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NITRATE REDUCTASE AND GLUTAMINE SYNTHETASE ACTIVITY IN YOUNG PLANTS OF *Jatropha curcas* L. UNDER LEVELS OF SHADE AND NITRATE CONCENTRATIONS

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INTRODUCTION

Jatropha curcas L. is considered an excellent option for many agricultural regions of Brazil, mainly because it is a demanding species with strong sunlight and drought resistance. Currently, this species is being studied more diligently to their commercial use in Brazil, because it is an oleaginous plant viable for obtaining biodiesel. The objective of this study was to assess the influence of different nitrate concentrations and levels of shading on the activities of the enzymes nitrate reductase and glutamine synthetase in young plants of *J. curcas*.

RESULTS

The results showed that the activities of the enzymes nitrate reductase and glutamine synthetase, and the total soluble protein content decreased linearly with increased shading.

Table 1 - Values of the F test and overall average activity of nitrate reductase in seedlings of Jatropha curcas L., 30, 60, 90 and 120 days after the start of treatment (DAT). Ilha Solteira- SP, Brasil, 2010.

	Treatments	30 DAT	60 DAT	90 DAT	120 DAT
LEAVES	Shadding (%)				
	0	3,81	3,14	1,36	1,53
	30	3,29	2,71	1,43	1,44
	50	2,92	3,11	1,78	1,64
	70	2,29	2,23	1,2	1,18
	Concentrations (mM NO_3^-)				
	0	2,10	1,32	0,90	0,68
	15	2,82	3,45	1,24	1,91
	30	3,87	3,26	1,55	1,72
	45	3,53	3,16	2,07	1,49
	Shadding (S)	4,12**	4,98**	1,88^{ns}	1,26^{ns}
	Nitrate concentration (N)	6,12**	27,39**	7,72**	9,36**
	S*N	0,81^{ns}	1,08^{ns}	0,98^{ns}	1,41^{ns}
	Means (µmoles NO_2^- gMF^{-1} h^{-1})	3,08	2,8	1,44	1,48
ROOTS	Shadding (%)				
	0	0,05	0,06	0,05	0,16
	30	0,06	0,06	0,06	0,16
	50	0,04	0,07	0,05	0,11
	70	0,04	0,05	0,04	0,09
	Concentration (mM NO_3^-)				
	0	0,03	0,04	0,04	0,11
	15	0,05	0,07	0,06	0,14
	30	0,05	0,07	0,05	0,13
	45	0,04	0,06	0,05	0,13
	Shadding (S)	2,71*	1,50^{ns}	3,76*	4,53**
	Nitrate concentrations (N)	5,04**	4,42**	5,58**	0,71^{ns}
	S*N	0,61^{ns}	0,83^{ns}	1,13^{ns}	1,34^{ns}
	Means (µmoles NO_2^- gMF^{-1} h^{-1})	0,04	0,06	0,05	0,13

MATERIAL AND METHODS

The treatments consisted of four concentrations of nitrate (0, 15, 30 and 45 mM), applied via the nutrient solution Hoagland and Arnon (1938), and four levels of shading (0, 30, 50 and 70% shading).

The activity of glutamine synthetase and nitrate reductase was analised at 30, 60, 90 and 120 days after de treatments (DAT) in leaves and roots of *Jatropha curcas*.

The experimental design was completely randomized, with 9 replicates.

Table 2 - Values of the F test and overall average activity of the enzyme glutamine synthetase (GS) in leaf and root tissues of *Jatropha curcas* L., 30, 60, 90 and 120 days after the treatment (DAT) . Ilha Solteira - SP, Brazil 2010.

	Treatments	30 DAT	60 DAT	90 DAT	120 DAT
LEAVES	Shadding (%)				
	0	112,98	120,80	79,43	138,71
	30	81,23	84,99	64,82	93,86
	50	71,76	69,59	57,71	87,97
	70	67,49	57,41	54,27	92,04
	Concentrations (mM NO_3^-)				
	0	82,79	69,01	66,94	112,42
	15	81,85	84,79	62,42	99,57
	30	83,95	92,13	61,07	98,65
	45	84,87	86,86	65,81	101,94
	Shadding (S)	37,19**	25,13**	6,73**	13,27**
	Nitrate concent. (N)	0,15^{ns}	3,29*	0,42^{ns}	0,94^{ns}
	S*N	0,97^{ns}	1,47^{ns}	1,44^{ns}	0,92^{ns}
	Means	83,36	83,2	64,06	103,14
ROOTS	Shadding (%)				
	0	39,21	41,91	36,12	39,61
	30	41,15	43,73	35,90	43,81
	50	39,44	44,71	36,21	37,41
	70	39,17	38,32	34,21	44,98
	Concentrations (mM NO_3^-)				
	0	32,57	36,65	25,53	35,54
	15	46,41	46,54	43,37	49,32
	30	40,28	43,00	38,46	39,37
	45	39,72	42,49	35,08	41,59
	Shadding (S)	0,11^{ns}	0,42^{ns}	0,14^{ns}	0,92^{ns}
	Nitrate concent. (N)	3,99**	0,89^{ns}	8,92**	2,46^{ns}
	S*N	0,30^{ns}	0,98^{ns}	0,50^{ns}	0,35^{ns}
	Means	39,75	42,17	35,61	41,45

CONCLUSION

Doses of nitrate concentrations exceeding 30mM and shadding above 50% are detrimental to the activity of two enzymes analyzed, in the leaves and roots tissues.

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