Egypt. J. Appl. Agric. Res. (NRC), **Vol. 2**, No.1, pp. 69 - 80 (2009)

Response of Iris (cv. Wedgewood) Plant to Active Dry Yeast Under Salinty Affected Soils

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POTS EXPERIMENT was carried out during the two growing seasons 2006 and 2007 to study the effect of active dry yeast on Iris (cv. Wedgewood) plants under artificial saline soil conditions.

The results indicated a negative response to growth, flowering characters, bulb production and chemical composition as the soil treated with salts (NaCl, $CaCl_2$,$Ca(CO_3)_2$ and Na_2SO_4 mixture at 1:1:1:1 by weight) with levels at 0, 0.5, 1.0 and 1.5 g salt/ 100 g soil.

Also results, revealed that the addition of active dry yeast at 0, 2.5, 5.0 and 7.5 g/ l gave better results comparing with control plants. Application of yeast reduced the harmful effect on plant growth and other traits caused by salinity.

It can be recommended the possibility of growing Iris cv. Wedgewood plants in soil salinity till 1.5 g/ 100 g soil and supplying with active dry yeast at 7.5 g/ l.

Keywords: Iris spp. L., Salinity, Yeast.

The genus Iris has a wide use for medicinal purposes and ornamental. It is known for a long time and was used for the bulb fram and alpine house, for water and bog garden, for the rock garden and cut flowers (Cassidy and Linnegar, 1982).

The problem of saline soils is increasingly facing the agriculture in Egypt. However little work had been reported dealing with salt affected soils especially on ornamental plants. So, the present work was designed in order to investigate the performance of Iris (cv. Wedgewood) plants grown in saline soils when treated with different levels of active dry yeast.

The role of salinity in decreasing vegetative growth, flowering, bulb production and chemical composition of bulb flowering plants and different plant species was pointed by Mousa and Lakany (1983) on narcissus and Manoly (1989) on tuberose. Also, El-Sayed (1991) on zinnia, Ismail (1993) on *Lantana camara*, El-Shewakh (1995) on *Acalypha macrophylla*, Mary and Abd-Ella (1995) on petonia; El- Mahrouk *et al.* (1996) on *Thevitia nereifolia*; Hussein (1999) on *Ocimum basilicum*, Ahmed *et al.* (2001) on *Ambrosia maritima*; Arshi *et al.* (2002) on senna plants and Shalan *et al.* (2006) on *Majorana hortensis*, L.

In addition, yeast is known as a natural source of many growth substance, vitamins, nutritional elements and organic compounds (Nagodawithana, 1991).

Several authors reported on the response of various medicinal, aromatic and ornamental plants, vegetable crops and fruit trees to yeast in promoting and enhancing growth, flowering and chemical composition of different plant species was pointed out by many investigators [Ahmed *et al.* (1997) on red roomy grapevine; Ahmed *et al.* (1998) on roselle; El- Ghamriny *et al.* (1999) on tomato; Ali (2001) on pot marigold; Ahmed *et al.*, (2001) on *Ambrosia maritima*, L.. Abdou and El-Sayed (2002) on caraway; Badran *et al.* (2002) *majorana hortensis*; El-Sayed *et al.* (2002) on coriander and Hassanein *et al.* (2003) on *Calendula officinalis*].

The aim of the present study was investigate the influence of active dry yeast at four different concentration (0, 2.5, 5.0 and 7.5 g/ l) in modifying, alleviating, overcoming or counteracting the harmful effects of soil salinity (0, 0.5, 1.0 and 1.5 g salt/ 100 g soil).

Material and Methods

A pots experiment was carried out during two successive seasons 2005/ 2006 and 2006/ 2007 at Orman Bot. Garden, Hort. Res. Inst., Giza, in order to investigate the response of vegetative growth, flowering parameters, bulb production and chemical composition of Iris (cv. Wedgewood) plants to active dry yeast levels under salt affected soils.

