

Supplementary Information:

Impacts of epigeic, anecic and endogeic earthworms on metal and metalloid mobility and availability

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Supplementary information contents:

4 pages in total

2 tables and 2 figures

Table SI-1. Combined mass of *Allolobophora chlorotica*, *Lumbricus terrestris* and *Eisenia veneta* earthworms prior to addition to each individual leaching column.

No. of earthworms added	Earthworm species	Incubation time	Replicate	Combined mass of earthworms before incubation (g)
20	<i>A. chlorotica</i>	24 days	1	3.36
20	<i>A. chlorotica</i>	24 days	2	3.31
20	<i>A. chlorotica</i>	24 days	3	3.54
20	<i>A. chlorotica</i>	24 days	4	3.71
20	<i>A. chlorotica</i>	56 days	1	3.74
20	<i>A. chlorotica</i>	56 days	2	3.33
20	<i>A. chlorotica</i>	56 days	3	3.52
20	<i>A. chlorotica</i>	56 days	4	4.15
20	<i>A. chlorotica</i>	112 days	1	3.53
20	<i>A. chlorotica</i>	112 days	2	3.01
20	<i>A. chlorotica</i>	112 days	3	3.41
20	<i>A. chlorotica</i>	112 days	4	3.15
2	<i>L. terrestris</i>	24 days	1	11.90
2	<i>L. terrestris</i>	24 days	2	11.20
2	<i>L. terrestris</i>	24 days	3	12.08
2	<i>L. terrestris</i>	24 days	4	12.51
2	<i>L. terrestris</i>	56 days	1	12.05
2	<i>L. terrestris</i>	56 days	2	12.11
2	<i>L. terrestris</i>	56 days	3	11.91
2	<i>L. terrestris</i>	56 days	4	12.18
2	<i>L. terrestris</i>	112 days	1	12.93
2	<i>L. terrestris</i>	112 days	2	12.93
2	<i>L. terrestris</i>	112 days	3	11.50
2	<i>L. terrestris</i>	112 days	4	11.72
5	<i>E. veneta</i>	24 days	1	5.95
5	<i>E. veneta</i>	24 days	2	5.61
5	<i>E. veneta</i>	24 days	3	6.45
5	<i>E. veneta</i>	24 days	4	6.15
5	<i>E. veneta</i>	56 days	1	5.24
5	<i>E. veneta</i>	56 days	2	5.97
5	<i>E. veneta</i>	56 days	3	5.70
5	<i>E. veneta</i>	56 days	4	6.07
5	<i>E. veneta</i>	112 days	1	6.76
5	<i>E. veneta</i>	112 days	2	5.41
5	<i>E. veneta</i>	112 days	3	5.78
5	<i>E. veneta</i>	112 days	4	6.62

13

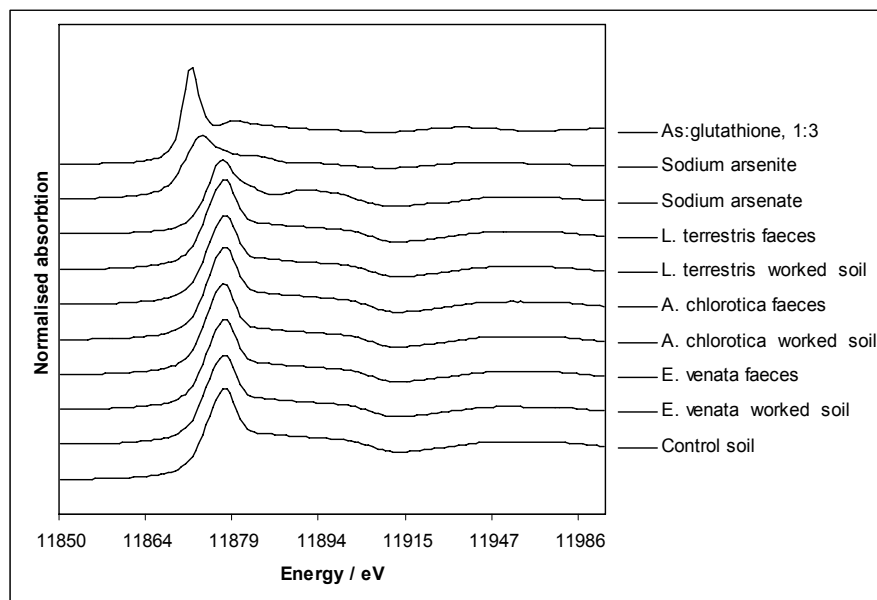
14 **Table SI-2. EXAFS fitting of the As K-edge data for earthworm faeces, earthworm-worked soil and**
15 **earthworm-free control soil after 112 days incubation in columns. The R factor is a least squares**
16 **residual¹.**

