Determination of four arsenic species in soil by sequential extraction and high performance liquid chromatography with post-column hydride generation and inductively coupled plasma optical emission spectrometry detection

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Supplementary material.

Soil analysis report.

Fig. S1. Effect of (a) $NaBH_4$ concentration, (b) $NaBH_4$ flow rate, (c) hydrochloric acid flow rate, (d) nebulizer flow rate, (e) plasma viewing distance, and (f) RF power.

Fig. S2. The effect of sonication time on the oxidation of 1.0 mg l^{-1} As(III) prepared in (a) deionized water, (b) 0.01 mol l^{-1} NaOH and (c) 0.01 mol l^{-1} H_3PO_4.

SOIL AND PLANT TISSUE TESTING LAB   LAB NUMBER: S050622-141
WEST EXPERIMENT STATION   BAG NUMBER: 62899
UNIVERSITY OF MASSACHUSETTS
AMHERST, MA 01003

                                             SOIL WEIGHT: 5.32 g/5cc

      DR. BARKER   COMMENTS:
      BOWDITCH HALL
      CAMPUS

                          ANALYSIS REPORT

      SAMPLE ID: NICA
      SOIL TYPE:

      SOIL PH   6.8   ALUMINUM (AL):   35 PPM (Soil Range: 10-300)
      BUFFER PH 7.0   ORGANIC MATTER: 1.3 %. Desirable range 4-8%.

NUTRIENT LEVELS: PPM	LOW	MEDIUM	HIGH	VERY HIGH
PHOSPHORUS (P) 8	XXXXXXXXXXXX			
POTASSIUM (K) 127	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
CALCIUM (CA) 281	XXXXXXXX			
MAGNESIUM (MG) 42	XXXXXXXXXX			
AMMONIUM (NH4-N) 1	XX			
NITRATE (NO3-N) 1				

CATION EXCH CAP   PERCENT BASE SATURATION   SOLUBLE SALTS
   2.0 MEQ/100G   K=15.6 MG=16.6 CA=67.9   0.13 dS/M (Soil Range: 0.08-0.50)

MICRONUTRIENT		PPM	SOIL RANGE	MICRONUTRIENT		PPM	SOIL RANGE
Boron	(B)	0.1	0.1-2.0	Copper	(Cu)	0.9	0.3-8.0
Manganese	(Mn)	0.8	3 - 20	Iron	(Fe)	3.5	1.0- 40
Zinc	(Zn)	0.4	0.1- 70				

EXTRACTED LEAD   (PB)   1 PPM.   ESTIMATED TOTAL LEAD IS   34 PPM.
EXTRACTED CADMIUM (CD) 0.0 PPM.
EXTRACTED NICKEL   (NI) 0.1 PPM.   EXTRACTED CHROMIUM (CR)   0.0 PPM.

                          COMMENTS

COMPUTER PROGRAM & RECOMMENDATIONS BY DEPT OF PLANT & SOIL SCI UMASS-AMHERST.

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West Experiment Station
University of Massachusetts
Amherst, MA 01003
413.545.2311
http://www.umass.edu/plsoils/soiltest

TEXTURAL ANALYSIS RESULTS

Customer Name: Dr Barker
Bowditch Hall
Campus

Sample ID: S050622-141

Customer Designation: NICA

USDA SIZE FRACTIONS

Main Fractions	Size (mm)	Percent
Sand	0.05-2.0	35.5
Silt	0.002-0.05	59.8
Clay	< 0.002	4.7
Total	< 2.0	100.0

Sand Fractions	Size (mm)	Percent
Very Coarse	1.0-2.0	0.2
Coarse	0.5-1.0	0.5
Medium	0.25-0.5	0.7
Fine	0.10-0.25	4.4
Very Fine	0.05-0.10	29.7
		35.5

Silt Fractions	Size (mm)	Percent
Coarse	0.02-0.05	39.9
Medium	0.005-0.02	18.3
Fine	0.002-0.005	1.6
		59.8

