

Fig. 1 Suppl. Arsenic toxicity symptoms of *Arabidopsis thaliana* plants cultivated in nutrient solution with 0 (A, E, I, K), 27 (B, F), 108 (C, G, J) and 216 (D, H, L)  $\mu\text{M}$  arsenic in the form of sodium arsenate for five days. Leaves showing a purple colour detectable mainly on the abaxial side (E - H) and roots showing increased hair density (J), brownish colouring and gelatinous appearance (L).

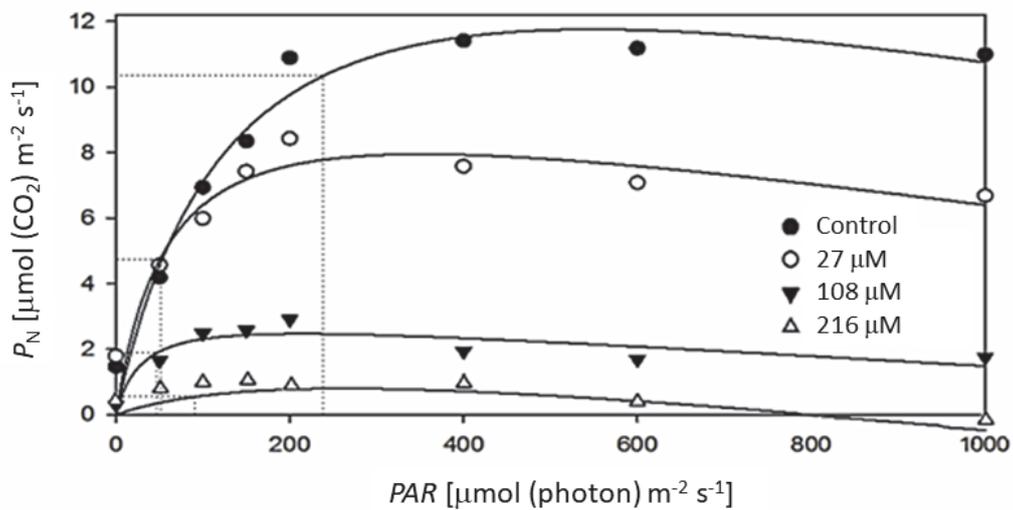


Fig. 2 Suppl. Photosynthetic light response curve and light saturation point (dashed lines, 80 % of the maximum  $P_N$  value) of *Arabidopsis thaliana* plants cultivated in nutrient solution with 0, 27, 108, and 216  $\mu\text{M}$  arsenic for five days.

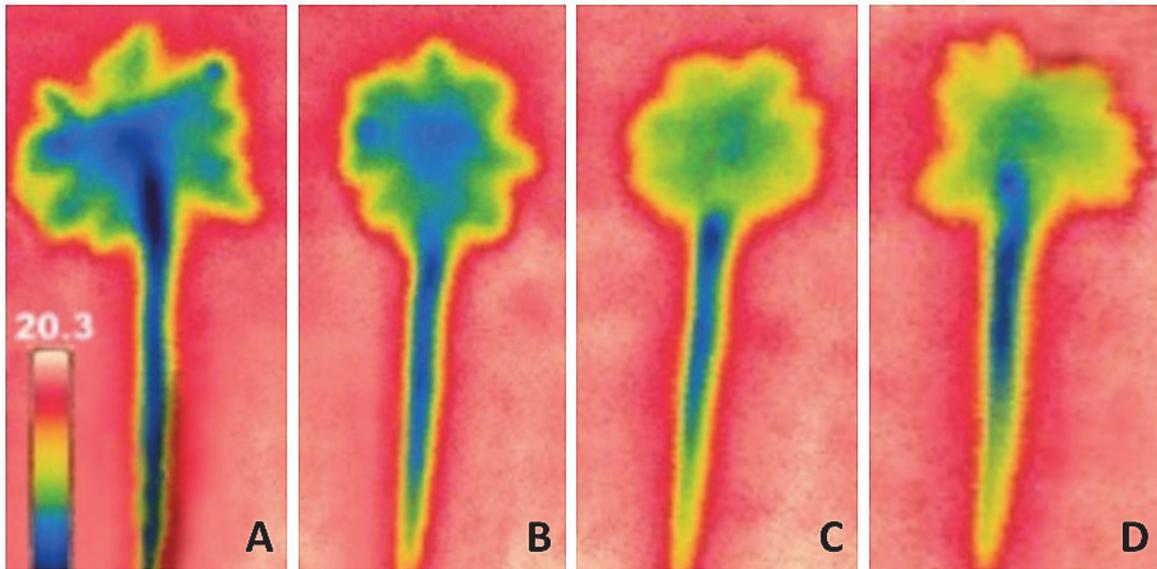


Fig. 3 Suppl. Images of *Arabidopsis thaliana* plants cultivated in nutrient solution with 0 (A), 27 (B), 108 (C), and 216  $\mu\text{M}$  (D) arsenic obtained using an infra-red photographic camera.