Artificial condition of salinity were developed in the soil before planting at four levels 0.0 (S.0), 0.5 (S1), 1.0 (S2) till 1.5 (S3) g salt/ 100 g soil by the addition of NaCl, $CaCl_2$, Ca $(CO_3)_2$ and Na_2SO_4 mixture at 1: 1: 1: 1 ratio by weight and the control treatment with did not receive any additive salts. Clay pots of 25 cm diameter which painted with three layers of bitumen to prevent direct contact between soil medium and pot wall. Each pot filled with 5 kg dry Nile clay soil. The chemical analysis of the soil before salinization were T.S.S.=0.101, pH= 7.35, E.CM moh/com=0.3, HCo_3 = 0.53 mg/100 g soil, Cl=0.36 ,gm/100 g soil, So_4 = 0.70 mg/100g Ca= 0.88 mg/100 g soil, Mg= 0.10 mg/100 g soil,, Na^+ = 0.43 mg/100g soil, K^+ = 0.16 mg/100 g soil,, N^+= 28.6 p.p.m, P^+ = 11.50 p.p.m. Salts were added on weight basis after they had been dissolved in one liter tap- water. After salinization, the soil of each pot was mixed thoroughly, tap- water was used for irrigation.

Active dry yeast solution was prepared by mixing with sugar at (1:1) in warm water for ten minutes before soaking and/ or spraying for activating yeast production. Chemical showed that active dry yeast contained 34.87 % protein, 7.55 % ash, 6.54 % glycogen, 2.09 % fats and 4.92 % cellulose.

In the same time bulbs of Iris with average weight 40 g and average diameter 3.2 cm were soaked 24 hrs in active dry yeast solutions (0.0, 2.5, 5.0 and 7.5 g/ l)

then, soaked bulbs were planted (single bulb/ pot) on October 8th of each seasons. The same active dry yeast solution, as those used for soaking bulbs before planting including control, were applied as foliar spray three times at 2 weeks intervals starting 5 weeks after planting for both seasons.

All plants including the control ones, were fertilized with 3.0 g ammonium nitrate (31 % N), 1.5 g triple superphosphate (45.5 % P_2O_5) and 2.0 g potassium sulphate (48 % K_2O) per each pot. Amounts of the three chemical fertilizers for each pot, were divided into three equal portions and added on December 20th, January 20th and April 20th, respectively. The last dose was applied on this particular date in order to encourage bulb formation, while the first, two doses were applied before flowering. Other agricultural processes were performed according to normal practice.

The experiment was arranged in a split plot design, with 3 replications and 5 pots/ replicate, where salinity levels occupied the main plots and active dry yeast treatments assigned to the sub plots.

Data were recorded for sprouting date (day), number of leaves/ plant; flowering date (day), flowering stalk length (cm), fresh weight of single flower/ plant (g), number and weight (g) and mean diameter (cm) of daughter bulbs/ plant. In addition, chlorophyll a content (mg/ g F.W.) in the leaves were determined according to Fadle and Sari-Eldeen (1978). Concerning bulbs of N %, P % and K % were determined according to A.O.A.C. (1980). All obtained data were statistically analyzed by Snedecor and Cochran (1967).

Results

Vegetative growth

Sprouting date

Number of days from planting to sprouting was gradually increased by increasing salinity levels up to 1.5 g salt/ 100 g soil. These results might be explained by the findings of Manoly (1989) who concluded that treating tuberose bulbs with equal amounts of NaCl + $CaCl_2$ up to 1.6 %. While, active dry yeast at the three levels used, significantly reduced the number of days to sprouting especially the higher level 7.5 g/ l comparing with untreated bulbs. The interaction between salinity and active dry yeast was significant in both seasons, as shown in Table 1.

The modifying effect of active dry yeast in counteracting the adverse effect caused by salinity treatments could be clearly seen. It could be suggested that yeast might reduce the moisture requirements of the tissues or that they might promote uptake of water under conditions of salt tress during sprouting.

