

Phytotoxicity and Effect of Ionic Liquids on Antioxidant Parameters in Spring Barley Seedlings: The Impact of Exposure Time

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Table 1. Effect of ILs on the germination potential (GP) and germination rate (GR) of spring barley.

Concentration of ILs (mg·kg ⁻¹ of soil DM)	[BMIM][Br]		[TBA][Br]		[TBP][Br]	
	GP (%)	GR (%)	GP (%)	GR (%)	GP (%)	GR (%)
0	93.33 ± 4.08 ^a	95.00 ± 4.47 ^a	92.50 ± 5.24 ^a	99.17 ± 2.04 ^{ab}	97.50 ± 2.74 ^a	100.00 ± 0.00 ^a
1	86.67 ± 2.58 ^a	96.67 ± 4.08 ^a	92.50 ± 5.24 ^a	98.33 ± 2.58 ^{ab}	95.83 ± 4.92 ^a	99.12 ± 5.17 ^a
10	88.33 ± 5.16 ^a	95.00 ± 6.32 ^a	91.67 ± 4.08 ^a	97.50 ± 4.18 ^{ab}	99.17 ± 2.04 ^a	100.00 ± 0.00 ^a
100	85.83 ± 8.61 ^a	95.83 ± 3.76 ^a	95.00 ± 4.47 ^a	98.33 ± 4.08 ^{ab}	98.33 ± 2.58 ^a	100.00 ± 0.00 ^a
400	70.00 ± 14.83 ^b	94.17 ± 4.92 ^a	95.00 ± 4.47 ^a	99.17 ± 2.04 ^{ab}	93.33 ± 4.08 ^a	93.86 ± 3.96 ^b
700	63.33 ± 10.33 ^b	89.17 ± 8.61 ^a	89.17 ± 8.61 ^a	100.00 ± 0.00 ^a	93.33 ± 2.58 ^a	93.86 ± 6.15 ^b
1000	59.17 ± 8.61 ^b	93.33 ± 5.16 ^a	85.00 ± 8.37 ^a	93.33 ± 5.16 ^b	93.33 ± 4.08 ^a	93.86 ± 6.15 ^b

Data are means ± SD from 3 independent experiments. Values denoted by the same letters in the columns do not differ statistically at $p < 0.05$.

Table S2. Dry weight (g g⁻¹ FW) content in spring barley seedlings exposed to ILs.

Doses of ILs (mg kg ⁻¹ of soil DM)	Dry weight		
	[BMIM][Br]	[TBA][Br]	[TBP][Br]
Day 7			

0	0.0792 ± 0.0009 ^d	0.0861 ± 0.0031 ^{hi}	0.0789 ± 0.0011 ⁱ
1	0.0777 ± 0.0006 ^d	0.0838 ± 0.0018 ⁱ	0.0807 ± 0.0010 ^{hi}
10	0.0808 ± 0.0006 ^d	0.0867 ± 0.0006 ^{hi}	0.0814 ± 0.0012 ^{hi}
100	0.0909 ± 0.0044 ^c	0.0991 ± 0.0012 ^f	0.1088 ± 0.0007 ^f
400	0.1152 ± 0.0020 ^b	0.1192 ± 0.0004 ^{cde}	0.1169 ± 0.0020 ^e
700	0.1318 ± 0.0050 ^a	0.1191 ± 0.0010 ^{cde}	0.1261 ± 0.0040 ^d
1000	0.1315 ± 0.0024 ^a	0.1240 ± 0.0020 ^{cd}	0.1358 ± 0.0027 ^c
Day 14			
0	0.0783 ± 0.0022 ^d	0.0880 ± 0.0005 ^{hi}	0.0803 ± 0.0011 ^{hi}
1	0.0769 ± 0.0006 ^d	0.0888 ± 0.0014 ^{ghi}	0.0835 ± 0.0009 ^{hi}
10	0.0785 ± 0.0052 ^d	0.0875 ± 0.0002 ^{hi}	0.0866 ± 0.0020 ^h
100	0.0835 ± 0.0031 ^{cd}	0.0908 ± 0.0016 ^{ghi}	0.1049 ± 0.0019 ^{fg}
400	0.1202 ± 0.0019 ^b	0.1169 ± 0.0053 ^{de}	0.1254 ± 0.0041 ^d
700	0.1307 ± 0.0028 ^a	0.1250 ± 0.0018 ^c	0.1397 ± 0.0022 ^c
1000	0.1318 ± 0.0007 ^a	0.1324 ± 0.0039 ^b	0.1491 ± 0.0030 ^b
Day 21			
0	0.0805 ± 0.0014 ^d	0.0877 ± 0.0036 ^{hi}	0.0810 ± 0.0013 ^{hi}
1	0.0798 ± 0.0012 ^d	0.0842 ± 0.0019 ^{hi}	0.0819 ± 0.0021 ^{hi}
10	0.0800 ± 0.0007 ^d	0.0914 ± 0.0028 ^{gh}	0.0828 ± 0.0023 ^{hi}
100	0.0822 ± 0.0017 ^d	0.0954 ± 0.0008 ^{fg}	0.0994 ± 0.0011 ^g
400	0.1131 ± 0.0007 ^b	0.1167 ± 0.0008 ^e	0.1220 ± 0.0004 ^{de}
700	0.1313 ± 0.0041 ^a	0.1249 ± 0.0017 ^c	0.1529 ± 0.0008 ^b
1000	0.1322 ± 0.0007 ^a	0.1446 ± 0.0033 ^a	0.1692 ± 0.0030 ^a

Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of p<0.05 (post-hoc Tukey's HSD test).

Table S3: Photosynthetic pigment (mg g⁻¹ DW) contents in spring barley seedlings exposed to [BMIM][Br].

Doses of [BMIM][Br] (mg kg ⁻¹ of soil DM)	Pigments			
	Chl <i>a</i>	Chl <i>b</i>	Chl <i>a</i> /Chl <i>b</i>	Chl(<i>a</i> + <i>b</i>)/Car
Day 7				
0	13.501 ± 0.072 ^{ab}	3.560 ± 0.014 ^a	3.814 ± 0.022 ^{efg}	5.208 ± 0.031 ^c
1	13.233 ± 0.165 ^{bc}	3.324 ± 0.064 ^b	3.982 ± 0.037 ^{cdef}	5.076 ± 0.076 ^{cde}
10	11.078 ± 0.076 ^c	2.955 ± 0.014 ^c	4.087 ± 0.045 ^{bcd}	4.928 ± 0.028 ^{efghi}
100	10.921 ± 0.015 ^g	2.521 ± 0.011 ^g	4.332 ± 0.015 ^{ab}	4.990 ± 0.018 ^{efgh}
400	10.832 ± 0.136 ^g	2.694 ± 0.052 ^f	4.021 ± 0.032 ^{cdef}	5.879 ± 0.035 ^a
700	8.035 ± 0.119 ⁱ	1.974 ± 0.049 ⁱ	4.175 ± 0.279 ^{abc}	5.692 ± 0.227 ^{ab}
1000	7.669 ± 0.057 ^j	1.772 ± 0.034 ⁱ	4.328 ± 0.051 ^{ab}	5.617 ± 0.024 ^b
Day 14				
0	13.379 ± 0.063 ^{bc}	3.346 ± 0.013 ^b	3.999 ± 0.016 ^{cdef}	4.855 ± 0.015 ^{fghi}
1	13.753 ± 0.040 ^a	3.161 ± 0.016 ^c	3.937 ± 0.114 ^{cdefg}	4.806 ± 0.032 ^{ghi}
10	13.083 ± 0.080 ^c	3.164 ± 0.016 ^c	4.135 ± 0.035 ^{abcd}	4.793 ± 0.011 ⁱ
100	12.522 ± 0.090 ^d	3.182 ± 0.071 ^c	4.352 ± 0.043 ^a	4.870 ± 0.010 ^{fghi}

