EFFECT OF SOME BIOFERTILIZER TREATMENTS ON GROWTH, YIELD AND BIOCHEMICAL CONTENT OF TWO WHEAT CULTIVARS GROWN UNDER SALINITY CONDITIONS.

Journal

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ABSTRACT

Two field experiments were performed during two consecutive winter seasons, 2006/2007 and 2007/2008 at the Agricultural Experimental Station of Desert Research Center at Ras Sudr, South Sinai Governorate. These experiments were carried out to study the response of yield, yield components and biochemical composition of two wheat cultivars (*Triticum aestivum* L. 1, Gemiza-9 and Sakha-94), under two saline water irrigation levels (3500 and 7000 ppm); to bio-fertilizer treatments, which were:

1-100 % of the recommended doses of NPK as control
2- 50 % of the recommended doses of cerealien (2L/fed.) and phosphorien (2L/fed.) + 50 % of the recommended doses of NPK
3- 100 % of the recommended doses of cerealien(4L/fed.) and phosphorien (4L/fed.) + 50 % of the recommended doses of NPK

The obtained data confirmed the absolute superiority of 100% cerealin + 100% phosphorin inducing the highest degree of the physiological tolerance to salinity, which enables the stressed plants of the two cultivars to be adapted and keep better performance against the two levels of salinity. The results showed that, wheat cultivars with cerealien 100 % + 100 % phosphorien + 50% NPK produced significant increments in all growth characters, yield and yield components as well as chemical constituents. Also, results showed that Gemiza-9 was superior to Sakha-94 in all yield criteria in the growing seasons. All chemical constituents including, proine , photosynthetic pigments in leaves and crude protein , total carbohydrates, total sugars, reducing sugars, non-reducing sugars, calcium, potassium in shoots and amino acids were increased in shoot and in grain under biofertilizer treatments as compared to their control treatments in two cultivars.

Key words: Wheat, *Triticum aestivum* L., Cultivars, Biofertilizer, Salinity levels, Free proline, Sugars, Amino acids.

INTRODUCTION

Wheat (*Triticum aestivum* L.) is the most important cereal crop as the main food stable for the Egyptian public. Improving the productivity of this crop is a main task due to its short supply which mandated importing about 50% of the needed wheat grains from outside the country. There is insufficient fresh water to develop all potential arable land. So, the use of saline water in agriculture is a subject of vital importance for arid and semi arid zones to meet increasing food demand (Volkmar *et al*., 1998). However, all fertilizer materials are salts according to their salt index. When they added to the soil, they increase the salt concentration and then the osmatic potential of the soil solution. Therefore, use of soil micro-organisms which can either fix atmospheric nitrogen or solublize phosphate or promote plant growth through synthesis of growth promoting substances or by enhancing the decomposition of plant residues to release vital nutrients and increase humic content of soils, will be environmentally begin approach for nutrient management and ecosystem function (Wu *et al*., 2005). Kaci *et al.,* (2005) reported that, these microorganisms are known to deliver a number of benefits including plant nutrition and tolerance to adverse soil conditions.

The aim of this study is to investigate the response of wheat plant to nitrogen fixer and phosphate dissolving bacterial fertilizers under two levels of saline water irrigation. Moreover, investigating the effect of these biofertilizers combinations as a biological technique for reducing the harmful effect of salinity and find out the level of salinity that plant can be tolerate and their effects on the growth and yield. In addition, the use of biofertilizers may have additional benefits such as nitrogen fixation, mobilizing phosphate and micronutrients through the production of organic acids and lowering soil pH (Saber, 1993).

Besides, microorganisms such *Pseudomonus, Azotobacter, Azospirillium* and *mycorrhizae* can secrete growth promoters, i.e., gibberellins, cytokinins like substance and auxins (Hartman *et al*., 1983). The strain of nitrogen fixing bacteria (*Azotobacter* spp.) under the commercial name Cerealien and phosphate dissolving bacteria (*Bacillus megaterium*) under the commercial name Phosphorien used under different levels of salinity. The previously mentioned treatments were evaluated for their effects on wheat plant growth, yield and chemical constituents (Abeer and Hanaa, 2008).

MATERIALS AND METHODS

Two field experiments were carried out in Agricultural Station of Desert Research Center at Wadi Sudr, South Sinai Governorate, during 2006/2007 and 2007/2008 growing seasons to study the response of growth, yield and yield components as well as biochemical composition of two wheat cultivars (*Triticum aestivum* L.) Gemiza-9 and Sakha-94 to three biofertilizer treatments under two saline water irrigations (3500, 7000 ppm). Soil and water analysis are presented in Table (1).

Table (1): Soil mechanical, chemical and two artesian irrigation water analyses for the experimental site at Ras Sudr region.