USDA Textural Class = silt loam

Gravel Content = 0.2%

PERCENT OF WHOLE SAMPLE PASSING

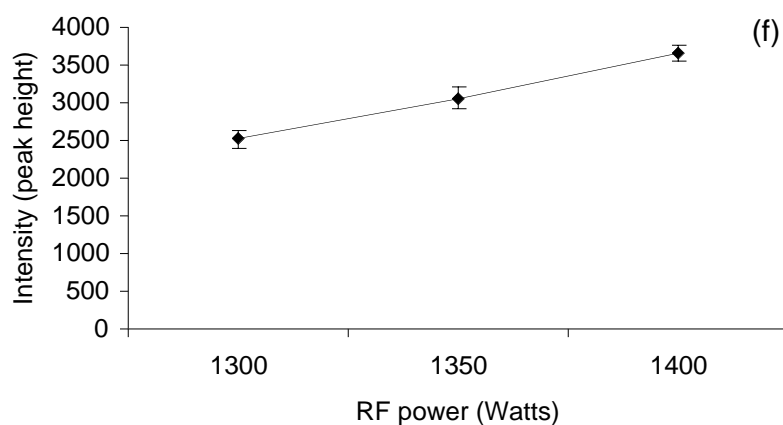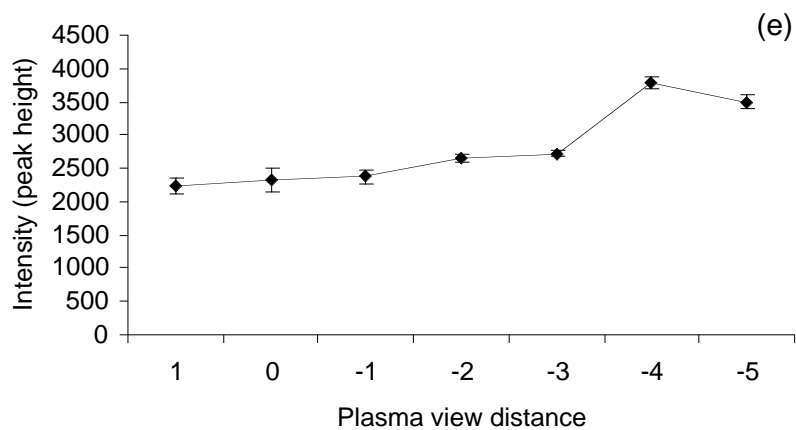| Size (mm)	Sieve #	%
2.00	#10	99.8
1.00	#18	99.6
0.50	#35	99.1
0.25	#60	98.4
0.10	#140	94.0
0.05	#270	64.4
0.02	20 um	24.6
0.005	5 um	6.3
0.002	2 um	4.7

COMMENTS:

(a)

(b)

(c)