400	10.771 ± 0.285 ^g	2.598 ± 0.071 ^{fg}	4.146 ± 0.015 ^{abc}	5.514 ± 0.013 ^b
700	7.945 ± 0.166 ^{ij}	1.729 ± 0.057 ^j	4.046 ± 0.135 ^{cde}	4.802 ± 0.066 ^{hi}
1000	6.936 ± 0.184 ^k	1.753 ± 0.028 ^j	3.957 ± 0.084 ^{cdefg}	5.017 ± 0.093 ^{def}
Day 21				
0	12.506 ± 0.055 ^d	3.314 ± 0.013 ^b	3.774 ± 0.007 ^{fg}	5.214 ± 0.006 ^c
1	11.793 ± 0.053 ^{ef}	3.088 ± 0.021 ^{cd}	3.820 ± 0.043 ^{efg}	4.992 ± 0.039 ^{efg}
10	11.529 ± 0.025 ^f	3.028 ± 0.029 ^{de}	3.895 ± 0.021 ^{defg}	4.976 ± 0.063 ^{fghi}
100	11.588 ± 0.023 ^f	3.115 ± 0.053 ^{cd}	3.721 ± 0.061 ^g	4.948 ± 0.059 ^{efghi}
400	8.425 ± 0.150 ^h	2.137 ± 0.037 ^h	3.943 ± 0.008 ^{cdefg}	5.090 ± 0.028 ^{cde}
700	6.993 ± 0.027 ^k	1.992 ± 0.038 ⁱ	4.182 ± 0.031 ^{abc}	5.064 ± 0.014 ^{cde}
1000	6.226 ± 0.139 ^l	1.501 ± 0.044 ^k	4.150 ± 0.0 ^a	5.195 ± 0.010 ^{cd}

Chla – chlorophyll *a*, Chlb – chlorophyll *b*, Chla/Chlb – chlorophyll *a*/chlorophyll *b*, Chl(*a* + *b*)/Car – (chlorophyll *a* + chlorophyll *b*)/carotenoids; Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of p<0.05 (post-hoc Tukey's HSD test).

Table S4: Photosynthetic pigment (mg g⁻¹ DW) contents in spring barley seedlings exposed to [TBA][Br].

Doses of [TBA][Br] (mg kg ⁻¹ of soil DM)	Pigments			
	Chla	Chlb	Chla/Chlb	Chl(<i>a</i> + <i>b</i>)/Car
Day 7				
0	13.704 ± 0.064 ^{bc}	3.538 ± 0.032 ^{abc}	3.874 ± 0.017 ^{abcde}	5.397 ± 0.024 ^{def}
1	14.597 ± 0.289 ^a	3.735 ± 0.115 ^a	3.909 ± 0.045 ^{abcd}	5.436 ± 0.020 ^{de}
10	14.009 ± 0.015 ^{ab}	3.603 ± 0.026 ^{ab}	3.889 ± 0.028 ^{abcde}	5.470 ± 0.036 ^d
100	12.148 ± 0.325 ^e	3.160 ± 0.115 ^{cd}	3.845 ± 0.038 ^{abcdef}	5.685 ± 0.023 ^c
400	9.346 ± 0.170 ^h	2.438 ± 0.047 ^h	3.833 ± 0.013 ^{bcd}	6.208 ± 0.049 ^b
700	8.978 ± 0.065 ^h	2.425 ± 0.047 ^h	3.703 ± 0.052 ^f	6.366 ± 0.047 ^a
1000	7.939 ± 0.057 ^{ij}	2.096 ± 0.046 ⁱ	3.789 ± 0.059 ^{cdef}	6.152 ± 0.076 ^b
Day 14				
0	14.387 ± 0.308 ^{ab}	3.738 ± 0.079 ^a	3.848 ± 0.017 ^{abcdef}	5.192 ± 0.012 ^{jk}
1	13.256 ± 0.038 ^d	3.426 ± 0.043 ^{bc}	3.829 ± 0.040 ^{bcd}	5.264 ± 0.023 ^{ghij}
10	12.939 ± 0.111 ^{cd}	3.409 ± 0.072 ^{bcd}	3.797 ± 0.048 ^{bcd}	5.312 ± 0.047 ^{fg hij}
100	11.194 ± 0.067 ^f	2.955 ± 0.027 ^{ef}	3.788 ± 0.013 ^{cdef}	5.198 ± 0.025 ^{ijk}
400	9.462 ± 0.076 ^h	2.521 ± 0.017 ^{gh}	3.753 ± 0.027 ^{ef}	5.375 ± 0.051 ^{defg}
700	8.133 ± 0.202 ⁱ	2.159 ± 0.084 ⁱ	3.768 ± 0.059 ^{def}	5.383 ± 0.026 ^{defg}
1000	7.324 ± 0.154 ^j	1.917 ± 0.065 ⁱ	3.823 ± 0.095 ^{bcd}	5.332 ± 0.039 ^{efgh}
Day 21				
0	13.115 ± 0.420 ^{cd}	3.454 ± 0.130 ^{bc}	3.798 ± 0.038 ^{bcd}	5.456 ± 0.040 ^d
1	12.668 ± 0.556 ^{de}	3.331 ± 0.185 ^{cd}	3.804 ± 0.054 ^{bcd}	5.229 ± 0.011 ^{hijk}
10	10.400 ± 0.507 ^g	2.609 ± 0.149 ^{gh}	3.988 ± 0.071 ^a	4.910 ± 0.047 ^l
100	10.731 ± 0.143 ^{fg}	2.738 ± 0.043 ^{fg}	3.920 ± 0.009 ^{abc}	5.120 ± 0.019 ^k
400	9.256 ± 0.025 ^h	2.459 ± 0.013 ^h	3.765 ± 0.009 ^{def}	5.328 ± 0.042 ^{efgh}
700	7.918 ± 0.016 ^{ij}	2.010 ± 0.045 ⁱ	3.941 ± 0.098 ^{ab}	5.301 ± 0.057 ^{fg hij}