A) Soil mechanical analysis

Depth (cm)	Coarse sand %	Fine sand %	Silt %	Clay %	Texture
0-15	22.61	45.49	16.48	15.33	Sandy loam
15-30	35.20	28.40	18.96	17.10	Sandy loam

B) Soil chemical analysis

Depth (cm)	pH	ECe dSm^{-1}	$CaCo_3$ %	Soluble cations (meq/L)				Soluble anions (meq/L)			
				Na^+	Ca^{++}	Mg^{++}	K^+	Co_3^-	HCO_3^-	Cl^-	So_4^{--}
0-15	7.39	8.54	45.62	48.04	21.21	10.86	5.62	-----	10.85	43.8	25.2
15-30	7.71	7.84	48.34	43.24	15.19	10.80	6.23	-----	11.6	44.95	19.8

C) Chemical analysis of the two saline water irrigation

Salinity levels (ppm)	EC dSm^{-1}	pH	Soluble cations (meq/L)				Soluble anions (meq/L)			
			Na^+	Ca^{++}	Mg^{++}	K^+	Co_3^-	HCO_3^-	Cl^-	So_4^{--}
3500	5.47	7.5	36.75	10.07	8.55	0.44	-----	3.80	36.48	14.75
7000	10.94	7.8	66.62	35.67	17.84	0.98	-----	5.68	73.89	40.67

Each experiment under each levels of saline water irrigation included 6 treatments, which were combination between two wheat cultivars (Gemiza-9 and Sakha-94) and three biofertilizer treatments, which were:

1. 100 % of the recommended doses of NPK as control
2. 50 % of the recommended doses of cerealien(2L/fed.) and phosphorien (2L/fed.) + 50 % of the recommended doses of NPK
3. 100 % of the recommended doses of cerealien(4L/fed.) and phosphorien (4L/fed.) + 50 % of the recommended doses of NPK

Both cerealien and phosphorien are produced by biofertilizers unit, General Organization of Agriculture Equalizaton Fund, Agriculture Research Centre, Ministry of Agriculture, Giza, Egypt. Two levels of salinity of irrigation water (3500 and 7000 ppm). The experiments design was split plot design with three replications, where biofertilizer treatments occupied the main plots and wheat cultivars were allocated at random in sub plots.

The experimental unit consisted of 15 rows, each of 3.5 meters in length and 20 cm between rows where, each plot area was 10.5 m^2. Seeding rate of 60 kg/fed. was used. Planting took place on 16^{th} and 18^{th} November in 2007 and 2008 seasons, respectively. The normal agronomic practices of growing wheat were practiced as recommended by wheat research Dept., A. R. C.

Biofertilizers, Cerealine and Phosphorine were applied twice with irrigating water after 15 and 45 days from sowing dates as recommended by the Ministry of Agriculture, Giza, Egypt. For biochemical determinations, two vegetative samples were taken at 75 and 105 days after sowing (DAS). Another samples were taken at harvest from 1m^2 from each replicate for yield and yield components.In the third sample at harvest, ten plants were taken randomly from each plot to determine plant height (cm), No. of tillers/plant, spike length (cm), No. of grains/spike, weight of grains/spike (g) and 1000-grain weight (g). Sample of 1 m^2 from each plot was harvested to determine No. of spikes/m^2, grain and straw yields (ton/fed.).

In order to obtained dry weight, plant material were chopped into small pieces and weighed then were kept in an electric Wily Mill grinder, mixed thoroughly and packed in air tight glass containers and were kept for chemical analysis. Determinations of sodium, potassium and calcium in shoots were determined in the acid digested samples by using flame photometer (Jenway PFP7) according to Brown and Lilleland (1964). Pigments were extracted from fresh leaves using 85% acetone according to the method of Veron and Seely (1966). Proline concentration was determined in fresh leaves according to Bates *et al.,* (1973) and total protein was determined in dry shoots according to A.O.A.C (1990). Total carbohydrates was estimated calorimetrically by the Nelson's reagent as reported by Cherry (1973), Soluble sugars, Reducing and non-reducing were determined in shoots according to Miller (1959). Determinations of free amino acids were accomplished according to Pellet and Young (1980) by using amino acid analyzer technique.

Statistical analyses:

The data in three replications were expensed to the proper statistical analysis of variance of a split plot design according to Snedecor and Cochran (1967). Duncan's multiple range (1955) was used to compare between means.

RESULTS AND DISCUSSION

A-Yield and its Components:

Effect of biofertilizer:

Tables (2 and 3) showed that the effect of biofertilizer treatments, wheat cultivars and their interaction on yield and yield attributes under the two salinity levels. Grain yield were increased by 45 % with 100 % of the recommended doses of cerealien (4L/fed.) supported with 50 % NPK at 3500 and 7000 ppm salinity levels as compared with 100 % of the recommended doses of NPK. These increasments may be due to significant increase of triangular yield components, i. e No. of spikes/ m^2, No. of grains/spike and 1000-grain weight. Moreover, treatments of 100 % of the recommended doses of cerealien with 50 % NPK increases significantly straw wield by 43 % and 74.4 % at 3500 and 7000 ppm salinity levels, respectively. These results may be attributed to significant in plant height, No. of tillers/plant and spike length. In this respect, El-Kased *et al*., (1999) observed that application of biological fertilizer increased the yield by 183% over the control. Also, Sharma *et al*.,

(2000) reported that application of biofertilizers (Azotobacter and phosphate solubilizing bacteria) increased yield of wheat.