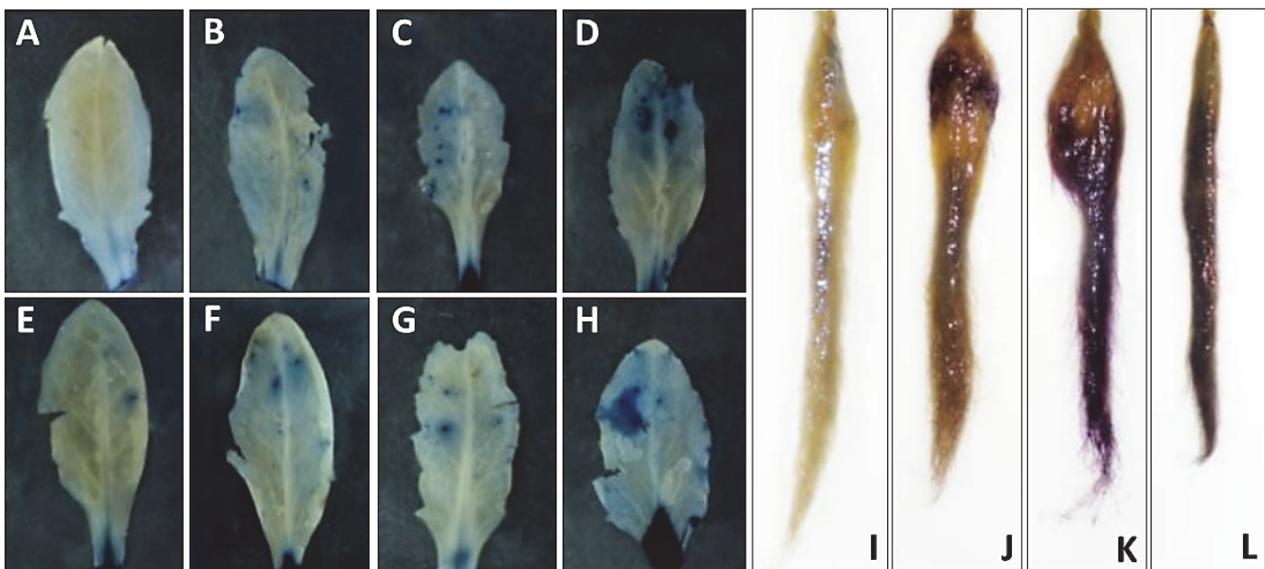


Fig. 4 Suppl. Superoxide radical detection using the NBT reagent in leaves (A - H) and roots (I - L) of *Arabidopsis thaliana* plants cultivated in nutrient solution containing 0 (A, E, I), 27 (B, F, J), 108 (C, G, K), and 216 (D, H, L)  $\mu\text{M}$  arsenic for five days.