Number of leaves

Number of leaves/ plant was statistically decreased by the gradual increase in salinity level. The lowest values, in both seasons, were produced on plant growth

in the highest salinized soil level. Table 1. These results were in close agreement with those reported by Manoly (1989) on tuberose and Hussein (1999) on *Ocimum basilicum*. The three levels used of active dry yeast enable the plants to carry more leaves than untreated ones in both seasons. The higher level of active dry yeast was much more effective than the lower one and the high level at 7.5 g/l was the superior treatment in both seasons as indicated in Table 1. The effectiveness of the yeast was reported by Ahmed *et al.* (1998) on roselle, El-Ghamriny *et al.* (1999) on tomato, Ali (2001) on pot marigold, Abdou and El-Sayed (2002) on caraway, Badran *et al.* (2002) on marjoram and El-Sayed *et al.* (2002) on coriander. The salinity – active dry yeast interaction was significant in the two seasons. Results showed that all active dry yeast levels were able to modify the harmful effect of salinity at 0.5 g salt/ 100 g soil, however, at 1.0 g salt/ 100 soil had the ability to do so. Further increase in soil salinity (1.5 g salt/ 100 g soil seemed to be far away from the ability of any active dry yeast levels to overcome it. These results might be explained by the findings of Ahmed *et al.* (2001) when spraying of *Ambrosia maritima*, L. plants with active dry yeast solution at 0, 1 and 2 g/ l under different salinity levels in both seasons.

TABLE 1. Effect of salinity and active dry yeast levels on sprouting date; number of leaves and flowering date of Iris cv. Wedgewood plants during 2005/ 2006 and 2006/ 2007 growing seasons.

Levels of salt / 100 g soil (A)	2005/2006 Growing season					2006/2007 growing season				
	Yeast g / l (B)					Yeast g / l (B)				
	0	2.5	5.0	7.5	Mean	0	2.5	5.0	7.5	Mean
Sprouting date (day)										
0.0	27.57	25.85	23.29	20.14	**24.21**	29.01	28.14	25.99	23.40	**26.64**
0.5	34.01	31.65	30.40	28.88	**31.24**	35.60	33.01	32.10	30.29	**32.75**
1.0	39.60	36.10	35.06	33.68	**36.11**	41.90	39.16	37.36	36.11	**38.63**
1.5	44.77	42.16	40.90	38.07	**41.48**	45.07	43.77	42.29	40.67	**42.95**
Mean (B)	**36.49**	**33.94**	**32.41**	**30.19**		**37.90**	**36.02**	**34.43**	**32.62**	
L.S.D. 5%	A: 1.01	B: 1.29	AB: 2.59			A: 0.98	B: 1.75	AB: 3.50		
1%	A: 1.52	B: 1.75	AB: 3.51			A: 1.48	B: 2.37	AB: 4.74		
Number of leaves/ plant										
0.0	7.77	8.05	8.41	8.67	**8.23**	8.28	8.92	9.01	9.38	**8.90**
0.5	7.65	7.96	8.18	8.40	**8.05**	8.08	8.41	8.75	8.83	**8.52**
1.0	4.48	5.08	5.17	5.33	**5.02**	4.62	5.15	5.30	5.50	**5.14**
1.5	3.20	4.38	4.42	4.50	**4.13**	4.00	4.50	4.63	4.72	**4.46**
Mean (B)	**5.78**	**6.37**	**6.55**	**6.73**		**6.25**	**6.75**	**6.92**	**7.11**	
L.S.D. 5%	A: 0.57	B: 0.70	AB: 1.41			A: 0.42	B: 0,69	AB: 1.39		
1%	A: 0.86	B: 0.95	AB: 1.91			A: 0.63	B: 0.94	AB: 1.88		
Flowering date (day)										
0.0	134.6	130.0	127.2	126.1	**129.5**	136.0	131.2	130.2	128.8	**131.6**
0.5	139.0	135.7	132.2	130.0	**134.2**	141.0	137.2	135.7	134.6	**137.1**
1.0	146.2	140.3	136.5	134.6	**139.4**	148.6	144.6	141.6	140.5	**143.8**
1.5	151.1	145.4	143.4	141.4	**145.3**	153.6	148.8	147.5	146.3	**149.1**
Mean (B)	**142.0**	**137.9**	**134.8**	**133.0**		**144.8**	**140.5**	**138.8**	**137.6**	
L.S.D. 5%	A: 0.8	B: 1.9	AB: 3.7			A: 0.8	B: 2.1	AB: 4.2		
1%	A: 1.3	B: 2.5	AB: 5.0			A: 1.3	B: 2.8	AB: 5.7		

