

Ecological and health risk assessment of heavy metals in the Hattar Industrial Estate,

Pakistan

Running Title: Ecological and health risk assessment

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Supporting Information

Table S1. Parameters along with definition, values and symbol used for risk assessment

Parameters	Symbol	units	Values	References
Average daily intake	ADI	(mg/kg)/day		
Average time cancer	ATc	days	70 x 365	(USEPA, 2002)
Average time chronic or non-cancer	ATnc	days	30 x 365	(USEPA, 2002)
Body weight	BW	kg	70 ^a , 6 ^b	(USEPA, 2002; Efe <i>et al.</i> , 2014)
Carcinogenicity slope factor	SF	Per (mg/kg)/day	Inhalation SF: 6.3 (Cd), 9.8 (Co), Ni (0.84), Cr (42), 0.0085 (Pb)	(Ferreira-Baptista and De Miguel, 2005; USDOE, 2011; Lu <i>et al.</i> , 2014)
Chronic reference dose	RfD	Per (mg/kg)/day	Oral RfD: 0.0003 (Co), 0.001 (Cd), 0.04 (Cu), 0.003 (Cr), 0.024 (Mn), 0.02 (Ni), 0.3 (Zn), 0.0035 (Pb), Dermal RfD: 2.0E-06 (Co), 1.0E-05 (Cd), 1.2E-02 (Cu), 6.00E-05 (Cr), 4.6E-02 (Mn), 5.4E-03 (Ni), 6.0E-02 (Zn 5.25E-05 (Pb),) Inhalation RfD: 4.3E-03 (As), 1.00E-05 (Cd), 5.7E-06 (Co), 3.00E-03 (Cr), 4.0E-02 (Cu), 5.0E-05 (Mn), 5.0E-05 (Ni), 3.5E-03 (Pb), 3.0E-02 (Zn)	(Ferreira-Baptista and De Miguel, 2005; Efe <i>et al.</i> , 2014)
Concentration of soil HMs	C	mg/kg		
Dermal absorption factor	ABS	Unitless	0.04 (Cr), 0.1 (Cd), 0.1 (Cu), 0.006 (Pb), 0.02 (Zn), 0.001 (Fe, Mn, Co), 0.35 (Ni),	(HC, 2004; Kelepertzis, 2014; Chen <i>et al.</i> , 2015)
Exposed skin exposed surface area	SA	m ²	5700 ^a , 2800 ^b	(Efe <i>et al.</i> , 2014)
Exposure frequency	EF	Day/year	350	(USEPA, 2002)
Exposure duration	ED	Year	30 ^a , 6 ^b	(USEPA, 2002)
Inhalation rate	InhR	m ³ /day	20 ^a , 7.6 ^b	(USEPA, 2002; Zheng <i>et al.</i> , 2010)
Ingestion rate	IngR	mg d ⁻¹	100 ^a , 200 ^b	(USEPA, 2002)
Particular emission factor	PEF	(m ³ /kg)	1.36E-09	(USEPA, 2002)
Minimum risk levels	MCL	µg/kg/day	0.1 (Cd), 10 (Co), 0.9 (Cr), 10 (Cu), 0.7 (Mn), 0.2 (Ni), 0.3 (Pb) 300 (Zn)	(ATSDR, 2011)
Skin adherence factor	SAF	mg/cm ²	0.07 ^a , 0.2 ^b	(USEPA, 2002)

^a adults

^b children

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