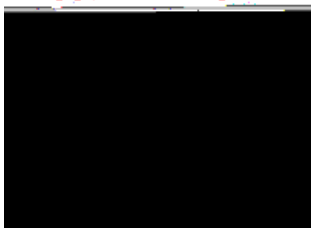
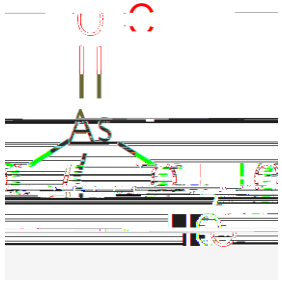
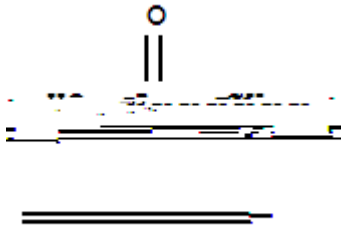


Arsenite (As ^{III})



Arsenate (As ^{V})

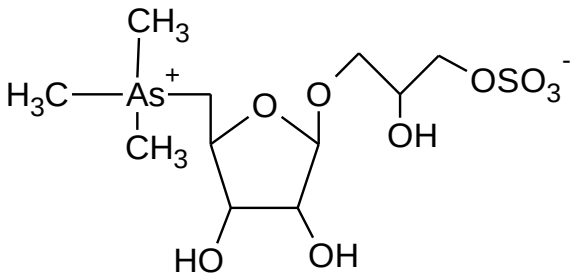


Methyl arsonate (MMA)

Dimethylarsenate (DMA)

Arsenobetaine (AsB)

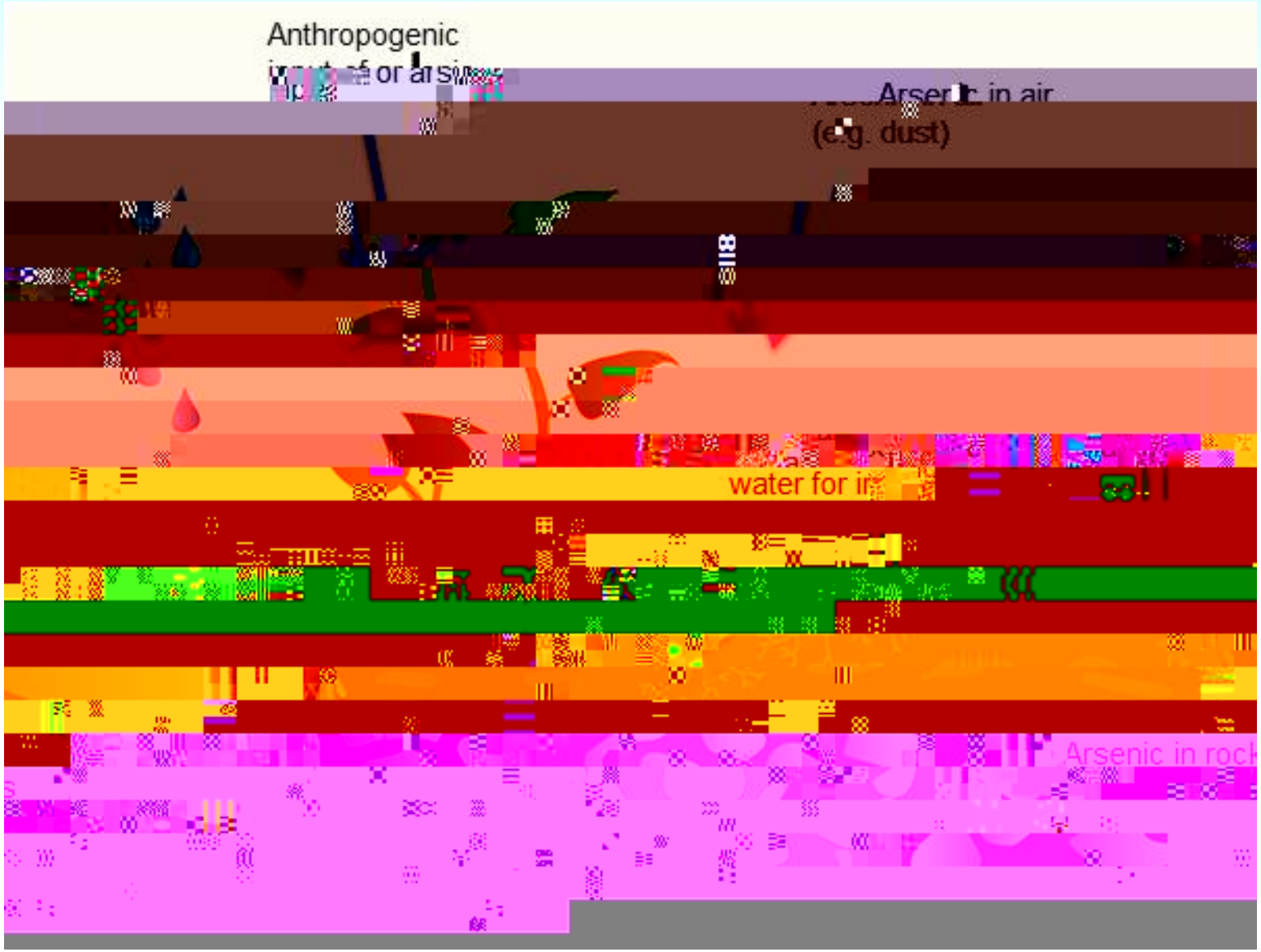
Arsenocholine (AsC)