Cultivars differences:

Data in Tables (2 and 3) indicated that there were significant differences between the two wheat cultivars under two salinity levels in the most characters. Gemiza-9 cultivar significantly surpassed Sakha-94 in plant height, No. of spike/m^2, No. of grains/spike, 1000-grain weight, grain and straw yields. While there were no significancy between the two wheat cultivars in No. of tillers/plant, spike length and weight of grains/spike under two salinity levels. These results may be due to the genetical differences between the two wheat cultivars under salinity levels. In this respect, Abd El-Gawad *et al*., (1987) found that wheat cultivars differed in partitioning and migration of the total available photosynthate to economic yields. Also, wheat cultivars differed in carbon equivalent for vegetative components and grain in production value of vegetative matter, grain yield and coefficient energy of crop and harvest index. The differences in 1000-grain weight of the two wheat cultivars may be attributed to the translocation rate variation of photosynthate from source to sink, i.e. the grain. These results were in harmony with the obtained results of Hassanein and Gomaa (2001) and Zaki *et al*., (2004).

Effect of the interaction between wheat cultivars and biofertilizer:

The effect of interaction between wheat cultivars and biofertilization on plant height, No. of tillers/plant, No. of spike/m^2, spike length, No. of grains/spike, weight of grains/spike, 1000-grain weight, grain and straw yields were significant under two salinity levels. Results in Tables (2 and 3) showed that the effective treatments for No. of spike/m^2 and grain yield were obtained from Gemiza-9 cultivar with 100% cerealien + 100% phosphorien supported with 50% NPK. Whereas, the differences between wheat cultivars with 100% cerealien + 100% phosphorien + 50% NPK did not reach the significant level in plant height, No. of tillers/plant, spike length, weight of grains/spike, No. of grains/spike, 1000-grain weight and straw yield. These results are in harmony with those obtained by Hassanein and Gomaa (2001) and Abd El-Razik (2002).

Table (2): Yield and its components of two wheat varieties as affected by different bio fertilizer treatments under 3500 ppm salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Items		Plant height (cm)	No. of tillers/ plant	No. of spike/m²	Spike length (cm)	No. of grains/ spike	Weight of grains/ spike (g)	1000 grain weight (g)	Grain yield (ton/fed)	Straw yield (ton/fed)
Fertilizers	Treat. 1	2.7 b	375.7 c	9.3 b	49.0 b	76.5 b	2.9 c	44.5 c	1.605 c	2.863 c
	Treat. 2	2.9 b	389.8 b	9.7 ab	56.2 b	79.8 ab	3.7 b	47.1 b	1.991 b	3.578 b
	Treat. 3	4.1 a	572.4 a	10.1 a	66.3 a	80.5 a	4.2 a	49.2 a	2.328 a	4.094 a
Cultivars	Gemiza(9)	3.3 a	498.0 a	9.8 a	59.5 a	80.3 a	3.8 a	47.3 a	2.096 a	3.749 a
	Sakha (94)	3.1 a	393.9 b	9.6 a	54.8 b	77.5 b	3.4 a	46.5 b	1.854 b	3.274 b
Treat. 1	Gemiza(9)	2.7 c	383.9 c	9.3 b	49.5 bc	78.0 b	3.2 b	44.5 c	1.667 c	3.271 b
	Sakha (94)	2.7 c	367.4 c	9.2 b	48.5 c	75.0 b	2.5 c	44.4 c	1.542 c	2.455 c
Treat. 2	Gemiza(9)	3.0 bc	421.5 bc	9.8 ab	62.5 b	81.3 a	3.9 b	47.9 b	2.240 b	3.794 b
	Sakha (94)	2.7 c	358.0 c	9.5 ab	49.8 bc	78.3 b	3.5 b	46.2 bc	1.741 bc	3.361 b
Treat. 3	Gemiza(9)	4.3 a	688.6 a	10.2 a	66.5 a	81.7 a	4.3 a	49.5 a	2.381 a	4.182 a
	Sakha (94)	4.0 ab	456.2 b	10.0 a	66.0 ab	79.3 a	4.1 a	48.8 a	2.278 b	4.005 a

