Methylated arsenic species in plants originate from soil microorganisms

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Supplementary Materials

Table S1 Recovery and speciation of the certified reference material NIST 1568a rice flour

Total iAs ($\mu g\ g^{-1}$ DW)	MMA(V) ($\mu g\ g^{-1}$ DW)	DMA(V) ($\mu g\ g^{-1}$ DW)	Sum As ($\mu g\ g^{-1}$ DW)	Recovery (%)	Reference
0.09 ± 0.003	0.01 ± 0.001	0.18 ± 0.007	0.28 ± 0.010	96	This study
0.11 ± 0.006	0.02 ± 0.004	0.14 ± 0.005	0.27 ± 0.010	94	Batista *et al.* (2011)

Data are means ± SD.
For a full list of previous analyses of As speciation in NIST 1568a, see Batista *et al.* (2011).

Batista BL, Souza JMO, De Souza SS, Barbosa Jr F. 2011. Speciation of arsenic in rice and estimation of daily intake of different arsenic species by Brazilians through rice consumption. *Journal of Hazardous Materials* **191**: 342-348.

Table S2 Relative abundance of *arsM* sequences detected in a Bangladeshi paddy soil using GeoChip.

Genbank ID	Organism	Mean relative abundance
158320129	*Alkaliphilus oremlandii* OhILAs	0.039
255008414	*Bacteroides fragilis 3_1_12*	0.024
167761029	*Clostridium scindens* ATCC 35704	0.055
254430241	*Cyanobium* sp. PCC 7001	0.217
57233796	*Dehalococcoides ethenogenes* 195	0.335
89896894	*Desulfitobacterium hafniense* Y51	0.300
158520779	*Desulfococcus oleovorans* Hxd3	0.305
257797304	*Desulfohalobium retbaense* DSM 5692*	1.814
258405077	*Desulfohalobium retbaense* DSM 5692*	1.733
258515753	*Desulfotomaculum acetoxidans* DSM 771	0.341
219869487	*Desulfovibrio desulfuricans* subsp. *desulfuricans* str. ATCC 27774	0.669
254448130	*Gamma proteobacterium* HTCC5015	0.424
168699430	*Gemmata obscuriglobus* UQM 2246	0.303
78223987	*Geobacter metallireducens* GS-15	0.364
284015962	*Haloterrigena turkmenica* DSM 5511	0.148
21226763	*Methanosarcina mazei* Go1	0.094
167461246	*Paenibacillus larvae* subsp. *larvae* BRL-230010	0.013
253575807	*Paenibacillus* sp. *oral taxon* 786 str. D14*	0.096
251844850	*Paenibacillus* sp. *oral taxon* 786 str. D14*	0.097
149277880	*Pedobacter* sp. BAL39	0.150
147676775	*Pelotomaculum thermopropionicum* SI	0.634
211959444	*Pseudovibrio* sp. JE062	0.590
254510744	*Rhodobacteraceae bacterium* KLH11	0.108
283559495	*Rhodomicrobium vannielii* ATCC 17100	0.269
283843001	*Rhodopseudomonas palustris* DX-1	0.421
83815482	*Salinibacter ruber* DSM 13855	0.640
116623500	*Solibacter usitatus* Ellin6076	0.839
269838062	*Sphaerobacter thermophilus* DSM 20745	0.553
51893507	*Symbiobacterium thermophilum* IAM 14863	0.507
269792113	*Thermanaerovibrio acidaminovorans* DSM 6589	0.596
219994748	*Thioalkalivibrio* sp. HL-EbGR7	0.498
220933438	*Thioalkalivibrio* sp. HL-EbGR7	0.330
74317446	*Thiobacillus denitrificans* ATCC 25259	0.445
257456586	*Treponema vincentii* ATCC 35580	0.637
269306796	*Xylanimonas cellulosilytica* DSM 15894	0.610