Flowering aspects

Flowering day

Number of days from planting to flowering was significantly prolonged in both seasons as salinity level gradually increased in comparison with unsalinized soil plants. Table 1 shows that flowering date was steadily delayed, in both seasons, by increasing salinity level up to 1.0 g salt/ 100 g soil sharply prolonged as salinity level reached 1.5 g salt/ 100 soil. The obtained results in the present work were in accordance with those revealed by Mousa and Lakany (1983) on narcissus and Manoly (1989) on tuberose, El-Sayed (1991) on zinnia and Mary and Abd-Ella (1995) on petonia plants.

Concerning active dry yeast, at low and high levels, each proved to be effective in reducing number of days from planting to flowering in both seasons. Similar results regarding the role of active dry yeast in producing early flowering was reported by Ali (2001) on pot marigold and Hassanein *et al.* (2003) on *Calendula officinalis*. The interaction between two factors was significant in both seasons.

Flowering stalk length

Increasing soil salinity caused Iris plants to produced shorter flowering stalks in both seasons as shown in Table 2. The longest flower stalks were produced from plants grown in the control soil and by the gradual increase in salinity level a significant and linear reduction in flowering stalk length was obtained. Reduction for (0.5, 1.0 and 1.5 g salt/ 100 g soil) salinity levels, compared to the check soil was 5.4, 31.8 and 52.8 % in the first season and 6.9, 31.5 and 51.1 % in the second one. The effect of salinity in reducing flowering stalk length was reported by Mousa and Lakany (1983) on narcissus, Manoly (1989) on tuberosa, El-Sayed (1991) on zinnia, Mary and Abd-Ella (1995) on petunia, El-Mahrouk *et al.* (1996) on *Thevitia nereifolia*, Hussein (1999) on *Ocimum basilicum*, Ahmed *et al.* (2001) on *Ambrosia maritima* and Shalan *et al.* (2006) on *Majorana hortensis*.

Flowering stalk length increased significantly as active dry yeast was applied at the level of 7.5 g/ l, and this treatment increased flowering stalk length for instance by 17.9 % in the first season and 16.5 % in the second season. These results in harmony with those reported by Hassanein *et al.* (2003) on *Calendula officinalis*. Concerning the interaction between soil salinity and active dry yeast, it was significant in both seasons. The combined treatments (0.5 g salt/ 100 soil+ any active dry yeast or 1.0 g salt/ 100 soil + 5.0 or 7.5 g/ l could be used as substitutions of the untreated plants to produce resonably taller flowering stalk.

Fresh weight of single flower/ plant

Salinity levels 0.5 and 1.0 g salt/ 100 soil caused a noticeable reduction in fresh weight of flower, that 1.5 g salt/ 100 g soil resulted in a great depression, compared to the control soil in both seasons. Numerically, fresh weight of flower/ plant was decreased by 7.6, 42.4 and 49.8 % in the first season and 8.4, 40.9 and 49.6 % in the second season for the 0.5, 1.0 and 1.5 g/ salt/ 100 g soil

salinity comparison with control. Many authors reported different adverse effect caused by salinity on various flower production such as Mousa and Lakany (1983) on narcissus; Manoly (1989) on tuberose; El-Sayed (1991) on zinnia and Mary and Abd-Ella (1995) on petonia.

TABLE 2. Effect of salinity and active dry yeast levels on flowering stalks length, fresh weight of single flower and number of daughter bulbs of Iris cv. Wedgewood plants during 2005/ 2006 and 2006/ 2007 growing seasons.