Sample	Scatterer	N	r (Å)	2σ ² (Å ²)	R factor
Control soil	O	4	1.69	0.003	21.7
	P	2	3.11	0.015	
<i>L. terrestris</i> faeces	O	4	1.69	0.004	18.6
	P	2	3.11	0.016	
<i>L. terrestris</i> inhabited soil	O	4	1.69	0.004	20.9
	P	2	3.12	0.016	
<i>A. chlorotica</i> faeces	O	4	1.68	0.006	26.4
	P	2	3.10	0.014	
<i>A. chlorotica</i> inhabited soil	O	4	1.68	0.004	21.7
	P	2	3.11	0.014	
<i>E. veneta</i> faeces	O	4	1.69	0.004	20.3
	P	2	3.12	0.015	
<i>E. veneta</i> inhabited soil	O	4	1.69	0.004	19.2
	P	2	3.11	0.013	

17 N (not refined) is the number of scatterers in each shell; r is the As-scatterer distance, ± 0.02 Å (inner shell), ±
18 0.05 Å (outer shell); 2σ² is the Debye-Waller type factor, ± 25%.

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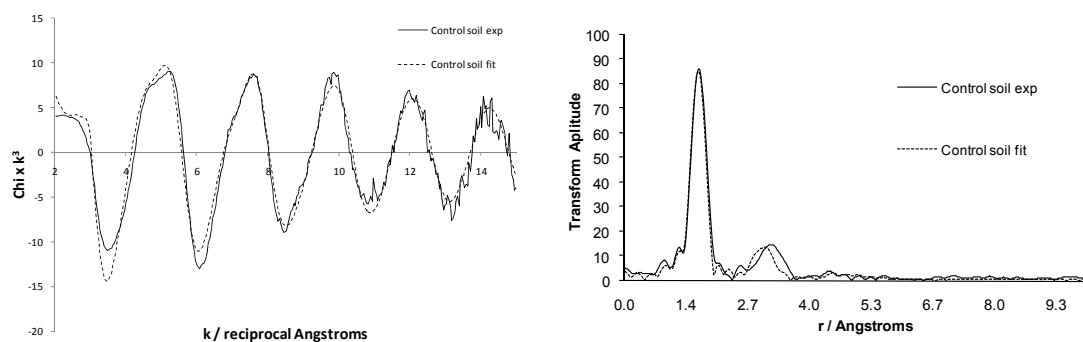
20 1. N. Binsted, R. W. Strange and S. S. Hasnain, Biochemistry, 1992, 31, 12117-12125.



