Oral bioaccessibility and health risk assessment of road dust-bound heavy metals from different pollution sources

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1.1 Specific extraction steps of Tessier sequential extraction method

Dust samples were extracted sequentially, and the samples were obtained as follows: F1: The sample was extracted at room temperature for 1 h with 8ml 1mol L^{-1} $MgCl_2$. F2: The residue of F1 was extracted at room temperature for 6 h with 15ml 1mol L^{-1} CH_3COONa, and adjusted pH to 5.0 with CH_3COOH. F3: The residue of F2 was extracted in a water bath at 96℃ for 6h with 10ml 0.04 mol L^{-1} $NH_2OH{\cdot}HCl$ (25% (v/v) CH_3COOH), adjust the pH to 2.0 with HCl. F4: The residue of F3 was extracted in a water bath at 85℃ for 3ml 0.02 mol L^{-1} HNO_3 and 5ml 30%H_2O_2, and adjusted pH to 2.0, then added 3ml 30%H_2O_2, continue water bath for 3 h. Finally, added 5ml 3.2 mol L^{-1} CH_3COONH_4 (20% (v/v) HNO_3) and oscillated for 0.5 h at room temperature. F5: The residue of F4 was treated by USEPA 3050B Method. After each extraction, the remaining dust residues were washed twice with Milli-Q water before continuing with the next step.

Table S1 Dust exposure risk health risk assessment model calculated parameters and values

Parameter	Children	Adult
EF (day/year)	345	
R_{ingest} (mg/day)	103	30
*ED (*years)	6	24
BW (kg)	29.3	67.55 (male) 57.59 (female)
AT (day)	365× ED（non-carcinogenic） 365× 70（carcinogenic）	

Table S2 Corresponding reference dose (RfD) and slope factor (SF) values for metals under ingestion exposure pathways in a health risk assessment model

elements	RfD(mg/(kg·d))	SF((kg·d)/mg)
As	3.00×10^{-4}	1.50×10^{0}
Cd	1.00×10^{-3}	6.10×10^{0}
Cr	3.00×10^{-3}	8.50×10^{-3}
Cu	4.00×10^{-2}	n/a
Mn	4.60×10^{-1}	n/a
Ni	2.00×10^{-2}	1.70×10^{0}
Pb	3.50×10^{-3}	8.50×10^{-3}
V	7.00×10^{-3}	n/a
Zn	3.00×10^{-1}	n/a