Levels of salt / 100 g soil (A)	2005/2006 Growing season					2006/2007 growing season				
	Yeast g / l (B)					Yeast g / l (B)				
	0	2.5	5.0	7.5	Mean	0	2.5	5.0	7.5	Mean
Flowering stalk length (cm)										
0.0	48.21	50.51	54.18	56.64	**52.39**	50.36	55.15	56.72	58.70	**55.23**
0.5	46.02	48.34	50.50	53.34	**49.55**	49.44	50.10	52.05	54.09	**51.42**
1.0	33.81	34.29	36.90	37.85	**35.71**	35.03	37.78	38.07	40.50	**37.85**
1.5	20.99	24.29	25.92	27.79	**24.75**	22.89	26.00	28.70	30.41	**27.00**
Mean (B)	**37.26**	**39.36**	**41.88**	**43.91**		**39.43**	**42.26**	**43.89**	**45.93**	
L.S.D. 5%	A: 0.74	B: 1.56	AB: 3.11			A: 0.68	B: 1.86	AB: 3.72		
1%	A: 1.19	B: 2.11	AB: 4.22			A: 1.02	B: 2.52	AB: 5.04		
Fresh weight of single flower (gm)										
0.0	8.87	9.25	9.60	9.98	**9.43**	9.10	10.11	10.19	10.43	**9.96**
0.5	8.58	8.66	8.72	8.89	**8.71**	9.00	9.09	9.15	9.23	**9.12**
1.0	5.35	5.58	5.74	6.05	**5.68**	5.64	5.72	5.98	6.20	**5.89**
1.5	4.44	4.65	4.82	5.01	**4.73**	4.90	5.01	5.06	5.11	**5.02**
Mean (B)	**6.81**	**7.04**	**7.22**	**7.48**		**7.16**	**7.48**	**7.60**	**7.74**	
L.S.D. 5%	A: 0.17	B: 0.59	AB: 1.18			A: 0.25	B: 0.30	AB: 0.60		
1%	A: 0.26	B: 0.80	AB: 1.60			A: 0.34	B: 0.41	AB: 0.82		
Number of daughter bulbs										
0.0	7.86	8.10	8.22	8.40	**8.15**	8.64	9.00	9.17	9.35	**9.04**
0.5	7.30	7.67	7.75	7.92	**7.66**	8.45	8.65	8.89	9.01	**8.75**
1.0	4.39	4.67	4.94	5.01	**4.75**	5.11	5.33	5.58	5.67	**5.42**
1.5	4.08	4.10	4.45	4.68	**4.33**	4.75	4.84	5.08	5.25	**4.98**
Mean (B)	**5.91**	**6.14**	**6.34**	**6.50**		**6.74**	**6.96**	**7.18**	**7.32**	
L.S.D. 5%	A: 0.31	B: 0.23	AB: 0.45			A: 0.23	B: 0.25	AB: 0.49		
1%	A: 0.47	B: 0.30	AB: 0.61			A: 0.30	B: 0.34	AB: 0.67		

Concerning active dry yeast, it caused a gradual increase in flower weight in both seasons as its levels increased. Numerically, fresh weight of flower/ plant was increased by 3.4, 6.0 and 9.8 % in the first season and 4.5, 6.2 and 8.1 % in the second one for the 2.5, 5 and 7.5 g/ l compared with control. These results are in close agreement with those reported by Hassanein *et al.* (2003) on *Calendula officinalis*.

The interaction between two factors was significant in both seasons. The trend of decreasing single flower weight by low and medium soil salinity levels was effectively counteracted by the active dry yeast.

Bulb parameters

Number, fresh weight and mean diameter of daughter bulbs/ plant was noticeably decreased by using S_1, S_2, S_3 soils. Such reduction reached (6.0, 41.7 and 46.9 %); (3.98, 47.6 and 57.3 %) and (4.0, 21.5 and 53.5 %) for the mentioned soils, respectively in comparison with the check soil, so in the first season as shown in Tables (2 and 3). The corresponding values for the reduction percentages in bulb parameters were (3.2, 44.3 and 44.9 %); (5.4, 45.5 and 55.1 %) and (5.1, 12.7 and 19.4 %) respectively, in the second season. Manoly (1989) observed a great reduction in bulb parameters of tuberose plants as a result of adding equal amounts of NaCl + $CaCl_2$ up to 1.6 %.

