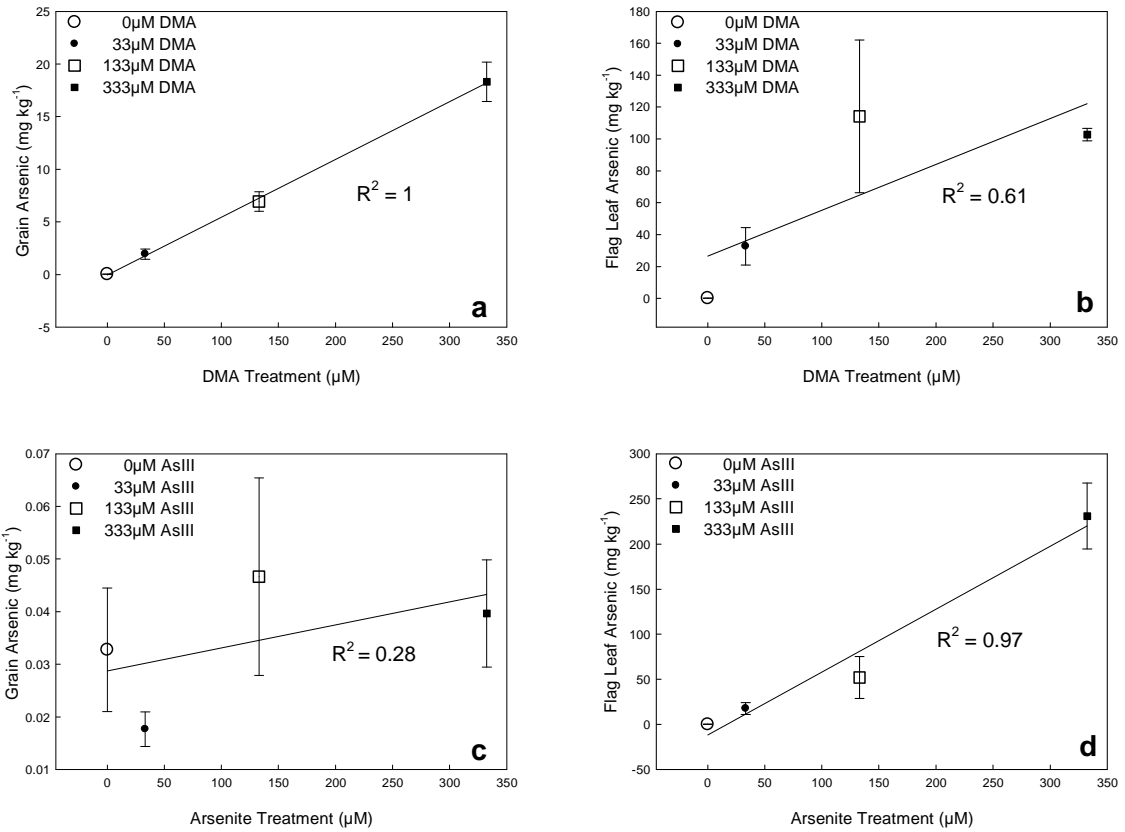