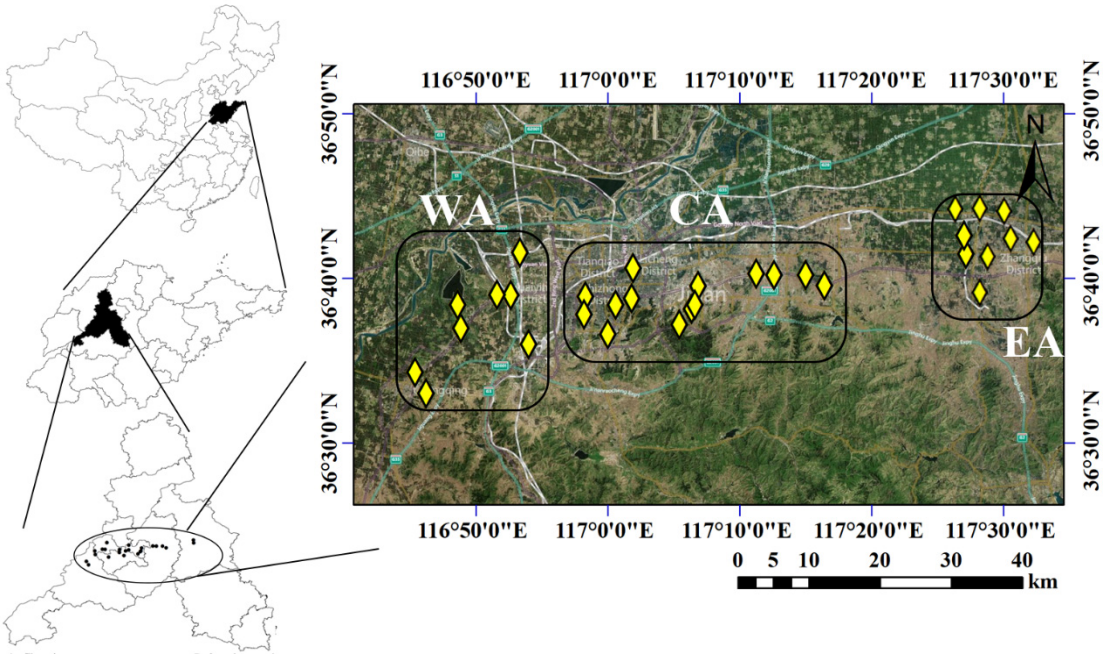


Figure S1 Sampling location of study area

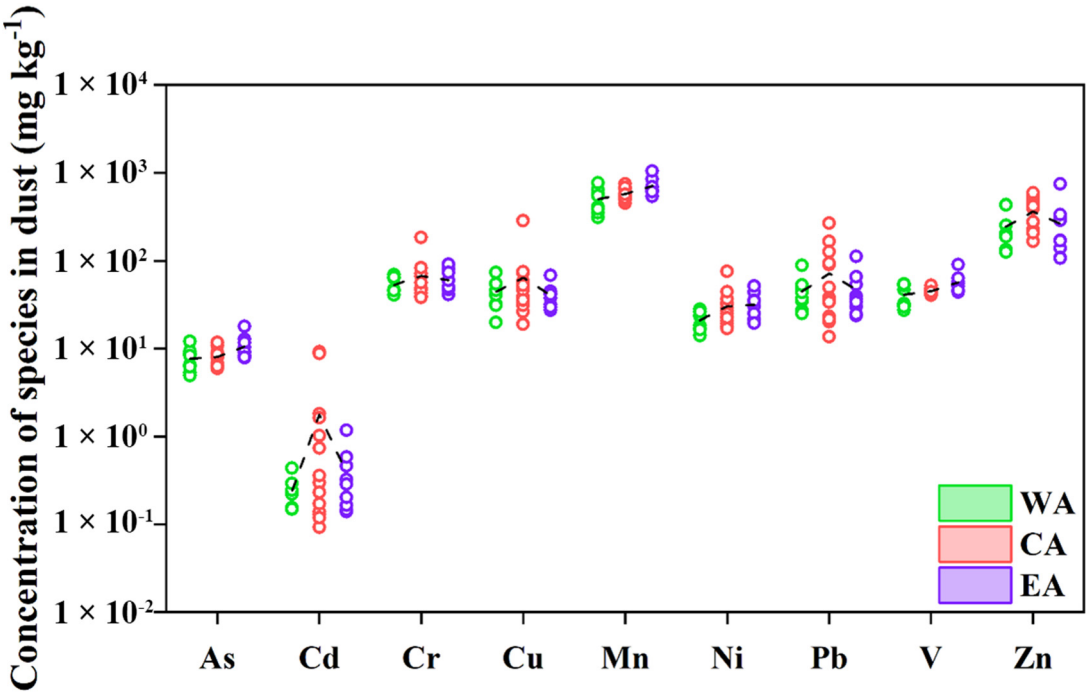


Figure S2 Metal element concentration (mg kg^{-1}) of dust samples from Jingshi Road of Jinan. WA, CA, and WA represented west, central, and east area along Jingshi Road, respectively.