Table (3): Yield and its components of two wheat varieties as affected by different biofertilizer treatments under 7000 ppm salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Items		Plant height (cm)	No. of tillers/ plant	No. of spike/m²	Spike length (cm)	No. of grains/ spike	Weight of grains/ spike (g)	1000 grain weight (g)	Grain yield (ton/fed)	Straw yield (ton/fed)
Fertilizers	Treat. 1	65.0 c	2.3 b	248.5 c	7.5 b	40.0 b	2.6 b	34.2 c	1.023 c	1.835 c
	Treat. 2	71.4 b	2.3 b	312.8 b	8.6 b	49.0 ab	3.4 a	38.4 b	1.240 b	2.854 b
	Treat. 3	79.4 a	2.9 a	470.8 a	9.8 a	55.0 a	3.8 a	42.5 a	1.483 a	3.200 a
Cultivars	Gemiza(9)	74.0 a	2.5 a	367.0 a	9.0 a	51.0 a	3.4 a	38.8 a	1.325 a	2.853 a
	Sakha (94)	69.8 b	2.4 a	321.0 b	8.3 a	45.0 b	3.1 a	37.9 b	1.172 b	2.407 b
Treat. 1	Gemiza(9)	67.3 bc	2.3 b	258.8 bc	7.5 b	46.0 b	2.7 bc	34.4 c	1.035 c	2.210 bc
	Sakha (94)	62.7 c	2.3 b	238.1 c	7.5 b	34.0 b	2.4 c	34.0 c	1.010 c	1.460 c
Treat. 2	Gemiza(9)	73.0 a–c	2.3 b	345.6 b	9.2 a	52.0 a	3.5 b	38.8 b	1.414 b	3.124 ab
	Sakha (94)	69.7 a–c	2.3 b	279.9 bc	8.0 a	46.0 b	3.3 b	38.0 bc	1.066 bc	2.584 b
Treat. 3	Gemiza(9)	81.7 a	3.0 a	496.5 a	10.2 a	55.0 a	3.9 a	43.2 a	1.525 a	3.224 a
	Sakha (94)	77.0 ab	2.7 a	445.0 ab	9.3 a	55.0 a	3.7 ab	41.7 a	1.441 b	3.176 ab

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

B-Chemical Analysis:

1-Proline in leaves, crude protein and carbohydrate fraction in shoots:

The obtained results showed in Table(4,5) the concentrations of proline,crude protein and carbohydrate fraction were affected by biofertilizer treatments,wheat cultivars and their interaction under tow salinity levels(3500 and 7000ppm) .

It is evident from the data that Biofertilizer treatment (50%cerealien+ 50%phosphorien) increased the concentration of proline as compared to control under lower level of salinity (3500 ppm) , this was clear in second sample.

On the other hand, two wheat varieties plant either with 50% cerealien + 50% phosphorien or 100% cerealien + 100% phosphorien (supported with 50% NPK) showed much higher values concentrations in second sample under 7000 ppm , It is clear with Gemiza(9) varieties. The data revealed that proline content were increased versus increasing water irrigation salinity from 3500 up to 7000 ppm , this results were obvious with Sakha-94

The interaction effect between wheat varieties and biofertilizer showed that the concentration of proline content is higher in tow wheat varieties after treatment with 100%cerealien+100+phosphorien in the second sample as compared to the first sample of two wheat cultivars (Gemiza-9 or Sakha-94).

Also, data revealed that proline content were increased versus increasing water irrigation salinity from 3500 up to 7000 ppm , in this connection , Kishore *et al*., (2005) concluded that proline is known to occur widely in higher plants and normally accumulates in large quantities in response to environmental stress. Also, Ashraf and Foolad (2006) noticed that there is a positive relationship between proline accumulation and plant stress tolerance. Also, Samuel *et al* (1985) found that proline content was increased in all plant samples which may be due to increased nitrogen metabolism and nucleic acids (DNA and RNA) in plant cell. In addition to its role as an osmolyte for osmotic adjustment, proline contributes to stabilizing structure (eg.membranes and proteins).

Data listed in Table (4,5) showed that the effect biofertilizer treatments (100%ceralien+100phosphorien) significantly enhanced protein content ascompared with the control. On the other hand, the

Table (4): Proline content in leaves (µmol/ g fresh wt.), crude protein (mg/ g dry wt.), total carbohydrates, soluble sugars, reducing sugars and non-reducing sugars (g% dry wt.) in shoots of two wheat varieties as affected by different biofertilizer treatments under 3500 ppm salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Items		Proline content		Crude protein		Total carbohydrates		Soluble sugars		Reducing sugars		Non-reducing sugars	
No. of sample		1	2	1	2	1	2	1	2	1	2	1	2
Fertilizers	Treat. 1	3.86 a	3.16 b	20.13 c	20.74 c	15.53 c	16.04 b	1.33 b	3.41 b	0.15 b	0.28 b	1.18 c	3.12 c
	Treat. 2	2.05 b	4.63 a	21.06 b	21.75 b	19.87 a	16.78 b	1.59 b	3.94 ab	0.14 b	0.37 b	1.29 b	4.19 a
	Treat. 3	2.94 b	3.85 ab	22.70 a	23.07 a	16.46 b	22.41 a	1.95 a	4.63 a	0.30 a	0.49 a	1.82 a	3.88 b
Cultivars	Gemiza(9)	3.26 a	3.75 a	21.98 a	22.45 a	18.35 a	16.91 b	1.53 a	3.92 a	0.20 a	0.36 a	1.32 b	3.79 a
	Sakha (94)	2.63 b	4.01 a	20.61 b	21.24 b	16.20 b	24.57 a	1.72 a	4.06 a	0.19 a	0.40 a	1.53 a	3.66 b
Treat. 1	Gemiza(9)	3.89 a	3.39 bc	20.80 d	21.28 e	13.26 d	13.31 d	1.52 a	3.89 b	0.15 d	0.23 c	1.37 d	3.66 c
	Sakha (94)	3.83 a	2.92 c	19.45 f	20.19 f	17.80 b	18.78 c	1.15 a	2.92 b	0.16 c	0.34 b	0.99 e	2.58 f
Treat. 2	Gemiza(9)	2.86 b	3.96 b	21.68 c	22.13 c	26.12 a	11.24 d	1.05 a	3.96 b	0.15 d	0.35 b	0.73 f	3.45 e
	Sakha (94)	1.24 c	3.80 b	20.43 e	21.37 d	13.62 d	22.32 bc	2.13 a	3.97 b	0.13 e	0.38 b	1.85 b	4.92 a
Treat. 3	Gemiza(9)	3.05 a	3.91 b	23.45 a	23.95 a	15.68 c	32.26 a	2.02 a	3.91 b	0.32 a	0.51 a	1.87 a	4.26 b
	Sakha (94)	2.83 b	5.30 a	21.94 b	22.18 b	17.24 bc	26.19 b	1.89 a	5.30 a	0.28 b	0.47 a	1.76 c	3.49 d