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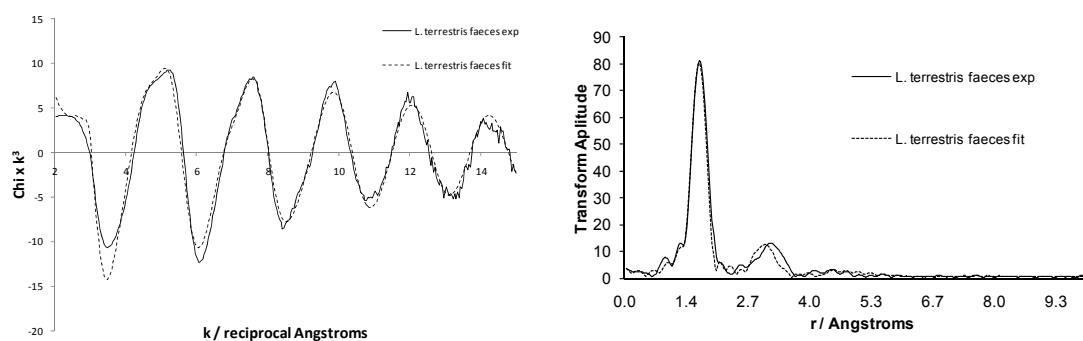
22 **Figure SI-1. XANES spectra of As K-edge of earthworm faeces, earthworm-worked soil and earthworm-**
23 **free control soil after 112 days incubation in columns compared with spectra from known standards.**

24 a)



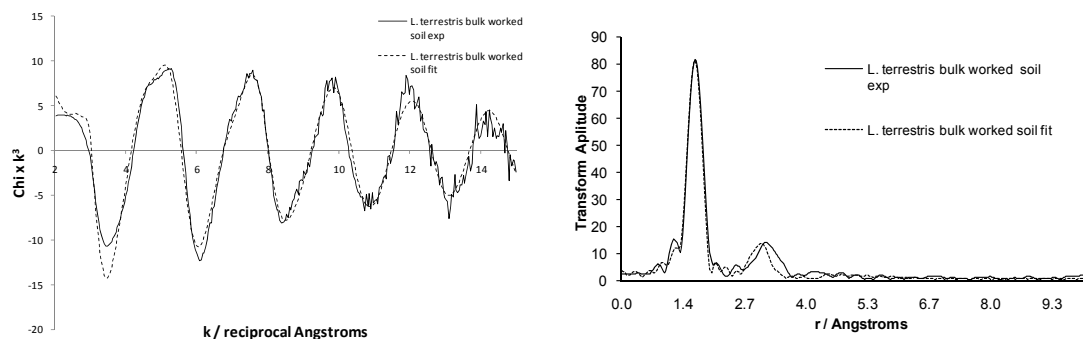
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26 b)



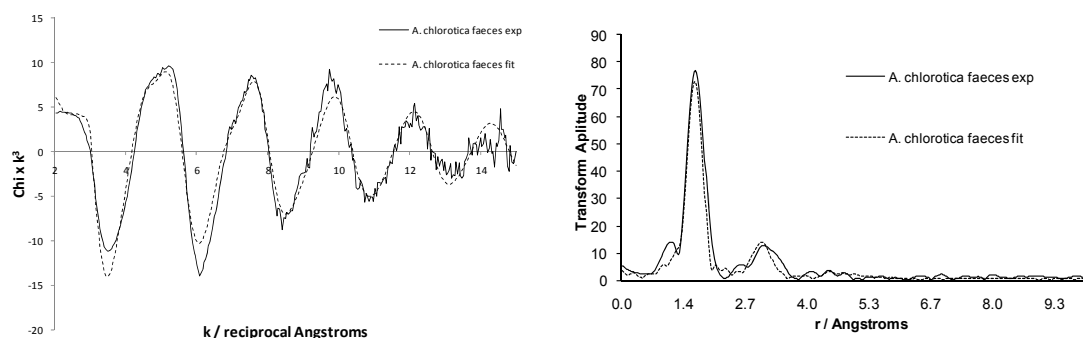
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28 c)