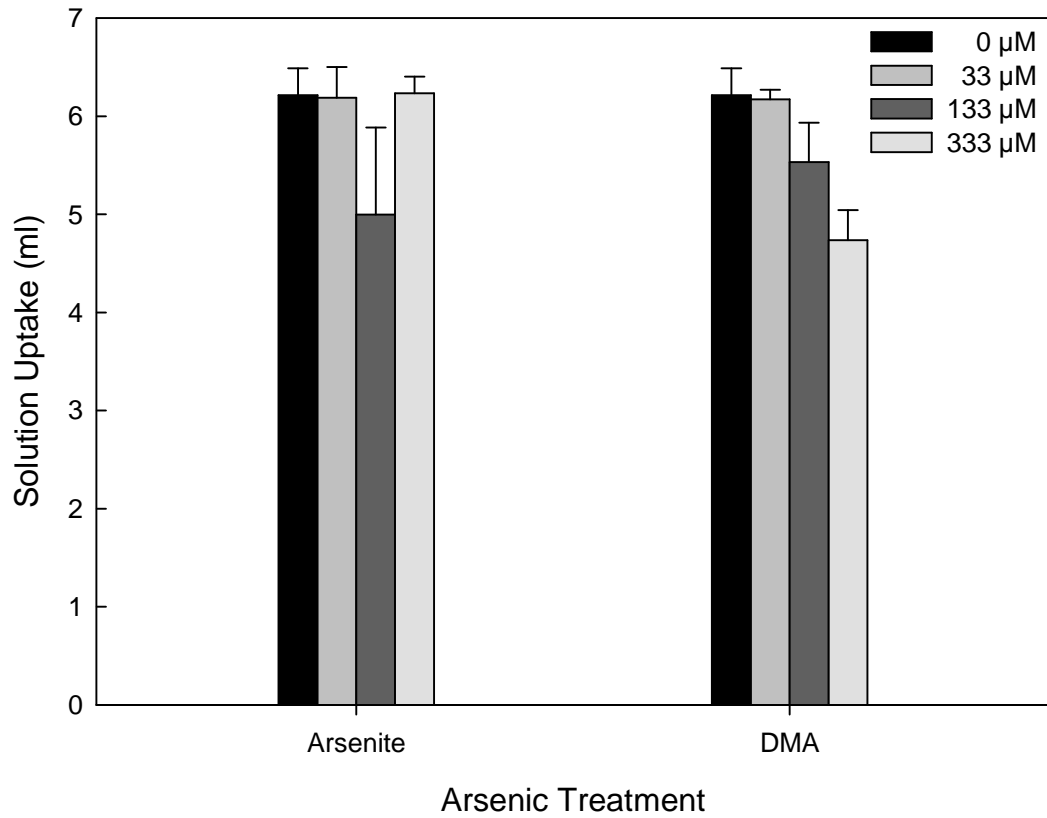