Arsenosugar

Arsenic species	Dose (µg g^{-1})

Potential routes for arsenic into food based plants.

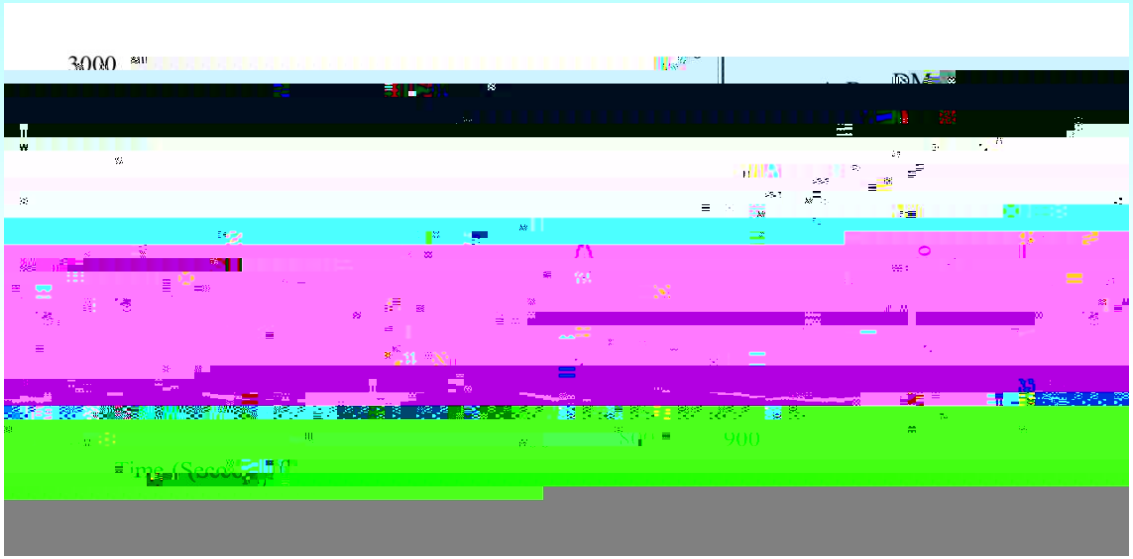


The concentration (mg/kg) of inorganic and total arsenic in the 20 food groups of the 2006 UK Total Diet Study

Food group	Inorganic arsenic mg/kg	Total arsenic mg/kg
Bread	’0.01	’ 0.005
Miscellaneous cereal	0.012	0.018
Carcase meat	’0.01	0.006
Offal	’0.01	0.008

M. Rose, M. Baxter, N. Brereton and C. Baskaran,

HPLC conditions for 1 % HNO_3 extracts



Chromatogram of four arsenic standards in aqueous solution. AsB, DMA and MMA and $InAs^{V}$ 50 µg L^{-1} As, employing a Hamilton PRP-X100 anion-exchange HPLC column using sodium sulfate.