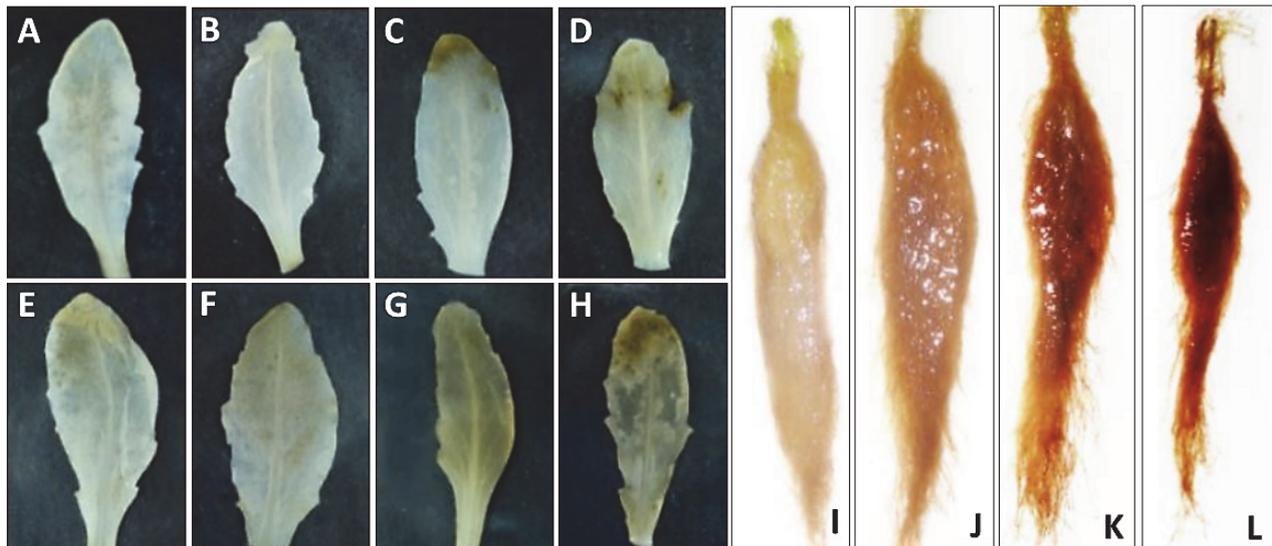


Fig. 5 Suppl. Hydrogen peroxide detection using the DAB reagent in leaves (A - H) and roots (I - L) of *Arabidopsis thaliana* plants cultivated in nutrient solution containing 0 (A, E, I), 27 (B, F, J), 108 (C, G, K) and 216 (D, H, L)  $\mu$ M arsenic for five days.

Table 1 Suppl. Primer pairs used for quantitative gene expression analysis. Accession numbers are based on the National Center for Biotechnology Information (NCBI); F and R indicate forward and reverse primers.

Gene	Accession	Primer pairs (5' $\rightarrow$ 3')
<i>ACT2</i> (actin 2)	NM_112764.3	F-CTTGCACCAAGCAGCATGAA R-CCGATCCAGACACTGTACTTCCTT
<i>AOX1A</i> (alternative oxidase 1A)	NM_113135.3	F-CTGGACCACGTTTGTTCT R-ACACCCCAATAGCTCG
<i>AOX1D</i> (alternative oxidase 1D)	NM_102968.2	F-TACCGCACTCTTCGAC R-GGCTGGTTATTCCCCT
<i>APX1</i> (L-ascorbate peroxidase 1)	NM_001123772.1	F-TGCCACAAGGATAGGTCTGG R-CCTTCCTTCTCTCCGCTCAA
<i>APX2</i> (L-ascorbate peroxidase 2)	NM_111798.3	F-TTGCTGTTGAGATCACTGGAGGA R-TGAGGCAGACGACCTTCAGG
<i>CAD1</i> (glutathione $\gamma$ -glutamylcysteinyltransferase 1)	NM_123774.3	F-TGGTGTGAATGCTCTTTCTATCG R-GGTTTCGAGCAATCCAACAT
<i>CAT1</i> (catalase 1)	NM_101914.3	F-AAGTGCTTCATCGGGAAGGA R-CTTCAACAAAACGCTTCACGA
<i>CAT2</i> (catalase 2)	NM_001036714.5	F-AACTCCTCCATGACCGTTGGA R-TCCGTTCCCTGTCGAAATTG
<i>CSD2</i> (copper/zinc superoxide dismutase 2)	NM_128379.3	F-GAGCCTTTGTGGTTCACGAG R-CACACCACATGCCAATCTCC
<i>EF1A</i> (elongation factor 1-alpha 4)	NM_001125992.1	F-TGAGCACGCTCTTCTTGCTTTCA R-GTGGTGGCATCCATCTTGTTACA
<i>GR</i> (glutathione reductase, chloroplastidic)	NM_115323.3	F-GCCCAGATGGATGGAACAGAT R-TAGGGTTGGAGAATGTTGGCG
<i>GRI</i> (glutathione-disulfide reductase, cytosolic)	NM_001125216.1	F-CTCAAGTGTGGAGCAACCAAAG R-ATGCGTCTGGTCACACTGC
<i>GSH1</i> (glutamate-cysteine ligase)	NM_001203879.1	F-CCCTGGTGAAGTGCCTTCA R-CATCAGCACCTCTCATCTCCA
<i>GSH2</i> (glutathione synthetase 2)	NM_122620.3	F-GGACTCGTCGTTGGTGACAA R-TCTGGGAATGCAGTTGGTAGC
<i>GSTF8</i> (glutathione S-transferase phi 8)	NM_180148.4	F-GCGAGAGTCAAAGAGCACCT R-TCTTTAAAGGCATGTTCCGGC

Table 2 Suppl. Young and fully expanded leaf anatomy of *Arabidopsis thaliana* plants cultivated in nutrient solution containing 0 and 108  $\mu\text{M}$  arsenic for five days. Means  $\pm$  SE,  $n = 5$ ,. \* and \*\* indicate significant differences at  $P < 0.05$  and  $0.01$ , respectively.