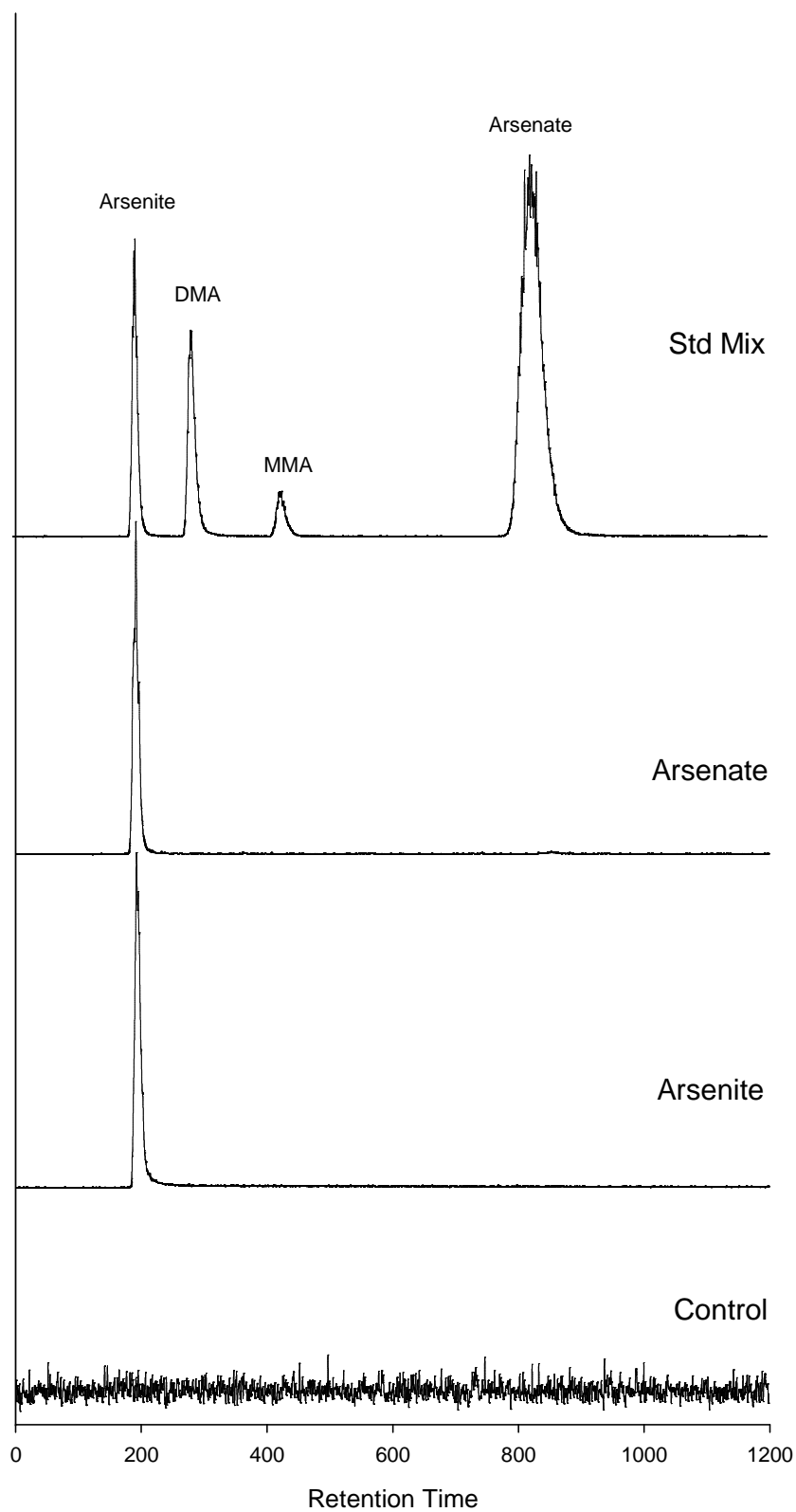
**Figure S1.** Mean total concentrations of rubidium (Rb, left) and strontium (Sr, right) in **a**, flag leaf and **b**, grain, for rice panicles exposed to 333  $\mu$ M of 1 of 5 arsenic treatments together with 1 mM Rb and Sr, or, in the case of the zero exposure controls, ultrapure, MilliQ water only. Treatments were delivered through the cut flag leaf on intact plants for 7 days, with a fresh vial applied every 24 hours. Total solution uptake is also shown for each treatment (circles). Error bars represent  $\pm$  SE of three replicates.