Chromatogram of sand sole using anionic-exchange HPLC-ICP-MS, using sodium sulfate

Certified reference material for total arsenic; all experimental values are given in µg g^{-1}, mean ± standard deviation (n=3)

CRM	Sample type	Certified value (Arsenic)	Experimental value obtained	Extraction efficiency %
		±	±	
		±	±	

* Aqua regia extractable content

A case study of arsenic speciation in soil, irrigation water and plant tissue.

Location: Dokan, SE of Arbeel in Kurdistan, Iraq.

Concentrations of arsenic in irrigation water samples *(vegetable crops grown in each region also shown).*

Water sample	Location	area	Label	Concentration (µg L^{-1} ± SD (n=3)	Vegetable or crop
Water 1				0.54 ± 0.01	
Water 2				0.664 ± 0.025	
Water 3				0.697 ± 0.02	
Water 4				0.683 ± 0.06	
Water 5				2.4 ± 0.12	
Water 6				1.152 ± 0.07	
Water 7				0.576 ± 0.02	
Water 8				1.06 ± 0.07	

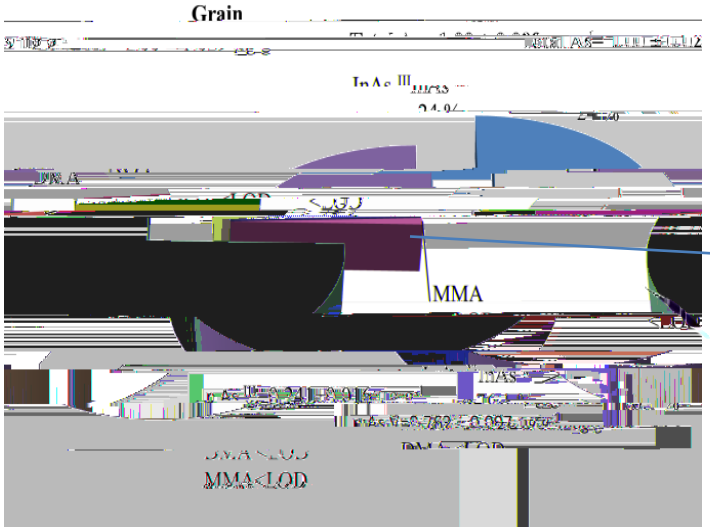
Arsenic concentration in different organs of vegetable crops t POTATO (dry weight); all values are given in µg g^{-1} of arsenic mean ± SD (n=3).

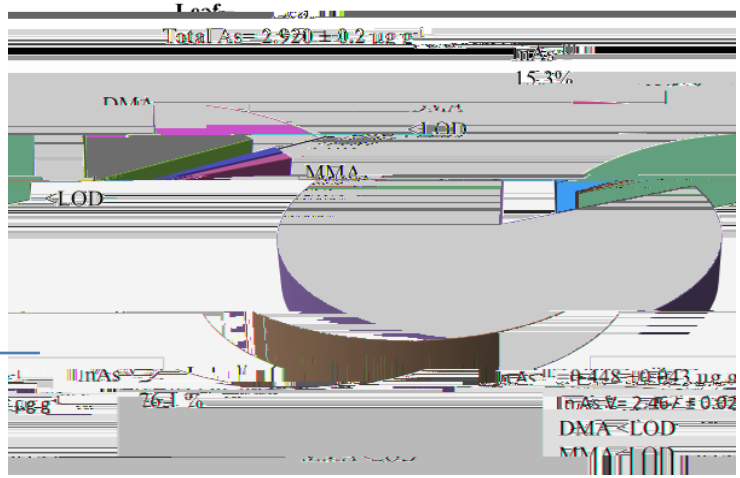
Vegetable	Microwave assist digestion	$InAs^{III}$	DMA	MMA	$InAs^{V}$	Total arsenic in residue	Total arsenic in extracts	Efficiency of extraction %	Sum of arsenic from species
Potato									
Root									
Skin									
Core									
Stem									
Leaf									

