepal + 2 % black tea residue | | | | | | |
| 0.3 % bio-adsorbent H. sabdariffa L. | 95.498 [a] | 91.222 [b] | 89.704 [b] | 84.532 [c] | 80.556 [c] | 76.562 [d] |
| sepal + 3 % black tea residue | | | | | | |
| 0.5 % bio-adsorbent H. sabdariffa L. | 90.478 [b] | 80.778 [c] | 74.306 [d] | 68.092 [d] | 60.232 [d] | 50.32 [f] |
| sepal + 3 % black tea residue | | | | | | |
| untreated contaminated Effluent | 110.15 [a] | 111.9 [a] | 110.16 [a] | 110.87 [a] | 110.34 [a] | 110.28 [a] |

Mean value ±SD of Cadmium, Cobalt and Nickel contents (mg /L) after addition of different percentages of H. sabdariffa L. sepal and black tea residue

**Source:** http://repositsc.nuczu.edu.ua/bitstream/123456789/6848/1/22-32-Parisa%20Ziarati.pdf

**Foliar heavy metal uptake, toxicity and detoxification in plants: A comparison of foliar and root metal uptake.(2017)**

**Table 1: Heavy metal levels in air reported in different countries**

| **Country** | **Poland** | **Pakistan** | **Spain** | **Algeria** | **Iran** | **India** | **UK** | **Nigeria** |
|---|---|---|---|---|---|---|---|---|
| Metal | Concentration in air (ng/$m^3$ ) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) | Concentration in air (ng/$m^3$) |
| Pb | 23.6 | 16.24 | 9.24 | 299 | 120.92 | - | 10.22 | 0.832 |
| | | | | | | | | |
| Cd | 0.806 | 31.66 | 0.25 | 21.2 | 0.33 | 0.02 | 0.2 | - |
| | | | | | | | | |
| Zn | 66.5 | 0.85 | 354 | - | 164.58 | 7.13 | - | 1.712 |
| | | | | | | | | |
| Ni | 2.15 | 65.78 | 3.38 | 42.4 | 5.33 | 0.29 | 1.74 | 0.478 |
| | | | | | | | | |
| As | 0.534 | - | 0.55 | - | 7.77 | - | 0.91 | - |
| | | | | | | | | |
| Fe | - | - | | 639.8 | 652.41 | 20.81 | - | 1.081 |
| | | | | | | | | |
| Co | 0.271 | 12.69 | | 37.7 | 5.13 | | - | - |
| | | | | | | | | |
| Al | 0.058 | 3.01 | - | - | 241.51 | 13.89 | - | - |
| | | | | | | | | |

**Source:** https://doi.org/10.1016/j.jhazmat.2016.11.063

**Table 2: Foliar heavy metal uptake by vegetables and associated health risks near industrial areas**

| Metal | | Vegetable | Concentration in atmospheric fallouts (mg $cm^{-2}$) | Concentration in plant shoot (mg /kg) | Concentration in grains | GEF | DIM (mg kg/ day) | HRI |
|---|---|---|---|---|---|---|---|---|
| Cd | | Spinach | | 317.3 | - | 396.6 | 0.127 | 25.493 |
| Cd | | Rice | | 30.1 | 2 | 0.1 | 0.012 | 2.418 |
| Cd | | Lettuce | 0.9 | 1.7 | | 1.9 | 0.001 | 0.137 |
| Pb | | Lettuce | | 335 | | 300.1 | 0.135 | 26.915 |
| Pb | | Lettuce | | 171.5 | | 248.7 | 0.069 | 13.779 |
| Pb | | Lettuce | 456.2 | 122 | | 0.3 | 0.049 | 9.802 |
| Pb | | Spinach | | 485 | - | 79.5 | 0.195 | 38.966 |
| Zn | | Lettuce | 6.9 | 29.1 | | 4.2 | 0.012 | 2.338 |
| Zn | | Wheat | | 31.68 | 43.61 | 1.4 | 0.013 | 2.545 |
| Zn | | Spinach | | 144.2 | - | 5.7 | 0.058 | 11.585 |
| Zn | | Wheat | | 86.8 | 43.4 | 0.5 | 0.035 | 6.974 |
| Sb | | Lettuce | 1.9 | 1.4 | | 0.7 | 0.001 | 0.112 |
| Sb | | Spinach | | 276.3 | - | 50.2 | 0.111 | 22.199 |
| Ni | | Birch | 58.2 | 4.8 | | 0.1 | 0.002 | 0.386 |
| Cu | | Ryegrass | 1.7 | 7 | | 4.1 | 0.003 | 0.562 |
| As | | Lettuce | 0.2 | 1.1 | | 5.5 | 0 | 0.088 |

GEF; Global Enrichment Factor, DIM; Daily Intake of Metals, HRI; Health Risk Index

**Source:** https://sci-hub.tw/10.1016/j.jhazmat.2016.11.063

## Field accumulation risks of heavy metals in soil and vegetable crop irrigated with sewage water in western region of Saudi Arabia (2016)

**Table 1: Daily intakes of metals (DIM) (mg kg$^{-1}$ person$^{-1}$ d$^{-1}$) and the Health Risk Index (HRI) for individual heavy metals in food crops irrigated with sewage water**

| **Metals** | **Translocation factor AF[a]** | **Risk assessment index** | | | **RDA[b] (mg day $^{1}$)** | **RfD[c] (mg kg $^{1}$ day $^{1}$)** |
|---|---|---|---|---|---|---|
| | | DIM | HRI | THQ | | |
| **Cu** | 0.0122–0.0246 | 3.30E-03 | 2.20 E-03 | 0.873 | 6.0–9.0 | 0.2 |
| **Ni** | 0.1265–0.1489 | 3.20E-03 | 1.62 E-01 | 0.902 | 2.0–8.0 | 0.4 |
| **Mn** | 1.0777–1.0964 | 4.06E-02 | 2.90 E-01 | 1.164 | 1.8–2.3 | 0.14 |
| **Pb** | 1.0124–1.0429 | 2.85E-02 | 8.14 E-00 | 1.803 | 2.0–6.5 | 0.6 |
| **Cd** | 0.0991–0.1820 | 1.70E-03 | 1.67 E-00 | 2.904 | 1.8–6-8 | 0.5 |
| **Zn** | 1.1422–1.1622 | 4.00E-04 | 3.00 E-04 | 0.065 | 8.0–11.0 | 0.3 |
| **Fe** | 0.6162–0.8354 | 1.90E-03 | 9.68 E-02 | 0.442 | 8.0–18.0 | 0.8 |
| **Cr** | 1.6730–1.8240 | 2.28E-02 | 1.63 E-01 | 2.279 | 5.0–9-0 | 0.3 |

The accumulation factors of the metals in the consumed parts of the plants were less than the values obtained for Fe and Cr. Chromium, with AF values in the range of 1.6730–1.8240, was the most accumulated. Thus, the bio-concentration factor (BCF) values of metals in the food crops showed a trend in the order of Cr > Zn > Ni > Cd > Mn > Pb > Cu ≈ Fe. The best accumulators for Cr are okra plants that preferentially concentrate metals in their leaves, the consumable part of the plant.

**Source:** https://www.sciencedirect.com/science/article/pii/S1319562X15002181