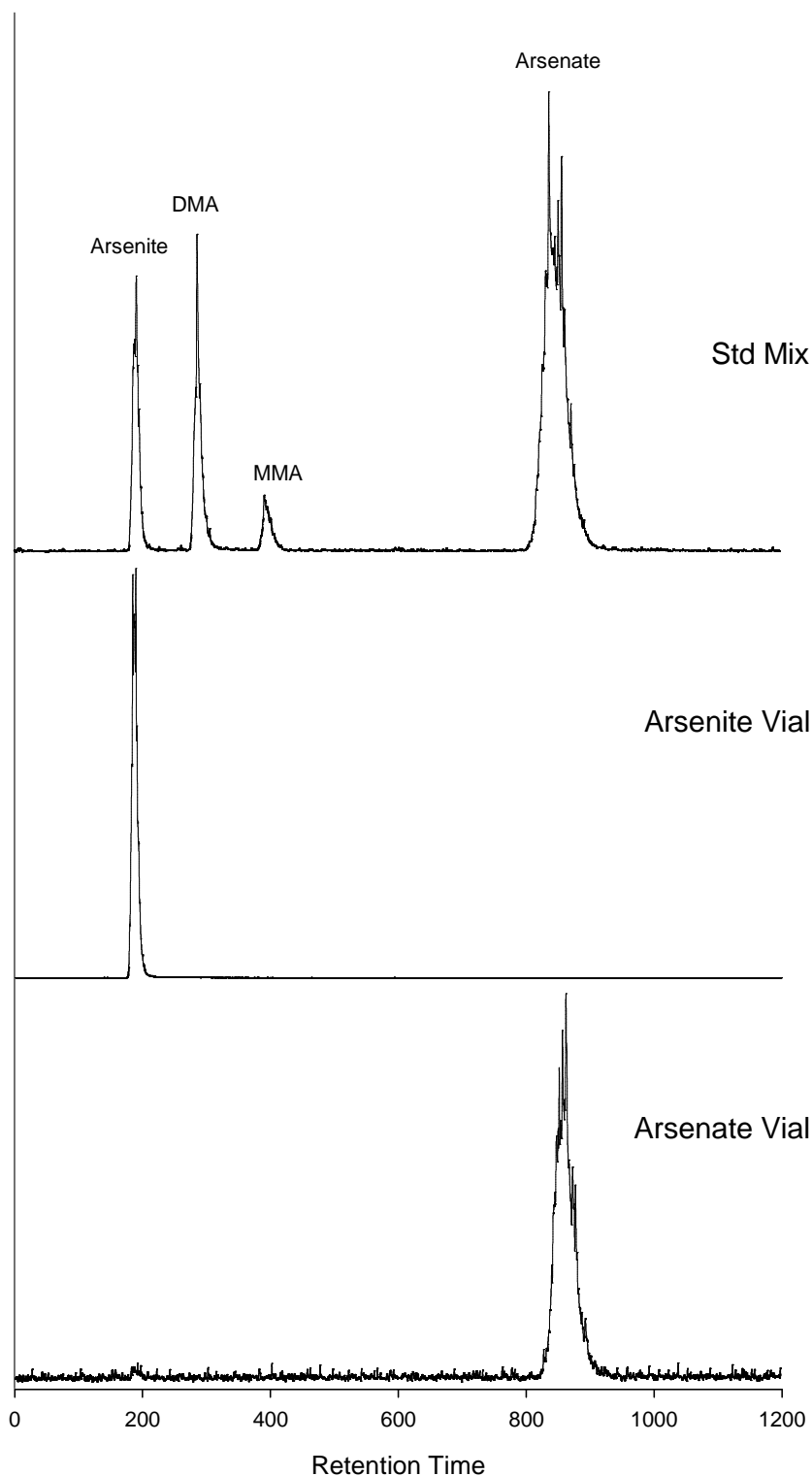
**Figure S2.** Dose response curves showing mean arsenic concentrations in grain and flag leaf for DMA treated panicles (a and b, respectively) and for arsenite treated panicles (c and d, respectively) under increasing levels of exposure. Rice panicles were exposed to 0, 33, 133 and 333 μM of DMA or arsenite through the cut flag leaf on intact plants for 7 days, with a fresh vial applied every 24 hours. Error bars represent ± SE of three replicates. Solution uptake for these treatments is shown in Figure S2.