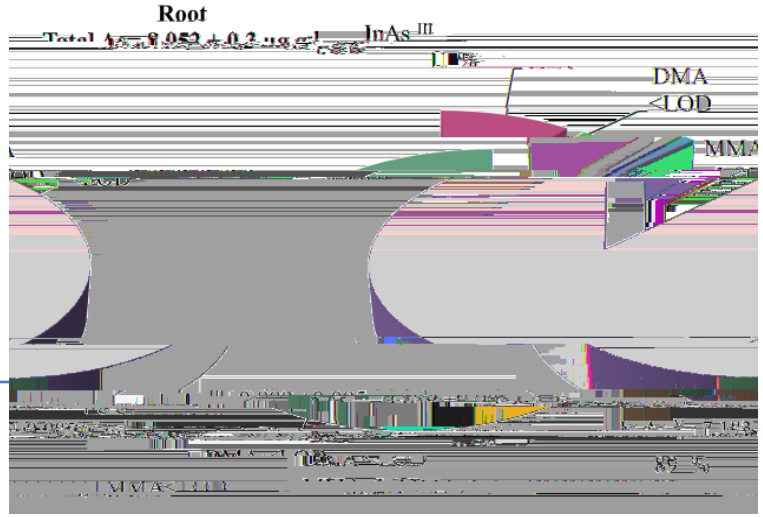
Concentration of As in cultivation soil, plant sample (μg As g^{-1} dry mass basis), and in irrigation water (μg As L^{-1}) mean ± SD (n=3)

Matrix	Total As (μg As g^{-1})
Cultivation soil	±
	±
	±
	±

Results


Grain
MMA
DMA <LOD
MMA<LOD


15.3%
DMA
<LOD
MMA
<LOD
DMA <LOD


Root
DMA
<LOD
MMA

Cellular level compartmentalisation of arsenic.

Known that As^{V} is a phosphate analog uptake through phosphate transport proteins.

Also known that As^{III} is a silicic acid analogue uptake through xylem system.

However, few studies on cellular level compartmentalisation of As in vegetative systems.

Aqueous DNA phase transferred and mixed with ammonium acetate and ethanol.

Tube inverted to precipitate the DNA.

measured after dissolution with nitric acid.

The extract was then washed several times with ethanol prior to final dissolution of the refined extract.

Sample Stem	Total arsenic in plant using microwave assisted acid digestion	Without washing Total arsenic in DNA extract	Washing with 70% ethanol Total arsenic in DNA extract
Rice	4.005 ± 0.264	0.09 ± 0.006	0.067 ± 0.005
Spring onion	0.702 ± 0.022	0.021 ± 0.003	<0.019
247 ± 0.020	<0.019	<0.019	Potato 0.
387 ± 0.012	<0.019	<0.019	Chard 0.
262 ± 0.010	<0.019	<0.019	Sunflower 0


using microwave
Total arsenic in DNA
ethanol
assisted acid digestion
extract

Conclusions:

The distribution of total and arsenic species in plant material depends on the individual plant species.

Arsenic concentration in different compartments of plants in this limited study fell into four groups.

Preliminary studies show .224 8lshow

Finally, in very recent work, taking the washed DNA and dissolving in TRIS EDTA buffer prior to speciation by ion chromatography ICP-MS, we found that although some As^{v} was released, the roots stem and leaf compartments all retained a very similar proportion of the As^{v} (41 1 %) implying that this fraction may be

Acknow 0 reti4e 0 rments

Thank you for listening.