Plants sprayed with active dry yeast solution especially 5 and 7.5 g/l significantly produced more number and highest fresh weight and mean diameter of daughter bulbs / plant in both seasons as indicated in Tables (2 and 3). The corresponding values for more production percentage in bulb parameters were (6.8 and 10.0 %); (15.0 and 19.6 %) and (6.4 and 13.6 %) respectively, in the first season and (6.5 and 8.6 %); (13.5 and 18.0 %) and (5.8 and 8.3 %) respectively, in the second season.

TABLE 3. Effect of salinity and active dry yeast levels on fresh and mean diameter of daughter bulbs and chlorophyll a content in the leaves of Iris cv. Wedgewood plants during 2005/ 2006 and 2006/ 2007 growing seasons.

Levels of salt / 100 g soil (A)	2005/2006 Growing season					2006/2007 growing season				
	Yeast g / l (B)					Yeast g / l (B)				
	0	2.5	5.0	7.5	Mean	0	2.5	5.0	7.5	Mean
Fresh weight of daughter bulbs (gm)										
0.0	62.15	68.58	70.50	73.92	**68.79**	66.41	70.52	75.17	78.03	**72.53**
0.5	60.17	65.22	68.18	70.64	**66.05**	63.91	68.51	69.68	72.44	**68.64**
1.0	33.21	35.90	36.85	38.29	**36.06**	35.77	38.43	40.41	41.68	**39.07**
1.5	24.26	29.74	31.31	32.25	**29.39**	27.71	31.07	34.86	36.60	**32.56**
Mean (B)	**44.95**	**49.86**	**51.71**	**53.78**		**48.45**	**52.13**	**55.03**	**57.19**	
L.S.D. 5%	A: 1.17	B: 1.18	AB: 2.37			A: 1.10	B: 2.01	AB: 4.01		
1%	A: 1.78	B: 1.60	AB: 3.20			A: 1.66	B: 2.72	AB: 5.43		
Mean diameter of daughter bulbs (cm)										
0.0	2.12	2.20	2.39	2.41	**2.28**	2.20	2.37	2.45	2.47	**2.37**
0.5	2.07	2.12	2.24	2.32	**2.19**	2.15	2.19	2.27	2.39	**2.25**
1.0	1.63	1.76	1.87	1.90	**1.79**	2.00	2.06	2.09	2.12	**2.07**
1.5	1.01	1.03	1.08	1.11	**1.06**	1.88	1.90	1.92	1.93	**1.91**
Mean (B)	**1.71**	**1.78**	**1.82**	**1.94**		**2.06**	**2.13**	**2.18**	**2.23**	
L.S.D. 5%	A: 0.06	B: 0.08	AB: 0.15			A: 0.6	B: 0.08	AB: 0.15		
1%	A: 0.08	B: 0.10	AB: 0.20			A: 0.8	B: 0.10	AB: 0.20		
Chlorophyll a content (mg / g F.W.)										
0.0	2.913	3.065	3.075	3.089	**3.036**	3.033	3.165	3.175	3.177	**3.138**
0.5	2.695	2.816	2.838	2.850	**2.800**	3.000	3.088	3.095	3.098	**3.070**
1.0	2.260	2.310	2.335	2.455	**2.340**	2.465	2.472	2.484	2.489	**2.478**
1.5	2.000	2.010	2.022	2.030	**2.016**	2.135	2.155	2.160	2.163	**2.153**
Mean (B)	**2.467**	**2.550**	**2.568**	**2.606**		**2.658**	**2.720**	**2.729**	**2.732**	
L.S.D. 5%	A: 1.118	B: 0.595	AB: 1.190			A: 1.230	B: 1.095	AB: 2.189		
1%	A: 1.693	B: 0.807	AB: 1.613			A: 1.864	B: 1.484	AB: 2.967		

Concerning, the interaction effect between soil salinity and active dry yeast, it was significant in both seasons. The astonishing effect of active dry yeast at all levels, in overcoming the reduction in bulb parameters caused by different salinity treatments including the highest one. Yet, active dry yeast exhibited their capability in counteracting soil salinity effect when they produced more number and highest weight and diameter of daughter bulbs/ plant than those produced on control plants.