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

1= 1st sample (75 DAS) 2=2nd sample (105 DAS)

Table (5): Proline content (µmol/ g fresh wt.), crude protein (mg/ g dry wt.), total carbohydrates, soluble sugars, reducing sugars and non-reducing sugars (g% dry wt.) in shoots of two wheat varieties as affected by different biofertilizer treatments under 7000 ppm salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Items		Proline content		Crude protein		Total carbohydrates		Soluble sugars		Reducing sugars		Non-reducing sugars	
No. of sample		1	2	1	2	1	2	1	2	1	2	1	2
Fertilizers	Treat. 1	4.26 a	5.65a	18.24 c	18.93 c	20.55 b	19.04 c	1.26 b	5.83 a	0.17 a	0.36 a	1.14 b	5.35 a
	Treat. 2	3.27 b	5.57 ab	19.14 b	21.13 b	23.48 a	22.79 b	1.11b	4.11 b	0.15 a	0.33 a	0.96 c	5.30 b
	Treat. 3	3.21 b	4.57 b	21.46 a	21.90 a	22.25 a	26.59 a	1.52 a	5.88 a	0.20 a	0.42 a	1.33 a	3.72 c
Cultivars	Gemiza(9)	3.28 a	5.53 a	20.28 a	21.06 a	25.58 a	23.49 a	1.33 a	5.53 a	0.18 a	0.37 a	1.19 a	5.07 a
	Sakha (94)	3.86 a	4.95 b	19.09 b	20.15 b	18.27 b	22.18 a	1.24 a	4.86 a	0.16 a	0.36 a	1.09 b	4.50 b
Treat. 1	Gemiza(9)	3.78 b	6.25 a	18.70 e	19.21 e	20.80 b	23.89 c	1.39 a	6.17 a	0.21 b	0.32 bc	1.27 b	5.58 b
	Sakha (94)	4.71 a	5.05 bc	17.78 f	18.64 f	20.29 b	14.18 e	1.13 a	5.50 ab	0.13 e	0.39 a	1.00 e	5.11 c
Treat. 2	Gemiza(9)	3.12 bc	6.17 ab	19.49 c	21.58 b	27.40 a	20.95 d	0.86 a	4.19 cd	0.17 d	0.37 ab	0.69 c	5.82 a
	Sakha (94)	3.41 bc	4.97 cd	18.79 d	20.67 d	17.41 c	24.64 bc	1.36 a	4.03 d	0.13 e	0.29 c	1.23 c	4.77 d
Treat. 3	Gemiza(9)	2.93 c	4.19 b	22.64 a	22.49 a	29.54 a	27.71 a	1.79 a	6.25 a	0.17 c	0.43 a	1.62 a	3.82 e
	Sakha (94)	3.48 bc	4.95 dc	20.69 b	21.31 c	17.10 c	25.46 b	1.25 a	5.50 ab	0.22 a	0.41 a	1.03 d	3.62 f

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

1= 1st sample (75 DAS) 2= 2nd sample (105 DAS) differences between wheat varieties showed that, Gemiaza (9) had higher protein content than Sakha (94)

The interaction effect between tow wheat varieties and biofertilizer showed that, the highest value of protein conten was produced from Gemiza (9) after treatment with (100% cerealien + 100 + phosphoreien), it is clear in tow samples.

The same data cleared also that irrigation under high salinity level (7000 ppm) decreased crude protein in shoots, these results coincided with the results obtained by Sher - Mohamed *et al.,* (1994) who stated that the reduction in protein content under high salinity level may be due to the disturbance in nitrogen metabolism, inhibition of nitrate absorption or decrease of the availability of amino acids and denaturation of the enzymes involved in amino acid and protein synthesis.

Generally, the interaction effect between wheat varieties and biofertilizer treatments, show that, the observed increase in protein content of two cultivars particularly with Gemiza-9. Similar results were obtained by Reddy *et al.,* (2003) found that biofertilizer inoculation has been reported to decrease fertilizers needed, improve the crude protein content and counteract the effects of salinity.

It is obvious from the results (Table,4,5) that, biofertilizer treatments significantly enhanced total carbohydrate, soluble sugars,reducing and non-reducing sugars in shoots of tow wheat plant as compared with the control in second sample.