**Figure S3.** Mean total solution uptake for panicles treated with 0, 33, 133 and 333  $\mu\text{M}$  arsenite or DMA. Treatments were delivered through the cut flag leaf on intact plants for 7 days, with a fresh vial applied every 24 hours. Error bars represent  $\pm$  SE of three replicates.

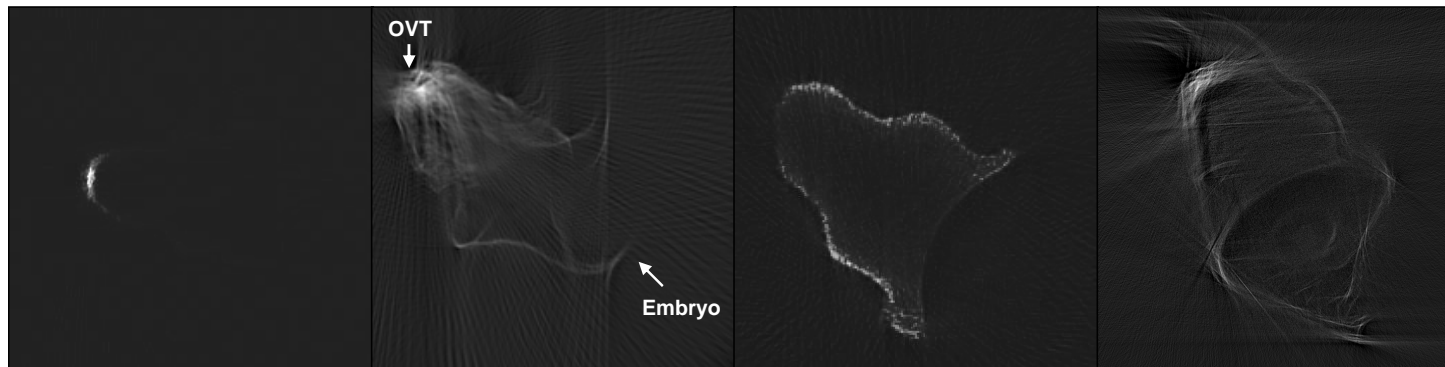


**Figure S4.** Chromatograms showing arsenic speciation in fresh leaf extracts of arsenite and arsenate fed flag leaves together with a standard mix. Flag leaves were exposed to 333  $\mu\text{M}$  for a period of 7 days, with a fresh vial of treatment solution applied every 24 hours.

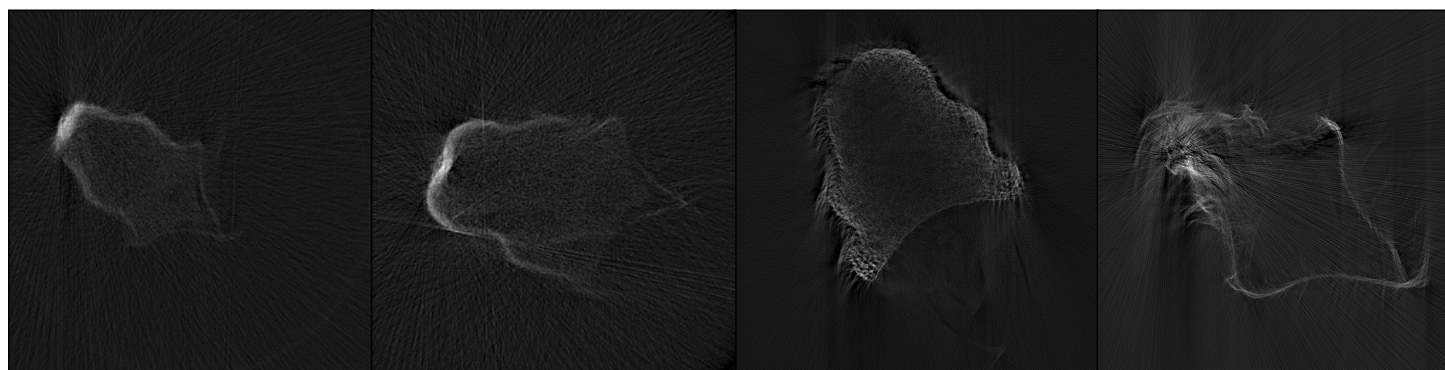


**Figure S5.** Chromatograms showing arsenic speciation in leaf feeding vials of arsenite and arsenate. In the experiment, flag leaves were exposed to 333  $\mu\text{M}$  arsenite or arsenate for a period of 7 days, with a fresh vial of treatment solution applied every 24 hours. Any vial contents that remained following the 24 hour period was weighed and then frozen at  $-20^{\circ}\text{C}$  for no more than 1 week prior to HPLC-ICP-MS analysis. Vial contents were then defrosted and mixed for each treatment immediately prior to HPLC-ICP-MS analysis.