* Duplicate organisms but different GenBank sequences.
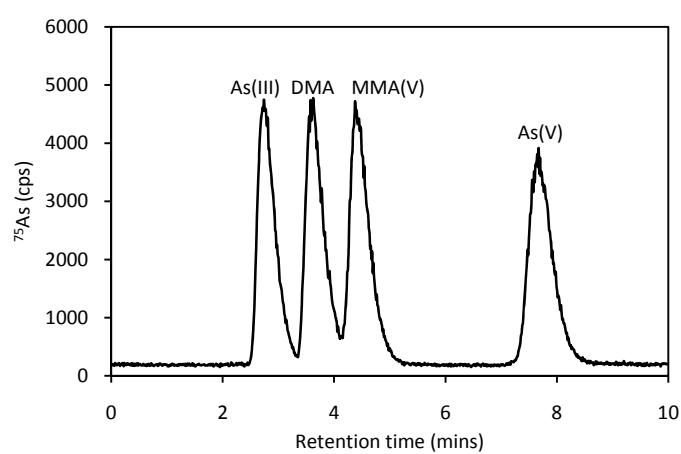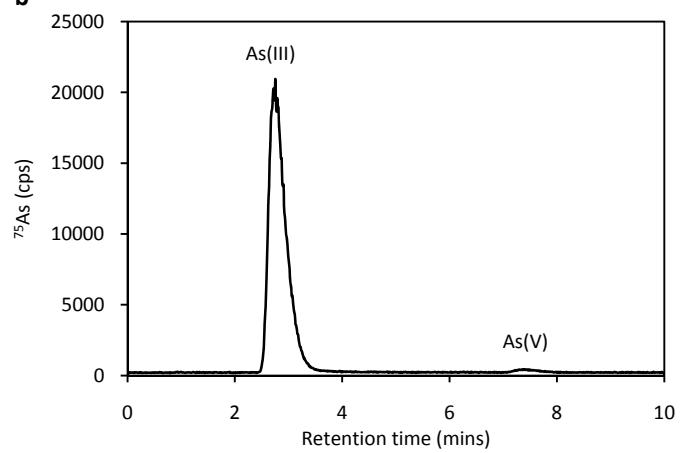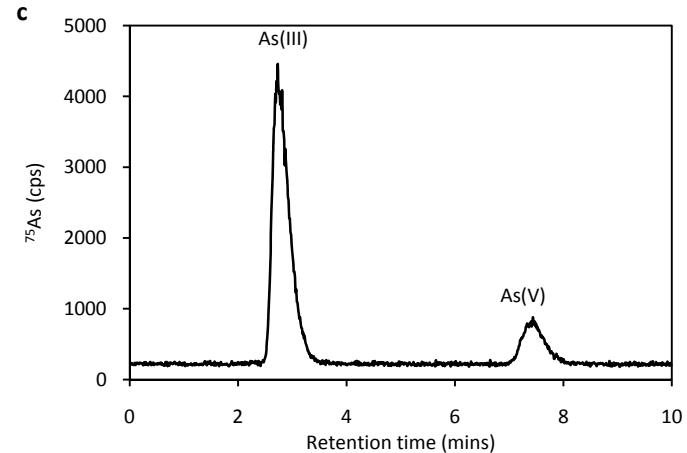
**Fig. S1** Lack of methylated As species in axenically-grown plant extracts. **a**, Chromatograms of standards containing 50 μg As L^{-1} arsenite, DMA(V), MMA(V) and arsenate by HPLC-ICP-MS. Representative chromatograms of As speciation in extracts of rice (cv. Nipponbare) roots (**b**) and shoots (**c**) exposed to 10 μM arsenate. cps = counts per second.
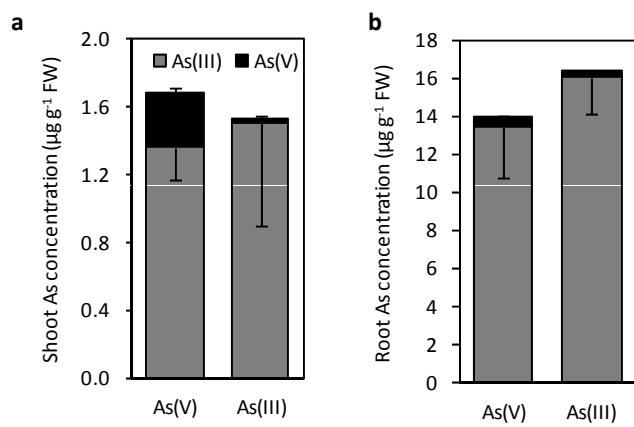
Fig. S2 Arsenic speciation in rice exposed to arsenate or arsenite in axenic culture. Arsenic speciation in rice (cv. Nipponbare) shoots (**a**) and roots **(b)** after exposure to 10 µM arsenate or arsenite. Error bars represent SE (*n* =5).