On the other hand, data show the differences among tow varieties in total carbohydrates in shoots of the two wheat cultivars are significant in first sample, it was obvious that Gemiza (9) recorded the highest value for total crbohydrate.

The interaction effect between wheat varieties and biofertilizer can be deduced from tabulated data in Table (4,5). The results showed that, the highest value of total carbohydrate and sugars was produced from Gemiza (9) after treatments with 100% cerealine + 100% Phosphorine .

Regarding Carbohydrate fractions the obtained data under two salinity levels,show that increasing salinity level caused a gradual increase in the concentrations of reducing, ,no- reducing and total sugars in the shoots to reach its maximum at the highest level of salinity i.e. 7000 ppm among second sample.

Moreover, Ingram and Bartels (1996) stated that under water stress soluble sugars can function in tow ways which are difficult to separate as osmotic agent and as osmoprotectors. As an osmotic agent, the increased sugar induced by water stress was significantly correlated to osmotic adjustment and turgor maintainance. As osmoprotectors, sugars stabilizes protein and membranes.

Also Tawfik *et al.,* (2006) showed that raising irrigation salinity levels increase the content of carbohydrate and proline. Similar results were obtained by Ashour *et al.,* (2004). In this respect, Kusaka *et al.,* (2005) added that, the observed increase in the osmotic potential might be due to the accumulation of inorganic solutes, several organic components such as sucrose, glucose and amino acids including proline. Also, Parasher and Varma (1987) revealed that, the increments in soluble and total available carbohydrate under saline condition may be associated osmotic regulation of plant cells as a mechanism of salt tolerance for wheat plants.

2- Photosynthetic pigments in leaves:

Results in Table (6), show that the highest content of photosynthetic pigments; chlorophyll a,b, and carotenoids were recorded in two wheat varieties with 100% cerealien + 100% phosphorien as compared to the control under two salinity levels. Also, results showed that differences between wheat cultivars did not reach the significant level at 5% level of signicance in chlorophyll a in first sample, while results in second sample showed that, Gemiza (9) recorded the highest value for chlorophyll.a and chlorophyll b

Data in the same table illustrate the effect of interaction between biofertilizer treatments and wheat cultivars. Results revealed that chlorophyll a and chlorophyll b of tow wheat varieties were not significantly after treatment with 100% cerealine + 100% phosporiien under tow salinity level.

It was cleared that biofertilizer treatments improve all the tolerance feature of plants and increase plant adaption to saline irrigation. These results were coincided with the results obtained by Zahirodini *et al*., (2004), who stated that, the bacterial inoculants clearly enhanced fermentation and consequently reduced soluble carbohydrates. By contrast, the stressed-plant organs were irrigated with two salinity levels (without bio-fertilizer treatments) showed lower values of photosynthetic pigments in all samples.

Table (6): Photosynthetic pigments in leaves (µ mol/mg) of the two wheat varieties as affected by different biofertilizer treatments under 3500 ppm and 7000 ppm salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008)

Salinity level		3500 ppm						7000 ppm					
No.of sample		1st sample(75 DAS)			2nd sample (105 DAS)			1st sample(75 DAS)			2nd sample(105 DAS)		
Photosynthetic pigments		Chl.a	Chl.b	Chl.c	Chl,a	Chl.b	Chl,c	Chl.a	Chl.b	Chl.c	Chl.a	Chl.b	Chl.c
Fertilizers	Treat. 1	1.17 a	2.08 b	0.41 a	1.14 a	1.99 a	0.40 c	1.19a	2.04 a	0.43 a	1.13 a	1.99 b	0.40 a
	Treat. 2	1.22 a	2.15 b	0.43a	1.15 a	2.03 a	0.41 b	1.22 a	2.20 a	0.43 a	1.15 a	2.00 b	0.41 a
	Treat. 3	1.25 a	2.15 b	0.48 a	1.17a	2.11 a	0.44 a	1.22 a	2.22 a	0.47 a	1.15 a	2.24 a	0.42 a
Cultivars	Gemiza(9)	1.21 a	2.18 a	0.44 a	1.19 a	2.15 a	0.45 a	1.22 a	2.21 a	0.44 a	1.16 a	2.07 a	0.42 a
	Sakha (94)	1.22 a	2.14 b	0.42 a	1.11 b	1.94 b	0.39 b	1.20 b	2.10 b	0.44 a	1.12 b	2.08 a	0.40 a
Treat. 1	Gemiza(9)	1.19 ab	2.09 a	0.40 b	1.11ab	1.93 b	0.40 d	1.19 e	2.14 a	0.41 bc	1.12 a	2.00 ab	0.40 a
	Sakha (94)	1.15 ab	2.07 a	0.38 b	1.06 b	1.81c	0.38 e	1.18 e	1.85 b	0.39 c	1.07 a	1.91 b	0.37 a
Treat. 2	Gemiza(9)	1.22 ab	2.22 a	0.43 b	1.19 a	2.13 a	0.43 b	1.21 c	2.23 a	0.44 bc	1.17 a	2.07 ab	0.41 a
	Sakha (94)	1.21 ab	2.09 a	0.43 b	1.16 ab	2.08 a	0.40 d	1.20 d	2.18 a	0.42 bc	1.12 a	2.01 ab	0.41 a
Treat. 3	Gemiza(9)	1.26 ab	2.27 a	0.52 a	1.21 ab	2.18 a	0.49 a	1.25 a	2.26 a	0.52 a	1.17 a	2.33 a	0.42a
	Sakha (94)	1.25 ab	2.22 a	0.43 b	1.19 ab	2.14 a	0.42 c	1.24 b	2.26 a	0.47 ab	1.13a	2.14 ab	0.42a

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

Also, Poljakoff Mayber and Gale, (1975), found that the reduction in chlorophyll contents by increasing salinity levels of irrigation water was refered to the decrease in absorption of iron and magnesium needed for chlorophyll synthesis.