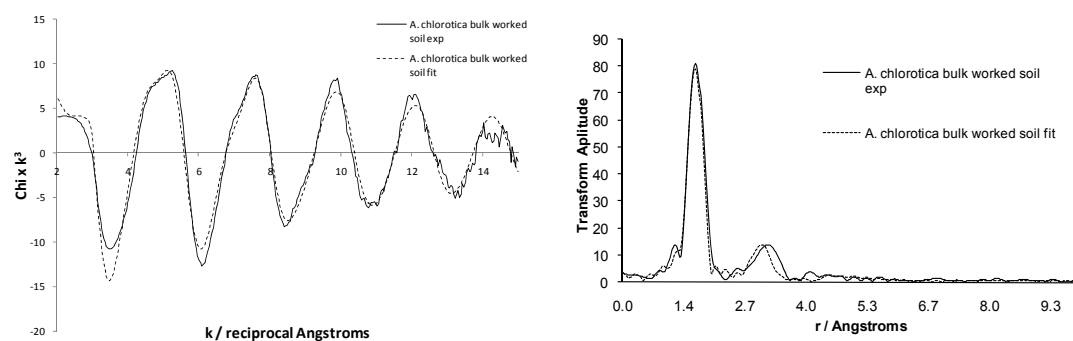
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30 d)

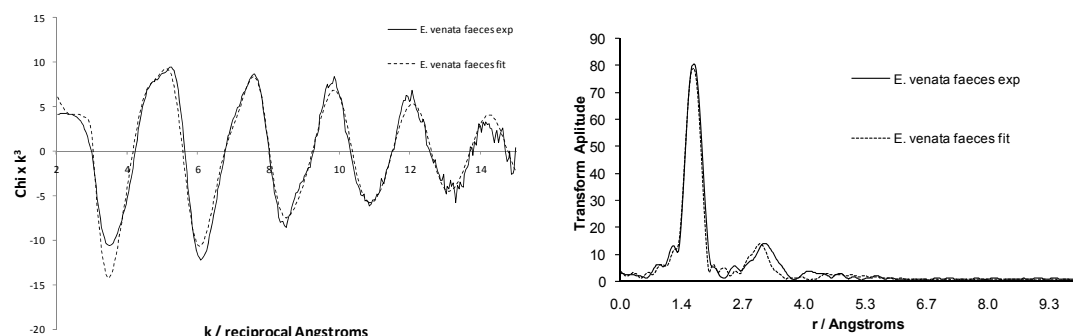


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e)



f)



g)

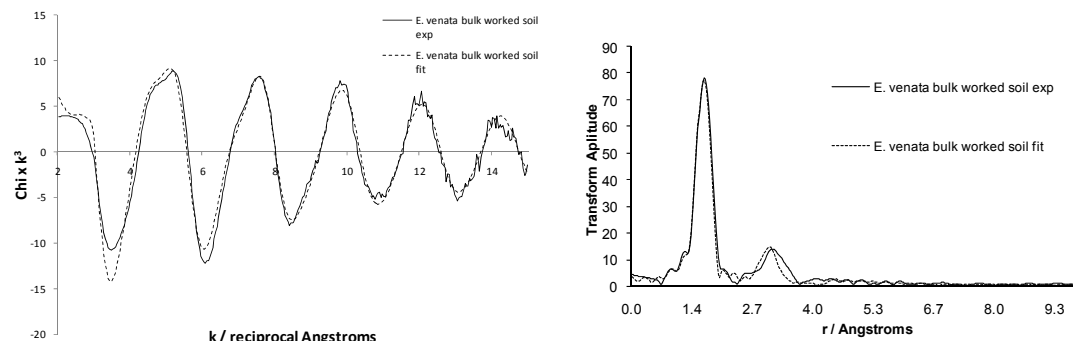


Figure SI-2. k^3 weighted As K edge EXAFS spectra and fourier transformation of a) earthworm-free control soil b) *L. terrestris* faeces c) *L. terrestris* inhabited soil d) *A. chlorotica* faeces e) *A. chlorotica* inhabited soil f) *E. veneta* faeces g) *E. veneta* inhabited soil. Solid lines represent experimental data and the dashed lines represent the theoretical fit.