(d)
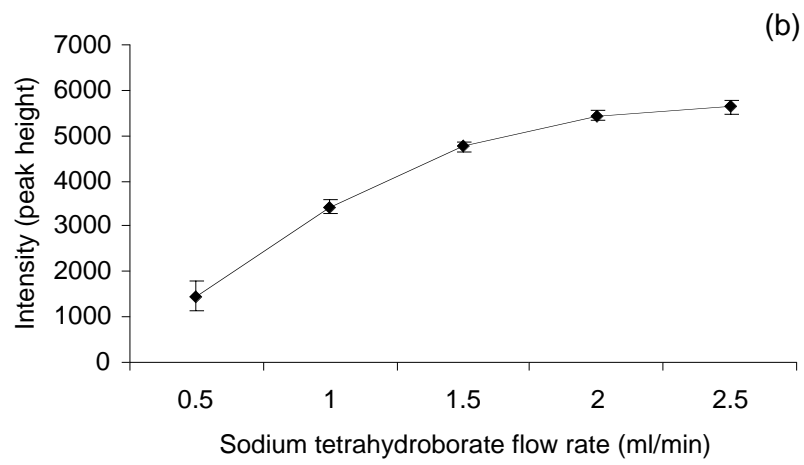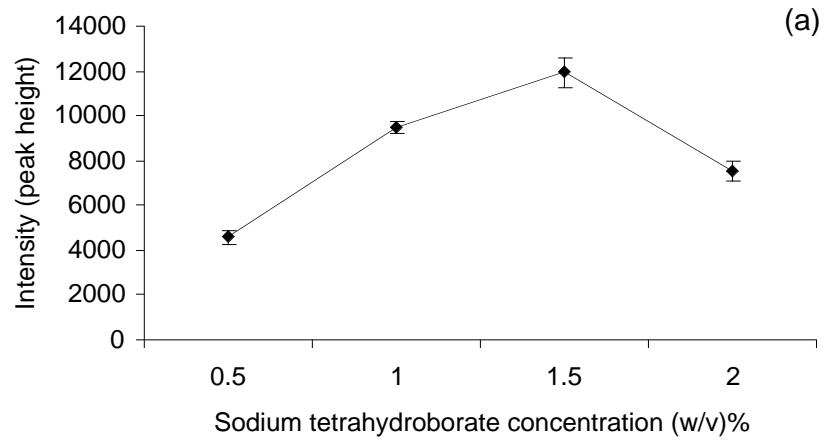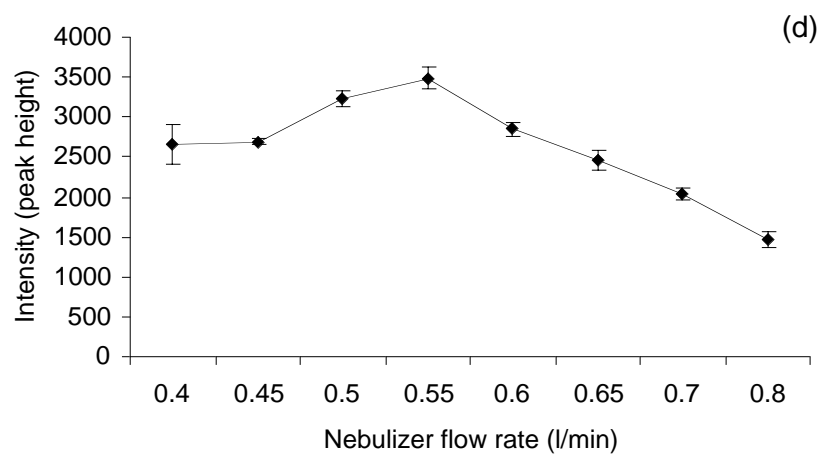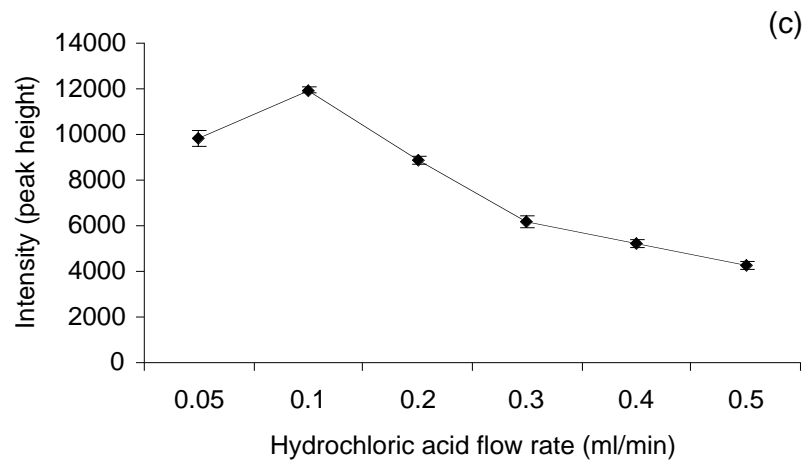
Figure S1: Effect of (a) NaBH$_4$ concentration, (b) NaBH$_4$ flow rate, (c) hydrochloric acid flow rate, (d) nebulizer flow rate, (e) plasma viewing distance, and (f) RF power. The plots are representative of the effect of each of the individual