3. Minerals content in shoots:

Data present in Table (7) show the effect of biofertilizer on minerals contents in tow wheat cultivars under tow salinity levels of irrigation water, it was cleared that the increase in potassium, calcium and decrease in sodium content of tow wheat varieties as compared with the control, similar results were obtained by Hamdia *et al., (*2005), found that, biofertilizer inoculation markedly altered the selectivity ions, it restricted Na^+ uptake and enhanced the uptake of K^+ and Ca^{++}.

It is evident from the data that the effect of biofetilizer treatments with varieties was recorded the highest value for potassium with Gemiza (9) variety.

Also, results shows the effect of interaction between tow wheat cultivars and biofertilizer on minerals content in shoots of wheat plants , the highest values of potasisium and calcium were obtained by the combination between (100%cerealine+100% phosphorien) and Gemiza(9) variety.

In this regard, Sheteawi and Tawifk(2007) showed that potassium content was higher by biofertilizer treatmet(Bigin and Nitrobin) than non fertilized mung bean plants. In this concern, Vijaya and Srivasuki (2001) stated that dual inoculation with *Gloms macrocarpus* and *Bacillus megatherium* was superior to individual inoculation either with *G.macrocarpus* or *B. megatherium* in enhacing the nutrient uptake(Ca, Na and K) of microprogated teak plants. However, Mansour *et al* (2002) showed that biofertilizer(Nitrobein and Phosphorein) on globe artichoke plants increased the percentage of K element.

On the other hand, results show that raising irrigation salinity levels increased the content of sodium and calcium during two samples of two varieties .Furthermore, the same treatment decreased the content of potassium, similar results were obtained by Tawfik *et al,* (2006) noticed that the effect of salinity on potassium content could be attributed to the difficulty of its uptake due to competition with the high concentration of the sodium in the root medium. Also,

Table (7): Sodium, Potassium and calcium elements (mg/ g dry wt.) in shoots of two wheat varieties as affected by different biofertilizer treatments under salinity water irrigation conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Items		Sodium		Potassium		Calcium		Sodium		Potassium		Calcium	
Salinity level		3500 ppm						7000 ppm					
No. of sample		1	2	1	2	1	2	1	2	1	2	1	2
Fertilizers	Treat. 1	6.49 a	11.55 a	10.5 c	9.9 b	4.00 a	1.13 a	8.07 a	7.23 a	10.7 c	12.2 b	4.98 a	1.17 b
	Treat. 2	6.24 a	9.12 b	11.05 b	10.1 b	4.67 a	1.75 a	7.64 b	6.85 a	14.5ab	15.1 a	5.30 a	1.85 a
	Treat. 3	5.33 a	7.24 d	12.1 a	11.8 a	5.59 a	1.81 a	7.26 b	6.11 b	15.1 a	15.3 a	6.24a	2.20 a
Cultivars	Gemiza(9)	6.51 a	9.45 a	12.6 a	11.2 a	4.8 a	1.78 a	8.33 a	7.12 b	16.7 a	15.9 a	5.45 a	1.80 a
	Sakha (94)	5.52 a	9.15 a	9.8 b	9.9 b	4.7 a	1.66 a	6.98 b	9.15 a	12.0 b	12.5 b	5.56 a	1.67 a
Treat. 1	Gemiza(9)	6.78 a	12.20 a	12.4 b	9.8 b	4.06c	1.19 d	8.99a	7.96 a	16.4 a	15.2 a	5.12 bc	1.05 e
	Sakha (94)	6.19a	10.90 b	8.6 e	9.8 b	3.94 c	1.07 d	7.22 c	6.50 c	10.7 c	9.3 b	4.83 c	1.28 d
Treat. 2	Gemiza(9)	6.56a	8.88 c	12.4 b	10.1 b	4.26 c	1.68 c	8.06 b	7.24 b	16.6 a	16.2 a	5.14 bc	2.01 b
	Sakha (94)	5.91a	9.36 c	9.7 d	10.0 a	5.07 b	1.81 bc	7.14 c	6.47 c	12.4 b	14.1 a	5.46 b	1.68 c
Treat. 3	Gemiza(9)	6.19 a	7.28 d	13.0 a	13.7 a	6.10 a	1.95 b	7.95 b	6.16 c	17.1 a	16.4 a	6.09 a	1.95 b
	Sakha (94)	4.46 b	7.20 d	11.2 c	10.0 a	5.08 b	2.44 a	6.57 c	6.05 c	13.0 b	14.1 a	6.38 a	2.45 a

Treat.1 = 100 % NPK (control)   Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK   Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

1= 1st sample (75 DAS)   2=2nd sample (105 DAS)

Mahajan and Tuteja (2005) said that potassium is one of the essential elements and is required by the plant in large quantaties. Potassium is required for maintaining the osmotic balance.