Excised Stem Fed



Leaf Fed



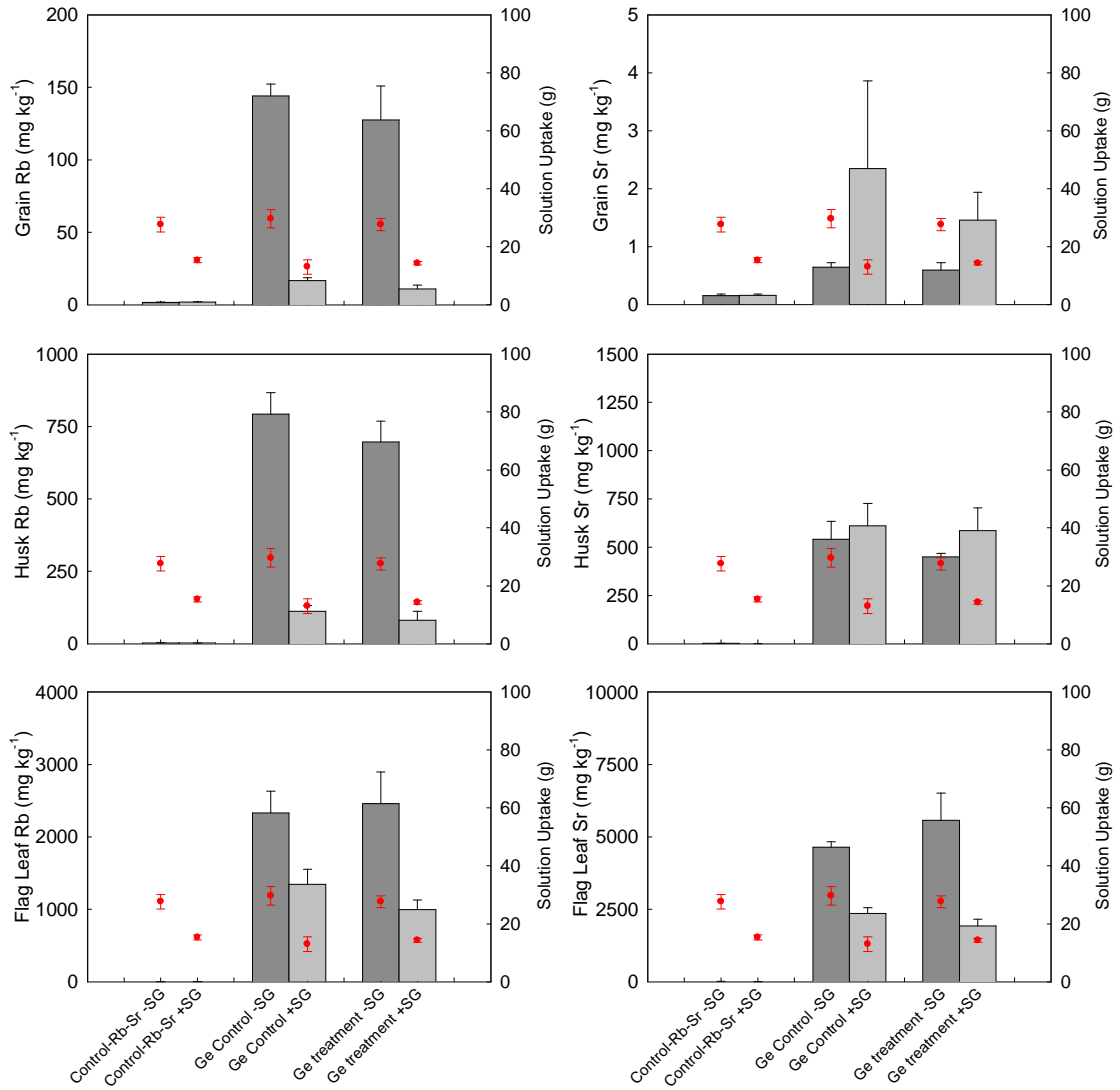
Arsenite

Arsenate

DMA

MMA

**Figure S6.** Fluorescence microtomography images showing distributions of arsenic for virtual cross sections of rice grain pulsed with either 133  $\mu\text{M}$  of 1 of 4 arsenic treatments through the excised panicle stem (top) or 333  $\mu\text{M}$  of 1 of 4 arsenic treatments through the cut flag leaf on intact plants (bottom). It should be noted that the image for the grain pulsed with arsenite through the cut leaf is essentially a control as ICP-MS analysis revealed no significant uptake into the grain.



**Figure S7.** Mean total concentrations of Rb (left) and Sr (right) in rice grain (top), husk (middle) and flag leaf (bottom) for excised rice panicles subjected to a  $\pm$  stem girdling treatment and hydroponically fed, over a 48 h period, nutrient solution amended with 133  $\mu$ M germanic acid and 1 mM Rb and Sr; 1 mM Rb and Sr only (germanic acid controls) or, for zero exposure controls, no amendment. Total solution uptake is also shown for each treatment (circles). Error bars represent the  $\pm$  SE of three replicates.