
Risk Assessment and Spatial Distribution of Heavy Metals with an Emphasis on Antimony (Sb) in Urban Soil in Bojnourd, Iran

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Supplementary Material

Table S1 Values of factors used in the risk assessment formulae.

Factors (units)	Value		References
	Adult	Children	
IngR (mg day ⁻¹)	100	200	(USEPA, 2011)
EF (days yr ⁻¹)	350	350	(RAIS, 2017; US EPA, 2002)
ED (yrs)	30	6	(US EPA, 2002)
BW (kg)	70	15	(US EPA, 2002; USEPA, 2001)
AT (days)	10 950	2190	(Man et al., 2010; US EPA, 2002)
SA (cm ²)	5700	2800	(US EPA, 2002)
AF (mg cm ⁻²)	0.07	0.2	(RAIS, 2017; US EPA, 2002)
InhR (m ³ /day)	20	7.6	(USEPA, 1989)
CF (kg·mg ⁻¹)	10 ⁻⁶		(USEPA, 1989, 1997)
ABS	ABS = 0.03 for As; ABS = 0.001 for other HMs		(RAIS, 2017; RSL, 2017)
PEF (m ³ /kg)	1.36 × 10 ⁹		(US EPA, 2002)

Table S2 Reference dose (RfD) and slope factor (SF) of heavy metals for health risk assessment.

Element	Oral RfD	Dermal RfD	RfD Inhalation	Oral SF	Dermal SF	Inhalation SF	Reference
Cd	0.001	0.00001	5.71E-05	6.1	6.1	6.3	(USEPA, 2012; Cheng et al., 2018)
Pb	0.0035	0.000525	0.00352	0.0085	8.5E-06	0.042	(USEPA, 2012; Jiang et al., 2017)
Sb	0.0004	-	-	-	-	-	(USEPA, 2001, 2020)
Cr	0.003	0.00006	0.0000286	0.5	20	42	(USEPA, 2012; Jiang et al., 2017; Cao et al., 2015)
As	0.0003	0.000123	0.0003	1.5	3.66	15	(USEPA, 2001)
Ni	0.02	0.0054	0.026	0.91	42.5	0.84	(Cao et al., 2015; USEPA, 2020)
Hg	0.0003	2.10E-05	0.0000857	-	-	-	(De Miguel et al., 2007; Penteado et al., 2021)

Table S3 Heavy metal average daily dose (ADD) by oral, dermal and inhalation exposure routes among children and adults.

Heavy Meta	Land type	Adult			Children		
		ADD _{ng}	ADD _{inh}	ADD _{dermal}	ADD _{ing}	ADD _{inh}	ADD _{dermal}
Sb	TA	6.47E-06	7.29E-10	2.58E-08	6.03E-05	5.54E-11	1.69E-07
	RA	2.45E-06	2.76E-10	9.78E-09	2.29E-05	2.1E-11	6.41E-08
	SA	1.26E-06	1.42E-10	5.03E-09	1.18E-05	1.08E-11	3.29E-08
Cd	TA	3.79E-06	4.28E-10	1.51E-08	3.54E-05	3.25E-11	9.92E-08
	RA	2.75E-06	3.1E-10	1.1E-08	2.57E-05	2.36E-11	7.2E-08
	SA	1.99E-06	2.24E-10	7.93E-09	1.85E-05	1.7E-11	5.19E-08
Cr	TA	8.09E-05	9.12E-09	3.23E-07	7.55E-04	6.93E-10	2.11E-06
	RA	6.43E-05	7.25E-09	2.57E-07	6.01E-04	5.51E-10	1.68E-06
	SA	0.000054	6.09E-09	2.15E-07	5.04E-04	4.63E-10	1.41E-06
Pb	TA	3.65E-05	4.12E-09	1.46E-07	3.41E-04	3.13E-10	9.55E-07
	RA	1.94E-05	2.19E-09	7.74E-08	1.81E-04	1.66E-10	5.07E-07
	SA	1.37E-05	1.55E-09	5.48E-08	1.28E-04	1.18E-10	3.59E-07
As	TA	1.43E-05	2.1E-15	4.87E-06	0.000133	3.72E-15	3.91E-06
	RA	1.48E-05	2.18E-15	5.07E-06	0.000138	3.86E-15	4.07E-06
	SA	2.07E-05	3.04E-15	7.07E-06	0.000193	5.39E-15	5.68E-06
Ni	TA	3.71E-05	5.45E-15	4.22E-07	0.000346	9.66E-15	3.39E-07
	RA	2.51E-05	3.69E-15	2.86E-07	0.000234	6.55E-15	2.3E-07
	SA	2.17E-05	3.19E-15	2.47E-07	0.000203	5.66E-15	1.99E-07
Hg	TA	1.62E-07	2.38E-17	1.85E-09	1.51E-06	4.23E-17	1.48E-09
	RA	4.44E-07	6.53E-17	5.06E-09	4.14E-06	1.16E-16	4.06E-09
	SA	5.28E-07	7.77E-17	6.02E-09	4.93E-06	1.38E-16	4.83E-09

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