

Article

Exposure and Health Risks Posed by Potentially Toxic Elements in Soils of Metal Fabrication Workshops in Mbarara City, Uganda

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SUPPLEMENTARY MATERIALS

Table S1: Values of exposure factors used in health risk assessments due to PTEs in soils from MFWs in Mbarara City, Uganda

Factor	Description (units)	Factor values	
		Children	Adults
C_{PTE}	Concentration of PTEs in the soils ($mg\ kg^{-1}$)	This study	This study
$IngR$	Ingestion rate ($mg\ day^{-1}$)	200	100
EXF	Exposure frequency ($days\ year^{-1}$)	350	350
EXD	Exposure duration (years)	6	30
FI	Fraction ingested from the contaminated source (unitless)	1.0	1.0
$InhR$	Inhalation rate of soil as dust ($m^3\ day^{-1}$)	200	100
CVF	Conversion factor ($kg\ mg^{-1}$)	1×10^{-6}	1×10^{-6}
W_{ab}	Body weight (kg)	15	60
T_{aet}	Average time (days)	Non-carcinogenic: $EXD \times 365\ days\ year^{-1}$; carcinogenic: $60\ years \times 365\ days\ year^{-1}$	
S_{AF}	Surface area of skin exposed to soil as dust (cm^2)	2800	5700
PEF	Particular emission rate ($m^3\ kg^{-1}$)	1.316×10^9	1.316×10^9
AF	Skin adherence factor ($mg\ cm^{-2}$)	0.2	0.7
DAF	Dermal absorption factor (unitless)	0.001	0.001

Based on US EPA [36,37], Ferreira-Baptista and De Miguel [38], and Ajeh et al. [35].

Table S2: Classification values of pollution and risk indices used in the study of PTEs in soils from MFWs in Mbarara City, Uganda

Pollution and risk indicators	Classification values	Description
Contamination factor (CFs) [41]	$CF < 1$	Low contamination
	$1 \leq CF < 3$	Moderate contamination
	$3 \leq CF < 6$	Considerable contamination
	$CF > 6$	Very high contamination
Geo-accumulation index (I_{geo}) [42]	$I_{geo} < 0$ (class 0)	Practically uncontaminated
	$0 < I_{geo} < 1$ (class 1)	Low to median contamination
	$1 < I_{geo} < 2$ (class 2)	Median contamination
	$2 < I_{geo} < 3$ (class 3)	Median to strong contamination
	$3 < I_{geo} < 4$ (class 4)	Serious contamination
	$4 < I_{geo} < 5$ (class 5)	Serious to extreme contamination
Pollution load index (PLDI)	$I_{geo} > 5$ (class 6)	Extreme contamination
	$PLDI < 1$	Unpolluted
Ecological risk (E_R^i and PERI) [41]	$PLDI > 1$	Polluted
	$E_R^i < 40$; $PERI > 95$	Low contamination
	$40 \leq E_R^i \leq 80$; $95 \leq PERI \leq 190$	Moderate contamination
	$80 \leq E_R^i \leq 160$; $190 \leq PERI \leq 380$	Considerable contamination
	$160 \leq E_R^i \leq 320$; $PERI \geq 380$	High contamination
	$320 \leq E_R^i$	Very high contamination