

Supplementary Material S1

**Combinative effects of *Azospirillum brasilense*
inoculation and chemical priming on germination
behavior and seedling growth in aged grass seeds**

Xu Liu^{*}, Zhao Chen¹, Yan Gao¹, Qian Liu¹, Wennan Zhou¹, Tian Zhao¹, Wenbo Jiang¹, Xuewen Cui¹, Jian Cui² and Quanzhen Wang¹

***Correspondence:** Quanzhen Wang: wangquanzhen191@163.com

Table A. The MDA content and the activity of SOD and POD in tall fescue 2015, 2014, orchardgrass 2013 and Russian wild rye 2009.

Species	MDA ($\mu\text{mol g}^{-1}$ FW)	SOD (U/g.FW/h)	POD (0.000) (U/g.FW/min)
Tall fescue 2015	13.80 \pm 5.22 ^b	17.06 \pm 8.83 ^b	1.62 \pm 0.49 ^c
Tall fescue 2014	9.94 \pm 0.22 ^b	12.20 \pm 8.21 ^b	1.33 \pm 0.64 ^c
Orchardgrass 2013	11.01 \pm 2.43 ^b	25.63 \pm 14.24 ^a	3.17 \pm 1.18 ^a
Russian wildrye 2009	37.76 \pm 9.73 ^a	5.43 \pm 14.32 ^c	2.37 \pm 0.78 ^b

[†]Data are the mean \pm SD.

[‡]Means followed by different letters are significantly different at $P < 0.05$.

Table B. Canonical response surface analysis for germination percentage, germination index, seed vigor index, root, shoot and seedling length, ratio of S/R, MDA content, the activity of SOD, POD, CAT and APX of the seedlings based on coded data.

Variable	Critical value of bacteria (X_1)	Critical value of time (X_3)	F Value	Pr>F	Estimate d value	Stationary point
Tall fescue 2015						
Germination percentage	50.6	19.1	3.04	0.036		minimum
Germination index	50.1	20.5	2.87	0.036		saddle point
Seed vigor index	63.2	6.9	3.08	0.028		maximum
Root length	49.7	16.4	2.31	0.076		maximum
Ratio of shoot to root	54.7	17.5	3.48	0.017		minimum
SOD activity	38.2	7.4	2.77	0.041		saddle point
MDA content	55.8	18.0	3.31	0.020		saddle point
CAT content	49.5	24.8	9.31	<.0001		saddle point
APX activity	52.1	15.6	4.21	0.007		minimum
Tall fescue 2014						
Seed vigor index	65.4	11.6	2.68	0.047		maximum
Root length	59.0	16.0	5.76	0.001		saddle point
Seedling length	51.0	26.3	4.42	0.005		maximum
Ratio of shoot to root	41.0	32.0	7.77	<.0001		minimum
MDA content	52.8	19.1	6.73	<.0001		saddle point
Orchardgrass 2013						
Germination index	51.1	14.4	3.19	0.024		saddle point
Seed vigor index	48.6	13.8	2.965	0.032		saddle point
Root length	45.4	5.9	3.51	0.016		maximum
Seedling length	55.7	6.2	2.95	0.032		maximum
Ratio of shoot to root	52.9	5.7	5.73	0.001		minimum
SOD activity	53.1	13.9	10.72	<.0001		saddle point
POD activity	23.5	20.0	6.84	<.0001		saddle point
CAT content	41.3	12.2	7.89	<.0001		saddle point
APX activity	19.6	44.9	7.00	0.0002		saddle point
Russian wildrye 2009						
Germination percentage	57.8	13.0	9.30	<.0001		saddle point
Germination index	52.5	14.4	3.19	0.024		saddle point
Seed vigor index	54.2	9.2	4.46	0.005		maximum
Root length	52.9	20.0	3.15	0.025		maximum
Shoot length	55.5	17.3	5.58	0.0015		maximum
Seedling length	53.8	18.0	5.516	0.0016		maximum
POD activity	61.1	3.9	2.82	0.038		maximum
MDA content	52.8	19.2	7.44	0.0008		minimum
CAT content	47.6	19.4	4.53	0.005		saddle point

Table C. Pearson correlation coefficients for activity of SOD, APX, POD, CAT, and MDA content.

	Germination percentage	Root length	SOD	APX	POD	CAT	MDA
Germination percentage	1	0.323**	0.419**	-0.378**	-0.262**	-0.140	-0.519**
Root length		1	0.212**	-0.445**	-0.447**	-0.194**	-0.450**
SOD			1	-0.262**	-0.041	0.045	-0.249**
APX				1	0.452**	0.165	0.373**
POD					1	0.119	0.383**
CAT						1	0.216*
MDA							1

*Significant at the 0.05 probability level.

**Significant at the 0.01 probability level.