1000	5.850 ± 0.056 ^k	1.486 ± 0.024 ⁱ	3.938 ± 0.042 ^{abc}	4.650 ± 0.020 ^m
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Chla – chlorophyll *a*, Chlb – chlorophyll *b*, Chla/Chlb – chlorophyll *a*/chlorophyll *b*, Chl(*a* + *b*)/Car – (chlorophyll *a* + chlorophyll *b*)/carotenoids; Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of p<0.05 (post-hoc Tukey's HSD test).

Table S5: Photosynthetic pigment (mg g⁻¹ DW) contents in spring barley seedlings exposed to [TBP][Br].

Doses of [TBP][Br] (mg kg ⁻¹ of soil DM)	Pigments			
	Chla	Chlb	Chla/Chlb	Chl(<i>a</i> + <i>b</i>)/Car
Day 7				
0	12.712 ± 0.110 ^b	3.179 ± 0.015 ^{cd}	3.999 ± 0.032 ^{bcd}	4.922 ± 0.003 ^k
1	12.274 ± 0.008 ^{cd}	3.193 ± 0.013 ^c	3.845 ± 0.014 ^{fgh}	4.994 ± 0.012 ^j
10	12.428 ± 0.089 ^{bcd}	3.285 ± 0.041 ^{bc}	3.784 ± 0.021 ^{hi}	5.092 ± 0.012 ⁱ
100	10.742 ± 0.070 ^f	2.657 ± 0.030 ^f	4.043 ± 0.024 ^{bc}	5.359 ± 0.026 ^f
400	8.927 ± 0.070 ⁱ	2.370 ± 0.019 ^h	3.766 ± 0.007 ⁱ	6.075 ± 0.016 ^a
700	8.294 ± 0.068 ^j	2.075 ± 0.024 ⁱ	3.998 ± 0.021 ^{bcd}	5.797 ± 0.007 ^b
1000	7.852 ± 0.022 ^k	2.075 ± 0.021 ⁱ	3.784 ± 0.035 ^{hi}	5.842 ± 0.031 ^b
Day 14				
0	12.126 ± 0.260 ^d	3.382 ± 0.065 ^b	3.585 ± 0.013 ^j	5.356 ± 0.007 ^f
1	14.439 ± 0.226 ^a	3.996 ± 0.093 ^a	3.613 ± 0.028 ⁱ	5.458 ± 0.044 ^d
10	12.027 ± 0.050 ^d	3.059 ± 0.014 ^{de}	3.932 ± 0.031 ^{de}	5.039 ± 0.019 ^{ij}
100	10.228 ± 0.149 ^g	2.527 ± 0.060 ^g	4.073 ± 0.038 ^{ab}	5.276 ± 0.009 ^g
400	8.422 ± 0.092 ^j	2.142 ± 0.018 ⁱ	3.932 ± 0.012 ^{de}	5.373 ± 0.012 ^{ef}
700	7.224 ± 0.226 ^l	1.841 ± 0.058 ^j	3.924 ± 0.025 ^{de}	5.629 ± 0.021 ^c
1000	6.267 ± 0.046 ^m	1.548 ± 0.018 ^k	4.048 ± 0.017 ^{bc}	5.432 ± 0.042 ^{de}
Day 21				
0	11.312 ± 0.105 ^e	2.961 ± 0.043 ^c	3.820 ± 0.020 ^{fghi}	5.195 ± 0.011 ^h
1	12.596 ± 0.231 ^{bc}	3.320 ± 0.061 ^b	3.794 ± 0.004 ^{ghi}	5.240 ± 0.024 ^{gh}
10	9.603 ± 0.119 ^h	2.483 ± 0.044 ^{gh}	3.868 ± 0.028 ^{efg}	4.715 ± 0.024 ^m
100	9.673 ± 0.113 ^h	2.489 ± 0.037 ^{gh}	3.886 ± 0.014 ^{ef}	4.816 ± 0.019 ^l
400	7.179 ± 0.129 ^l	1.831 ± 0.028 ^j	3.921 ± 0.018 ^e	5.223 ± 0.020 ^{gh}
700	4.444 ± 0.070 ⁿ	1.167 ± 0.027 ^l	3.809 ± 0.041 ^{ghi}	4.771 ± 0.035 ^{lm}
1000	3.991 ± 0.070 ^o	0.968 ± 0.012 ^m	4.123 ± 0.021 ^a	4.563 ± 0.027 ⁿ