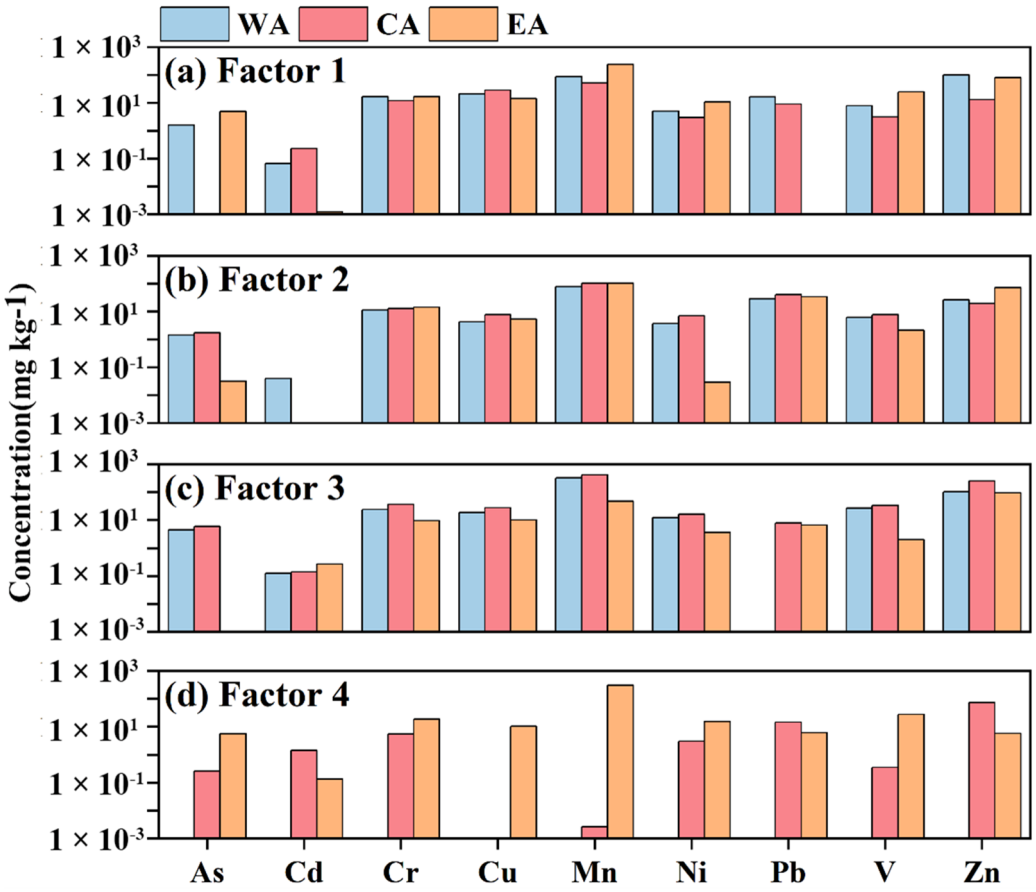


Figure S3 Factor distribution of metal in road dust based on PMF model. (a)-(e) represents the factor profiles of metal elements in road dust in Jinan in WA, CA and EA from PMF model.