parameters and were obtained with the values of the other parameters either close to or at the optimum values. Arsenic concentration was 0.1 µg l^{-1} as arsenite at flow rate 1 ml min^{-1}. Error bars are mean ± standard deviation (n = 3).
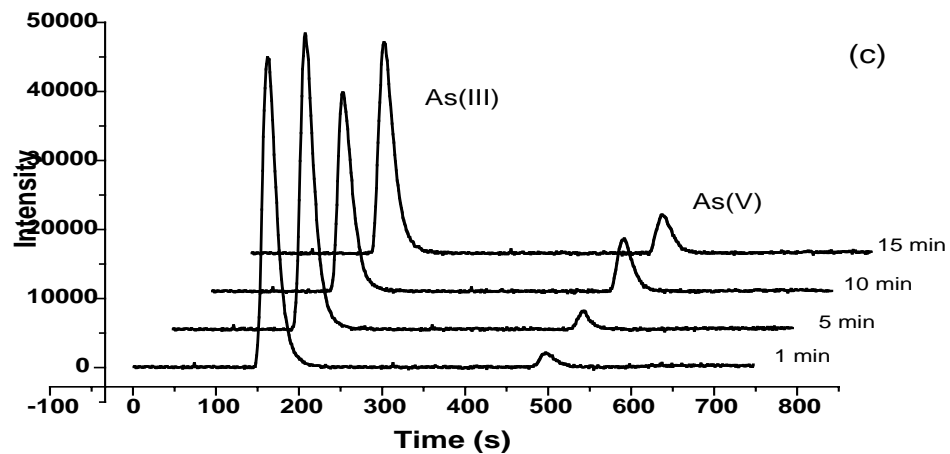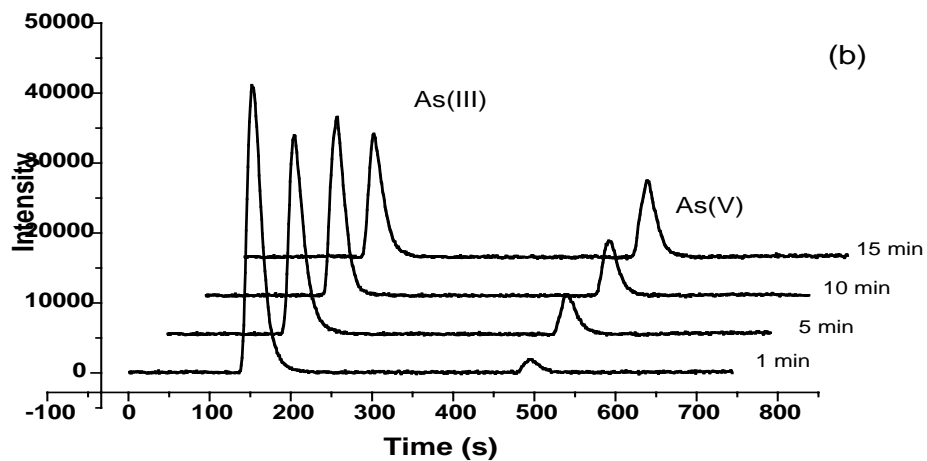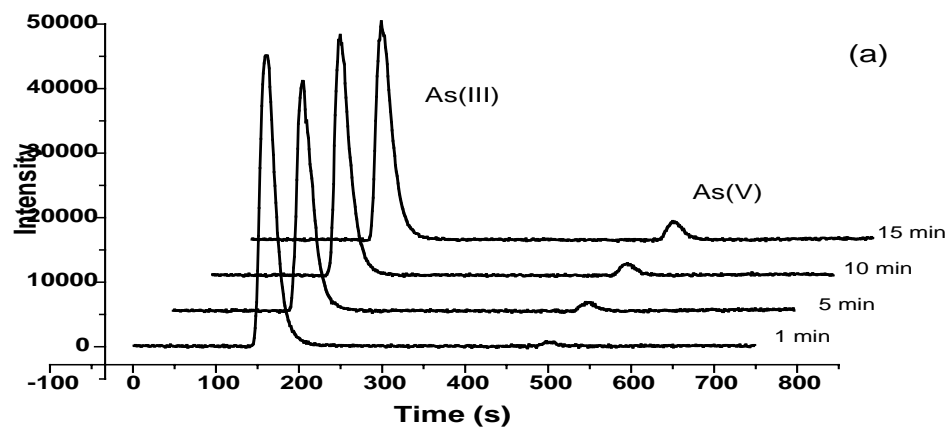
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