Chla – chlorophyll *a*, Chlb – chlorophyll *b*, Chla/Chlb – chlorophyll *a*/chlorophyll *b*, Chl(*a* + *b*)/Car – (chlorophyll *a* + chlorophyll *b*)/carotenoids; Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of p<0.05 (post-hoc Tukey's HSD test).

Table S6: Malondialdehyde (MDA) (µg g⁻¹ FW) content in spring barley seedlings exposed to ILs.

Doses of ILs (mg kg ⁻¹ of soil DM)	Malondialdehyde (MDA) (µg g ⁻¹ FW)		
	[TBA][Br]	[BMIM][Br]	[TBP][Br]

Day 7			
0	35.937 ± 1.205 ^{ab}	29.509 ± 1.545 ^{de}	31.177 ± 0.369 ^{bc}
1	35.381 ± 0.347 ^b	26.700 ± 1.437 ^{fg}	27.999 ± 0.683 ^e
10	26.858 ± 0.586 ^{cd}	29.614 ± 0.653 ^{cde}	29.113 ± 0.136 ^{de}
100	35.069 ± 2.173 ^b	27.565 ± 1.101 ^{efg}	32.777 ± 0.689 ^{ab}
400	38.675 ± 0.233 ^a	32.513 ± 0.896 ^b	30.595 ± 0.068 ^{cd}
700	36.888 ± 0.283 ^{ab}	31.976 ± 0.606 ^{bcd}	31.171 ± 0.291 ^{bc}
1000	35.179 ± 0.669 ^b	28.658 ± 1.167 ^{ef}	33.014 ± 0.493 ^a
Day 14			
0	22.111 ± 0.403 ^{fgh}	27.380 ± 0.877 ^{efg}	23.657 ± 0.934 ^f
1	26.008 ± 0.878 ^{cde}	23.251 ± 1.584 ^{hi}	19.923 ± 0.838 ^h
10	23.781 ± 1.728 ^{efg}	25.769 ± 0.803 ^{gh}	21.591 ± 0.239 ^g
100	28.546 ± 0.892 ^c	29.471 ± 0.472 ^{def}	22.468 ± 0.192 ^{fg}
400	27.794 ± 0.405 ^c	35.569 ± 1.312 ^a	28.275 ± 0.359 ^e
700	21.553 ± 0.229 ^{gh}	35.388 ± 0.395 ^{ab}	29.407 ± 0.651 ^{de}
1000	20.607 ± 0.607 ^h	32.293 ± 0.941 ^{bc}	28.795 ± 0.517 ^e
Day 21			
0	17.242 ± 0.818 ^{ij}	20.022 ± 0.178 ^{ik}	19.718 ± 0.413 ^{hi}
1	14.745 ± 0.298 ^j	17.133 ± 0.376 ^l	18.191 ± 0.567 ⁱ
10	15.207 ± 0.360 ^j	16.223 ± 0.454 ^l	18.325 ± 0.354 ^{hi}
100	20.050 ± 0.295 ^{hi}	18.519 ± 0.118 ^{kl}	23.295 ± 0.295 ^f
400	24.651 ± 0.559 ^{def}	20.840 ± 0.627 ^{ijk}	22.878 ± 0.310 ^{fg}
700	20.185 ± 0.851 ^{hi}	22.306 ± 0.326 ^{ij}	27.889 ± 0.411 ^e
1000	21.020 ± 0.594 ^{gh}	21.116 ± 0.632 ^{ijk}	23.952 ± 0.965 ^f

Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of p<0.05 (post-hoc Tukey's HSD test).

Table S7. Superoxide dismutase (SOD) (U mg⁻¹ protein) activity in spring barley seedlings exposed to ILs.

Doses of ILs (mg kg ⁻¹ of soil DM)	Superoxide dismutase (SOD) (U mg ⁻¹ protein)		
	[TBA][Br]	[BMIM][Br]	[TBP][Br]
Day 7			
0	12.455 ± 0.818 ^a	11.329 ± 0.774 ^a	8.067 ± 0.210 ^{bcde}
1	11.179 ± 0.773 ^{ab}	11.342 ± 0.698 ^a	8.659 ± 1.002 ^{bcd}
10	9.795 ± 0.709 ^{abc}	10.343 ± 0.330 ^{ab}	6.447 ± 0.882 ^e
100	9.630 ± 0.296 ^{bcd}	10.228 ± 0.276 ^{abc}	6.696 ± 0.462 ^{de}
400	8.470 ± 0.725 ^{cde}	10.422 ± 0.800 ^{ab}	6.844 ± 0.264 ^{de}
700	9.050 ± 0.561 ^{cde}	10.226 ± 0.474 ^{abc}	7.293 ± 0.714 ^{cde}
1000	8.232 ± 0.074 ^{cde}	10.367 ± 0.642 ^{ab}	7.218 ± 0.162 ^{cde}
Day 14			
0	8.499 ± 0.077 ^{cde}	8.050 ± 0.320 ^{cd}	8.757 ± 0.440 ^{bcd}
1	8.481 ± 0.534 ^{cde}	7.410 ± 1.458 ^d	9.096 ± 0.992 ^{bc}
10	7.700 ± 0.332 ^e	7.648 ± 0.951 ^d	8.205 ± 0.256 ^{bcde}

100	7.694 ± 0.321 ^e	6.686 ± 0.514 ^d	7.878 ± 0.385 ^{bcd}
400	7.541 ± 0.498 ^e	6.783 ± 0.293 ^d	8.171 ± 0.270 ^{bcd}
700	7.809 ± 0.147 ^e	8.424 ± 0.976 ^{bcd}	8.099 ± 0.215 ^{bcd}
1000	7.478 ± 0.440 ^e	8.581 ± 0.723 ^{bcd}	8.973 ± 0.234 ^{bc}
Day 21			
0	8.410 ± 0.263 ^{cde}	7.105 ± 0.433 ^d	8.972 ± 0.844 ^{bc}
1	8.016 ± 0.112 ^{de}	7.401 ± 1.088 ^d	9.581 ± 1.389 ^{ab}
10	9.782 ± 1.522 ^{abcd}	6.430 ± 0.437 ^d	8.639 ± 0.170 ^{bcd}
100	8.210 ± 0.346 ^{cde}	6.514 ± 0.136 ^d	8.208 ± 0.560 ^{bcd}
400	7.678 ± 0.173 ^e	6.530 ± 0.340 ^d	8.955 ± 1.311 ^{bc}
700	9.168 ± 0.782 ^{cde}	6.404 ± 0.733 ^d	9.733 ± 0.363 ^{ab}
1000	9.653 ± 0.182 ^{bcd}	6.386 ± 0.114 ^d	11.350 ± 0.473 ^a

Data are means ± SD (n=3); values denoted with the same letters form homogeneous groups at the level of $p < 0.05$ (post-hoc Tukey's HSD test).