Leaf stage	Arsenic [ $\mu\text{M}$ ]	Thickness [ $\mu\text{m}$ ]				total	Number of palisade parenchyma cells
		epidermis adaxial	abaxial	parenchyma palisade	spongy		
Young	0	35.14	27.30	190.02	203.06	455.52	42
	108	34.38	27.61	194.95	161.15**	418.10**	44
Fully expanded	0	38.18	29.02	218.40	217.45	503.05	41
	108	33.41**	22.73*	194.90**	174.14**	425.18**	38

Table 3 Suppl. Effects of arsenic on the metabolic profile of roots, fully expanded leaves, and young leaves of *Arabidopsis thaliana* plants cultivated in nutrient solution containing 0, 27, 108, and 216  $\mu\text{M}$  arsenic for five days. Different letters indicate significant differences ( $n = 4$  or  $5$ ;  $P < 0.05$ , Tukey's test). Values are given relative to those in the control (0  $\mu\text{M}$  arsenic) for each organ, except for fructose, glucose, sucrose and starch which are given in [ $\text{mmol kg}^{-1}(\text{d.m.})$ ].

As [ $\mu\text{M}$ ]	Roots				Fully expanded leaves				Young leaves			
	0	27	108	216	0	27	108	216	0	27	108	216
<b>Saccharides</b>												
Fructose	15.1 ab	20.2 a	11.3 b	3.4 ab	16.7	12.0	18.9	13.8	13.6	20.6	13.8	14.1
Glucose	63.5 ab	75.0 a	61.1 ab	18.7 b	56.7 a	48.2 a	195.4 b	126.2 ab	47.8 a	171.2 b	203.0 b	220.6 b
Glucose-6-P	1.0 ab	2.6 a	2.6 ab	0.7 b	1.0	0.4	0.6	0.8				
Maltose	1.0 a	3.1 ab	12.8 b	39.1 c	1.0 a	0.3 b	0.6 ab	0.3 ab	1.0	0.8	0.5	0.6
Myo-inositol	1.0	1.5	2.0	2.0	1.0 a	0.7 b	0.6 b	0.8 ab	1.0	1.2	0.8	1.0
Ononitol/pinitol	1.0 a	1.6 a	5.7 b	6.2 b	1.0	0.7	0.5	0.5	1.0a	0.8a	0.4 b	0.4 b
Raffinose	1.0	1.4	38.5	22.9	1.0	1.5	2.3	0.6	1.0a	4.6ab	6.2 b	3.9 ab
Starch	38.8	43.9	42.6	56.5	116.0 a	92.5 a	106.3 a	54.3 b	115.2a	111.9a	102.0 a	74.1 b
Sucrose	67.3	64.0	118.5	84.0	52.8	48.7	68.2	70.2	49.6ab	54.0a	56.0 a	24.5 b
<b>Organic acids</b>												
2-Oxoglutarate					1.0 a	4.1 ab	11.5 b	8.9 ab				
Citrate	1.0 a	1.1 a	3.3 b	1.2 a	1.0	0.9	0.8	0.4	1.0a	0.9ab	0.6 ab	0.4 b
Erythreonic acid	1.0 a	6.4 bc	8.3 c	2.9 ab	1.0	1.3	2.6	2.1	1.0a	1.5a	2.6 b	2.2 ab
Fumarate	1.0	1.8	1.7	4.9	1.0 a	1.0 a	0.4 b	0.4 b	1.0a	1.3b	0.9 a	0.5 c
Glycerate	1.0 a	73.7 b	25.2 ab	5.0 ab	1.0	0.8	1.2	0.8	1.0	0.7	0.9	0.9
Glycolate	1.0 a	1.3 a	2.1 ab	4.0 b	1.0 a	4.1 ab	7.9 b	1.9 ab	1.0	0.6	1.3	1.5
Malate	1.0	1.6	2.1	1.1	1.0 a	2.4 a	5.9 b	5.1 b	1.0a	1.4a	2.4 b	2.7 b
Pyruvate	1.0 a	3.3 ab	3.9 b	2.7 ab	1.0	1.0	0.9	0.8				
Succinate	1.0 a	1.4 ab	2.6 b	1.2 ab	1.0 ab	1.5 a	0.9 ab	0.3 b	1.0ab	1.3 a	0.7 ab	0.5 b
Threonic acid	1.0 a	4.9 ab	8.7 b	6.6 b	1.0	0.7	1.1	0.7	1.0	0.9	1.0	0.8
<b>N compounds</b>												
Alanine	1.0	1.3	2.1	0.8	1.0 a	0.7 a	14.3 a	130.5 b	1.0	0.0	4.8	4.7
Allantoin	1.0 a	1.0 a	0.9 ab	0.3 b								
$\beta$ -alanine	1.0 a	2.5 ab	4.3 b	2.9 ab	1.0 a	1.7 ab	2.0 ab	5.0 b	1.0a	0.9a	1.2 a	2.7 b
Ethanolamine					1.0 a	0.5 a	5.2 b	4.5 b	1.0	0.3	1.6	2.5
GABA	1.0	1.2	2.1	1.0	1.0	0.7	0.9	0.9	1.0a	1.2ab	1.5 bc	1.7 c
Glycine	1.0	1.2	1.3	0.8	1.0 a	3.3 a	8.3 a	21.0 b	1.0a	0.4a	4.4 a	10.2 b
Leucine	1.0 a	2.5 ab	4.5 b	2.8 ab								
Lysine	1.0 a	1.8 ab	2.8 b	2.3 ab								
Phenylalanine	1.0 a	3.5 b	2.0 ab	2.4 ab	1.0	1.0	1.2	3.1	1.0a	0.5ab	0.3 b	0.8 ab
Proline	1.0	0.7	28.3	113.8	1.0 a	18.8 a	574.8 a	2303.8 b	1.0a	0.8a	1300.6ab	2611.9b
Pyroglutamate	1.0	1.1	1.1	0.6	1.0	0.7	1.0	0.8	1.0a	0.6ab	0.6 b	0.5 b
Valine	1.0 a	3.0 b	3.2 b	3.7 b	1.0 a	41.7 ab	81.8 ab	179.7 b	1.0a	1.0a	33.4 a	98.2 b

