

Supplementary Information

Health Risk Assessment of Heavy Metals in Indoor Household Dust in Urban and Rural Areas of Chiang Mai and Lamphun Provinces, Thailand

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Table S1 The values of parameters for non-carcinogenic and carcinogenic risk assessment

Table S2 The reference values for non-carcinogenic and carcinogenic risk assessment

Table S3 Quality control values of heavy metal measurement

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Table S1. The values of parameters for non-carcinogenic and carcinogenic risk assessment

Abbrev	Parameter	Value		Unit	Ref
		Adults	Children		
Non-carcinogenic risk					
ABS	Absorption factor (dermal)	0.001	0.001		Hou et al., 2019 ¹
AT	Averaging time	8760	8760	Days	Doyi et al., 2019 ²
BW	Body weight	70	15	kg	
CF	Conversion factor	1.00E-06	1.00E-06	mg kg ⁻¹	Isley et al., 2022 ³
ED	Exposure duration	24	6	Years	Hou et al., 2019 ¹
EF	Exposure frequency	350	350	Days year ⁻¹	US EPA ⁴
ET	Exposure time	24	24	Hours day ⁻¹	US EPA ⁴
IngR	Ingestion rate^	100	200	mg day ⁻¹	US EPA, 2011 ⁵
InhR	Inhalation rate	16.3	7.6	m ³ day ⁻¹	Hou et al., 2019 ¹
PEF	Soil to air particulate emission factor	1.36E+09	1.36E+09	m ³ kg ⁻¹	US EPA ⁴
SA	Skin surface area	5700	2373	cm ²	Wang et al., 2022 ⁶
SL	Solid to skin adherence factor	0.07	0.2	mg cm ⁻²	US EPA ⁴
Carcinogenic risk					
24	Hours per day	24	24	hours	
ABS	Absorption factor (dermal)	0.001	0.001		Hou et al., 2019 ¹
AT	Averaging time	365*70	365*70	days	US EPA ⁴
CF	Conversion factor	1.00E-06	1.00E-06	mg kg ⁻¹	Isley et al., 2022 ³
DFS	Age adjusted soil dermal factor	362.4	362.4	mg year kg ⁻¹ day ⁻¹	Doyi et al., 2019 ²
ED	Exposure duration	24	6	years	Hou et al., 2019 ¹
EF	Exposure frequency	350	350	Days year ⁻¹	US EPA ⁴
ET	Exposure time	24	24	Hours day ⁻¹	US EPA ⁴
IR	Intake rate	113	200	mg year kg ⁻¹ day ⁻¹	US EPA ⁷
LT	Lifetime	70	70	years	US EPA ⁴
PEF	Soil to air particulate emission factor	1.36E+09	1.36E+09	m ³ kg ⁻¹	US EPA ⁴

Table S2 The reference values for non-carcinogenic and carcinogenic risk assessment

Elements	Non-carcinogenic			Carcinogenic		
	RfD _{ing}	RfD _{inh}	RfD _{der}	SF _{ing}	SF _{inh}	SF _{der}
As	3.00E-04 ^a	1.50E-05 ^a	1.23E-04 ^b	1.50E+00 ^a	4.30E-03 ^a	1.50E+00 ^a
Cd	1.00E-03 ^c	5.70E-06 ^c	2.50E-05 ^c	3.80E-01 ^c	7.05E+00 ^c	1.52E+01 ^c
Cr	3.00E-03 ^a	1.00E-04 ^a	6.00E-05 ^b	5.00E-01 ^a	4.20E+01 ^a	5.00E-01 ^a
Cu	4.00E-02 ^c	6.90E-04 ^b	1.20E-02 ^b	-	-	-
Mn	2.40E-02 ^a	5.00E-05 ^a	1.84E-03 ^a	-	-	-
Ni	2.00E-02 ^a	2.06E-02 ^c	5.40E-03 ^b	1.54E-01 ^d	2.60E-04 ^a	9.10E-01 ^a
Pb	3.50E-03 ^b	3.52E-03 ^c	5.25E-04 ^b	8.50E-03 ^e	1.20E-05 ^d	2.10E-01 ^a
Zn	3.00E-03 ^a	3.00E-01 ^b	6.00E-02 ^b	-	-	-

a: US EPA⁴b: Ferreira-Baptista and De Miguel., 2005⁸c: Doyi et al., 2019²d: Wignall et al., 2018⁹e: OEHA¹⁰

Table S3 Quality control values of heavy metal measurement

Metals	LOD (mg kg ⁻¹)	Standard recovery ± SD (%)	SRM 2584		%R.S.D
			Certified mass fraction (mg kg ⁻¹)	SRM recovery (%)	
As	2.08	83.93 ± 3.29	17.4 ± 4.2	69.1	8.23
Cd	0.39	93.82 ± 3.25	10.0 ± 1.1	84.7	5.61
Cr	1.11	92.86 ± 4.71	135 ± 9.1	79.7	1.85
Cu	0.58	97.58 ± 3.15	320	90.1	4.55
Mn	0.51	96.98 ± 4.93	370	80.1	1.44
Ni	1.12	81.88 ± 5.84	90	61.5	5.27
Pb	0.60	86.83 ± 7.80	9761	86.5	1.11
Zn	1.54	83.30 ± 5.41	2580 ± 150	81.1	1.53

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