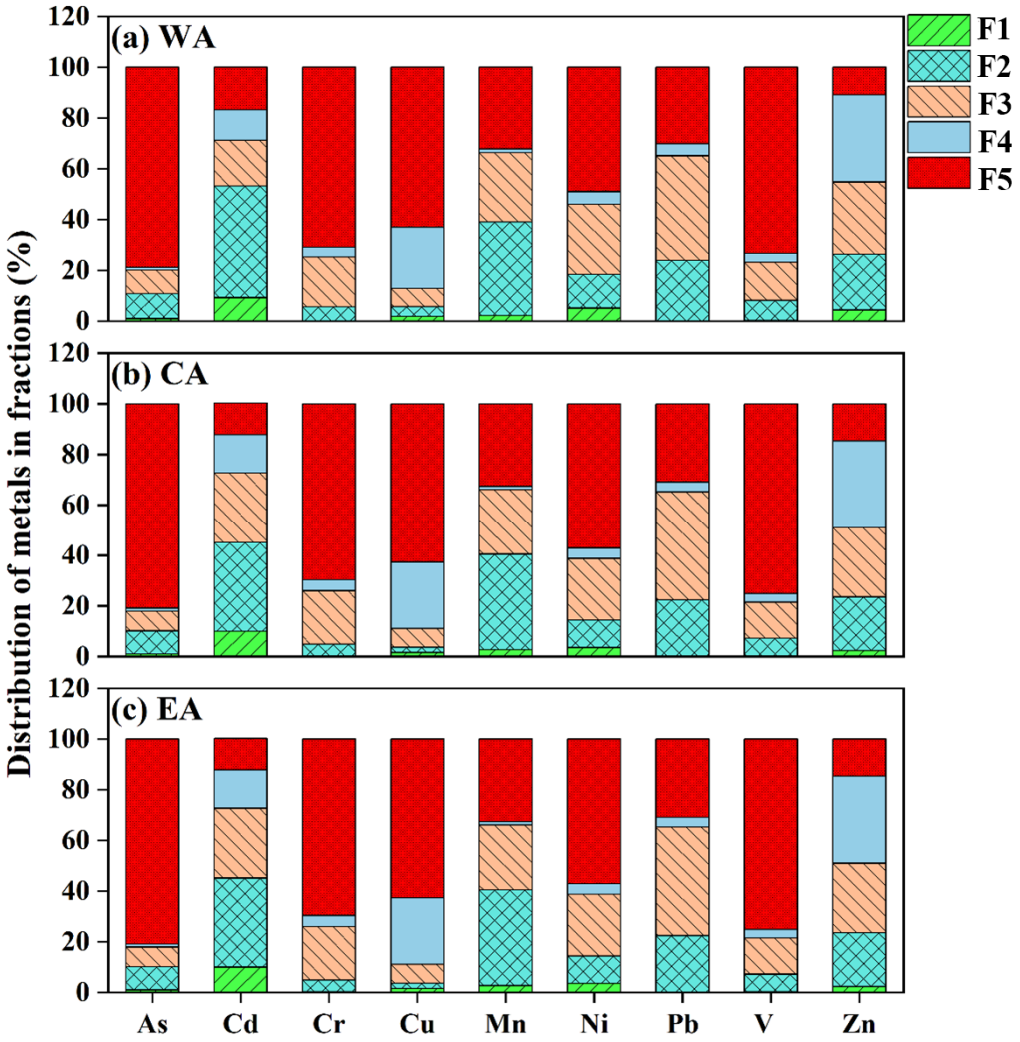


Figure S4 Distribution of nine heavy metals in Jinan road dust in different fractions, (a), (b) and (c) is the speciation distribution of heavy metals in dust in WA, CA and EA, respectively. The fractions were operationally defined as follows: exchangeable fraction (F1); carbonate fraction (F2); Fe/Mn oxide fraction (F3); organic fraction (F4); and residual fraction (F5).

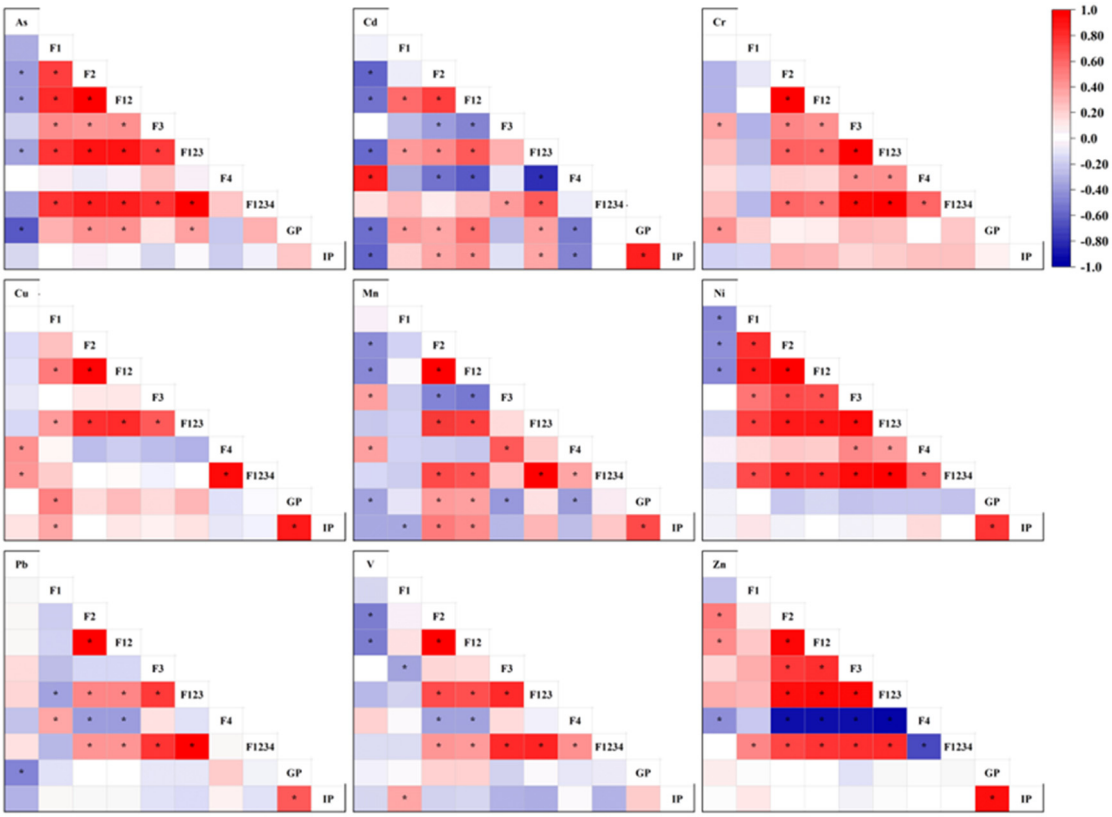


Figure S5 The correlation between the bioaccessibility, the total concentration and fraction of heavy metals in the road dust of Jinan. * represents $p < 0.05$.