

Table 1. Parameters and input assumptions for the health risk assessment.

Parameters	Description	Value for adults	Value for children	Units	References
IngR	Ingestion rate of soil	20	50	mg/day	[1] USEPA (2011)
InhR	Inhalation rate of soil	16	7.6	m ³ /day	[2, 3] MEPC (2013)and Chabukdhara (2013)
EF	Exposure frequency		350	day/year	[4] USDOE (2011)
ED	Exposure duration	24	6	year	[1] USEPA (2011)
SA	Skin area available for soil contact	4350	1600	cm ²	[5] Environmental site assessment guideline (2009)
AF	Soil-to-skin adherence factor	0.7	0.2	mg/cm day	[6] USEPA (1993)
ABS	Absorption factor		0.001		[3] Chabukdhara (2013)
BW	Body weight	55.9	15	kg	[5] Environmental site assessment guideline (2009)
PEF	Particle emission factor		1.36 × 10 ⁹	m ³ /kg	[7](USEPA 2001)
AT	Average time		ED × 365	day	-

Table 2. Values of RfD (mg/kg/day) and SF (per mg/kg/day) for six heavy metals [8](Chen *et al.* 2016).

	As	Cr	Ni	Cu	Zn	Pb
RfD for ingestion	3.00×10 ⁻⁴	3.00×10 ⁻³	2.00×10 ⁻²	4.00×10 ⁻²	3.00×10 ⁻¹	3.50×10 ⁻³
RfD for dermal absorption	1.23×10 ⁻⁴	6.00×10 ⁻⁵	5.40×10 ⁻³	1.20×10 ⁻²	6.00×10 ⁻²	5.25×10 ⁻⁴
RfD for inhalation	1.23×10 ⁻⁴	2.86×10 ⁻⁵	9.00×10 ⁻⁵	4.02×10 ⁻²	3.00×10 ⁻¹	3.52×10 ⁻³
SF for ingestion	1.5	0.5	-	-	-	8.50×10 ⁻³
SF for dermal absorption	3.66	-	-	-	-	-
SF for inhalation	15.1	42	0.84	-	-	-

Table 3. Average concentrations of heavy metals in soil from different regions.

Location	As	Cr	Ni	Cu	Zn	Pb	Reference
Tonghua , China	15.72	72.41	15.04	20.52	266.57	16.30	This study
Medak province, India	4.39	244.10	20.22	63.63	58.80	24.73	[9]
Islamabad, Pakistan		21.75	-	26.05	45.76	44.48	[10]
Nepal	4.50	309	121	277	1020	137	[11]
San Guillermo, Mexico		135	141	93	447	116	[12]
Ciudad Real, Spain				29.75	186.09	393.05	[13]
Brno, Czech				16.6	59.0	27.2	[14]
Tianjin, China	11	51	39	33	143	45	[15]
Anshan, China		69.9	33.5	52.3	213	45.1	[16]
Hangzhou, China		63.65		42.33	196.8	62.55	[17]
Wuhan, China	15.58	140.1	117.8	60.73	3.32	74.16	[18]
Beijing, China		60.27	25.87	34.42	89.63	39.50	[19]
Shanghai, China		107.9	31.14	59.25	301.40	70.69	[20]

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