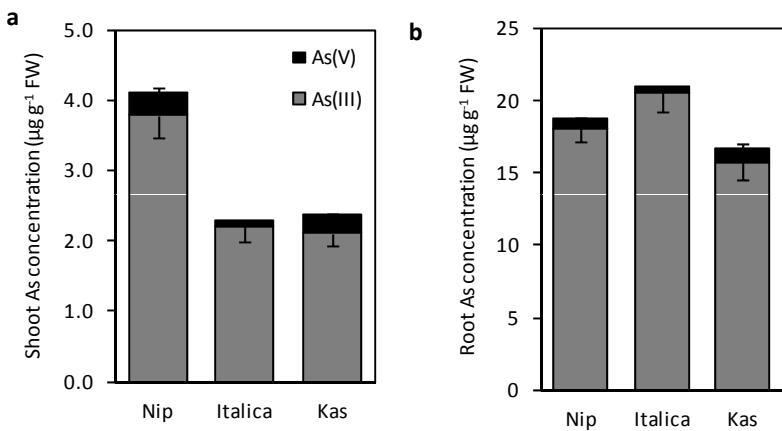
Fig. S3 Arsenic speciation in different rice cultivars exposed to arsenate in axenic culture. Arsenic speciation in shoots (**a**) and roots (**b**) of 3 different rice cultivars; Nip = Nipponbare (japonica), Italica = Italica carolina (japonica) and Kas = Kasalath (indica), after exposure to 10 μM arsenate. Error bars represent SE (n =5).
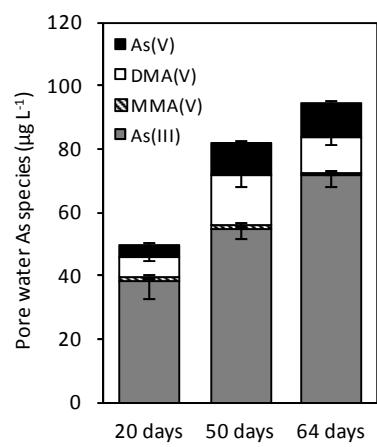
Fig. S4 Arsenic speciation in pore water of incubated UK arable soil. Pore water was collected at 20, 50 and 64 days after flooding. Error bars represent SE (*n* =5).
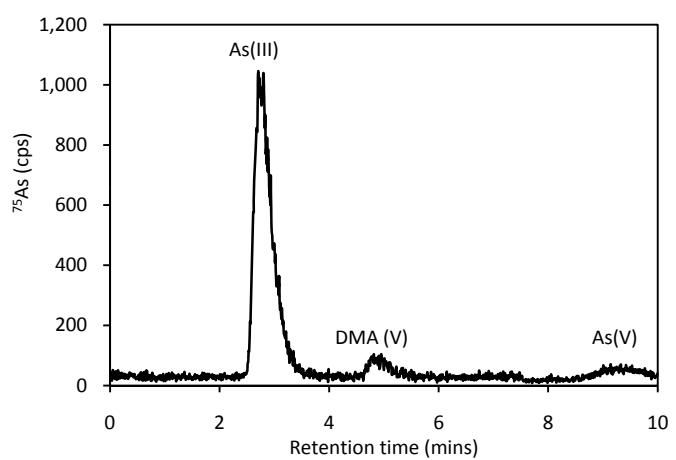
Fig. S5 Detection of methylated As in nutrient solution amended with arsenite. Representative chromatogram of As speciation of nutrient solution spiked with 10 µM arsenite at the end of the 7 day exposure period.