Chemical analysis

Chlorophyll a content in the leaves

The high salinity soil, S_3 caused a considerably reduction in chlorophyll a content in the leaves comparing with all other soil types S_1, S_2 and the control, so, in both seasons, Table 3. These results were in close agreement with those reported by Ismail (1993) on *Lantana camara*; El-Shewakh (1995) on Acalypha and Arshi *et al.* (2002) on senna plants.

Concerning active dry yeast, it caused a gradual increase in chlorophyll a content in the leaves in both seasons as its levels increased in both seasons.

The interaction between two factors was significant. It is obvious that all active dry yeast levels could be used to compensate the reduction in chlorophyll a content caused by growing iris plants in 0.5 g salt/ 100 g soil salinity level. Meanwhile, active dry yeast at 7.5 g/ l was the only effective treatments, in both seasons able to overcome salinity reducing effect when it reached 1.0 g salt/ 100 g soil.

Nitrogen, phosphorus and potassium percentage in the bulbs

The high saline soil levels caused a considerable reduction in N, P and K % in the bulbs comparison with untreated plant in both seasons, (Table 4).

Concerning, spraying iris plants with active dry yeast at 2.5, 5 and 7.5 g/ l increasing N, P and K % in the bulbs especially the high levels (5.0 or 7.5 g/ l), comparing to control plants in both seasons.

The interaction between two factors was significant for N and K % in both seasons, while P % in the bulbs was not significant in both seasons.

The impaired effect of salinity on vegetative growth, flowering, bulb production and chemical composition might be due to the interrupting the activity of meristimatic tissue, disturbing normal stomatol opening and closure which reflects in excessive water loss and leaf injury symptoms like those of drought. Also, increasing NaCl and the other salt percentage might reduce or inhibit photosynthesis, and translocation of assimilates, consequently, plant growth. So, the limitation of plant growth under salin conditions could be attributed to directly plant assimilates from growth to repair cellular damage caused by high salinity, decreasing photosynthetic processes and for a reduction in the rate of CO_2 assimilation by reducing the total leaf area/ plant. In addition,

the uptake of nutrient ions under salin conditions is generally depressed and the normal metabolic pathways are disturbed.

TABLE 4. Effect of salinity and active dry yeast levels on N, P and K % in the bulbs of Iris cv. Wedgewood plants during 2005/ 2006 and 2006/ 2007 growing seasons.