Table 4 Suppl. Macro and micronutrient content in shoot and root tissues of *Arabidopsis thaliana* plants cultivated in nutrient solution containing 0, 27, 108, and 216  $\mu\text{M}$  arsenic for five days. Different letters indicate significant differences ( $n = 5$ ;  $P < 0.05$ , Tukey's test).

	As [ $\mu\text{M}$ ]	Macronutrients [(g kg <sup>-1</sup> (d.m.))]					Micronutrients[ (mg kg <sup>-1</sup> (d.m.))]				
		Ca	K	Mg	P	S	Cu	Fe	Mn	Mo	Zn
Shoots	0	29.4 a	16.4 a	7.3 a	3.37 a	6.8 a	2.35 c	122.3 b	91.1 b	3.6 a	19.1 a
	27	30.4 a	14.8 a	7.5 a	2.84 ab	6.8 a	2.16 c	122.0 b	96.4 ab	3.2 ab	12.8 b
	108	31.0 a	15.5 a	7.6 a	2.26 b	6.8 a	2.47 ab	139.5 ab	104.1 a	3.2 bc	11.3 b
	216	30.6 a	16.6 a	7.7 a	2.17 b	7.3 a	2.58 a	160.9 a	98.6 ab	2.7 c	14.1 b
Roots	0	9.7 c	25.4 a	5.7 a	4.32 a	8.1 ab	22.57 a	2283 bc	97.1 b	15.7 a	60.5 a
	27	11.3 bc	16.2 b	5.5 a	4.08 a	9.4 a	16.62 b	1859 c	113.7 b	5.0 b	21.1 b
	108	13.4 b	10.5 bc	4.3 b	3.32 b	6.1 ab	19.01 ab	2498 b	324.2 a	6.1 b	16.5 b
	216	14.5 a	5.0 c	4.0 b	3.20 b	5.7 b	23.27 a	3062 a	87.6 b	5.4 b	25.0 b