Levels of salt / 100 g soil (A)	2005/2006 Growing season					2006/2007 growing season				
	Yeast g / l (B)					Yeast g / l (B)				
	0	2.5	5.0	7.5	Mean	0	2.5	5.0	7.5	Mean
N % in the bulbs										
0.0	2.20	2.74	2.98	3.03	**2.74**	2.34	2.92	3.08	3.12	**2.87**
0.5	1.98	2.66	2.70	2.96	**2.58**	2.02	2.71	2.94	3.06	**2.68**
1.0	1.67	2.34	2.52	2.76	**2.32**	1.92	2.54	2.65	2.90	**2.50**
1.5	1.08	2.30	2.45	2.63	**2.12**	1.76	2.43	2.52	2.75	**2.73**
Mean (B)	**1.73**	**2.51**	**2.66**	**2.85**		**2.01**	**2.65**	**2.80**	**2.96**	
L.S.D. 5%	A: 0.11	B: 0.21	AB: 0.30			A: 0.14	B: 0.25	AB: 0.35		
1%	A: 0.20	B: 0.28	AB: 0.90			A: 0.26	B: 0.33	AB: 0.47		
P % in the bulbs										
0.0	0.219	0.341	0.358	0.374	**0.323**	0.225	0.352	0.377	0.384	0.335
0.5	0.200	0.330	0.344	0.360	**0.309**	0.218	0.348	0.350	0.372	0.322
1.0	0.190	0.271	0.286	0.291	**0.260**	0.203	0.284	0.291	0.300	0.270
1.5	0.173	0.255	0.279	0.284	**0.248**	0.184	0.278	0.284	0.292	0.260
Mean (B)	**0.196**	**0.299**	**0.317**	**0.327**		**0.208**	**0.316**	**0.326**	**0.337**	
L.S.D. 5%	A: 0.023	B: 0.033	AB: N.S			A: N.S	B: 0.014	AB: N.S		
1%	A: 0.042	B: 0.044	AB: N.S			A: N.S	B: 0.019	AB: N.S		
K % in the bulbs										
0.0	2.675	3.538	3.753	3.770	**3.424**	2.880	4.103	4.015	4.053	**3.763**
0.5	2.449	3.423	3.533	3.672	**3.269**	2.558	3.570	3.645	3.696	**3.367**
1.0	2.209	2.355	2.402	2.413	**2.345**	2.212	2.408	2.469	2.482	**2.393**
1.5	2.103	2.230	2.364	2.441	**2.285**	2.128	2.388	2.396	2.508	**2.355**
Mean (B)	**2.359**	**2.887**	**3.013**	**3.074**		**2.445**	**3.117**	**3.131**	**3.185**	
L.S.D. 5%	A: 0.185	B: 0.162	AB: 0.229			A: 0.141	B: 0.172	AB: 0.243		
1%	A: 0.340	B: 0.214	AB: 0.303			A: 0.259	B: 0.227	AB: 0.322		

In addition, the various positive effect applying active dry yeast was attributed to its own contents of different nutrients, high percentage of protein, large amounts of vitamin B and natural plant growth regulators such as cytokinins. Also, soluble phosphate will reading only combine with cation in soil solution to form low solubility substances called phosphate fixation. This is dominate with high soil pH and greater percentage of calcium carbonate. Soil microorganisms which convert the insoluble form of phosphorus to soluble one play an important rule in supplying the plants with available phosphorus. Ahmed *et al.* (1997).

Recommendation : It can be recommended the possibility of growing Iris cv. Wedgewood plants in soil salinity till 1.5 g/100 g soil and supplying with active dry yeast at 7.5 g/l.

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(*Received* 14/4/2008;
accepted 17/2/2009)

استجابة نبات الإيرس صنف ويدجوود للخميرة النشطة الجافة فى ظروف الاراضى الملحية

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أجريت هذه التجربة على الأصص خلال موسمى ٢٠٠٦ ، ٢٠٠٧ م لدراسة تأثير الخميرة النشطة الجافة على نبات الإيرس صنف ويدجوود تحت ظروف التمليح الصناعى للتربة .

لقد دلت النتائج على الاستجابة السالبة لكل من النمو والتزهير وإنتاج الأبصال والمكونات الكيماوية نتيجة معاملة التربة بخليط من أملاح كلوريد الصوديوم وكلوريد الكالسيوم وكربونات الكالسيوم وكبريتات الصوديوم بنسب متساوية على أساس الوزن بمستويات صفر ، ٠,٥ ، ١,٠ و ١,٥ جرام من الملح / ١٠٠ جرام تربة.

وكذلك دلت النتائج أيضا على أن إضافة الخميرة النشطة الجافة تركيز صفر ، ٢,٥ ، ٥ و ٧,٥ جرام / لتر أعطت أحسن النتائج بالمقارنة بالنباتات الغير معاملة وكذلك فإن إضافة الخميرة النشطة الجافة قد قلل التأثير الضار على النبات والصفات الأخرى التى تأثرت بالملوحة .

وكذلك يمكن التوصية بزراعة نباتات الإيرس صنف (ويدجوود) فى الأراضى الملحية حتى تركيز ١,٥ جرام لكل ١٠٠ جرام تربة وإمدادها بالخميرة النشطة الجافة بمعدل ٧,٥ جرام لكل لتر .