Plants generally require mineral nutrients in all metabolic processes ,e.g. K ions which is a part from its role as an osmotic component, K is essential for the formation of starch, protein synthesis, photosynthate partitioning, normal stomatal function and above all as an activator to a number of monovalent cation requiring enzyme (Marschner 1995 and Mahajan and Tuteja 2005). Also, calcium is important for cell wall, membrane, pectinates, and regulation of cell metabolism.

4-Amino acids composition of protein in shoots and grains:

Results in Table (8,9) illustrated that amino acids of two varieties in shoots and grains were effected by biofertilizer treatments under two salinity levels of irrigation water.

The data cleared that bio-fertilizer treatments were increased the content of amino acids of tow wheat cultivars as compared to the control ,it is obvious from the results that the highest content of amino acids were recorded in plants with 100% cerealien and 100% phosphorien treatments under lower salinity level. These results coincided with the results obtained by Zahiroddini *et al.,* (2004). The obtained data also revealed that quantitative chromatographic evaluation of individual amino acids in shoots and grains of both studied varieties show the presence of 16 amino acids including; aspartic, threonine, serine, glutamic, proline, glycine, alanine, valine, methionine, isoleucine, leucine, tyrosine, phenylalanine, histidine, lysine and arginine , respectively. Also, data presented in Table (8,9) showed the quantitative analysis of amino acids in their protein hydrolzates. Data also showed that content of acidic amino acids (aspartic and glutamic) in shoots and grains of both studied varieties was mostly higher than other amino acids, possibly due to their being precursors for synthesis of most amino acids.

In another study, Reddy *et al.,* (2003), who found that, biofertilizer inoculation has been reported to decrease fertilizers needed, improve the crude protein content and counteract the effects of salinity. Also, Mengel and Kirkby (1979) reported that low levels of K frequently increase the contents of both glutamine and asparagines because of reduced rate of N incorporation into protein, K being reported to be involved in several steps of protein synthesis. Other possibility could be the glutamate transformation to proline under salinity stress (Miflin, 1980) as well as the aspartate conversion into methionine and threonine in the presence of ATP (Umbarger, 1978). The obtained data also revealed that the content of indicated amino acids decreased with high salinity, 7000 ppm being more effective, but increase with biofertilizer treatments.

As for the effect of interaction between biofertilizer treatments and cultivars , results showed that the absolute superiority was confirmed for the 100% cerealien + 100% phosphorien treatments in the all cases over the respective values of the control particularly with grains for Gemiza (9)variety.

On the other hand, data showed that basic amino acids group included three amino acids: arginine, lysine and histidine, their content decreased with salinity, this is possibly due to transformation to other nitrogenous compounds such as synthesis of puterscine from arginine (Miflin, 1980). Also results showed that neutral amino acids group represents the rest of studied amino acids appeared decreased with salinity and increased with biofertilizer treatments depending on the concerned amino acid, response being also dependent on studied variety.. In this connection, promotive effect of salinity on alanine,valine and leucine may be due to the formation of pyruvic acid from glucose through Embden-Meyerhof-Parnas(EMP) reaction pathway(Street and Cockburn,1972).Variations between the two studied varieties could be attributed to contribution of the concerned amino acids for the synthesis of some protein types responsible to cope with salinity stress according to differences in the genetic back ground in each variety (El-Leboudi *et al.,* 1997).

The positive effect of biofertilizer on amino acid contents was mentioned by Ismail (2002) found that the highest value of amino acids content of pea leaves were obtained by using biofertilizer treatments (Biomagic).

Table (8): Amino acids composition of protein (mg/ g dry wt.) in shoots of two wheat varieties as affected by different biofertilizer treatments under salinity conditions (combined analysis of 2006/2007 and 2007/2008 seasons).

Amino acids / Treatments	Gemiza (9)						Sakha (94)					
	Treat. 1		Treat. 2		Treat. 3		Treat. 1		Treat. 2		Treat. 3	
	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm
Aspartic	0.39	0.15	0.75	0.40	1.64	0.28	0.23	0.19	0.45	0.16	1.03	0.28
Therionine	0.41	0.26	0.68	0.29	0.86	0.31	0.24	0.20	0.37	0.11	0.84	0.25
Serine	0.49	0.26	0.59	0.30	0.75	0.42	0.27	0.20	0.39	0.10	0.67	0.30
Glutamic	1.04	0.69	0.2	0.71	1.24	0.87	0.66	0.53	0.88	0.35	0.92	0.68
Proline	0.82	0.59	0.93	0.84	0.88	0.65	0.47	0.39	0.79	0.44	0.82	0.68
Glycine	0.31	0.22	0.62	0.28	0.98	0.35	0.20	0.14	0.63	0.22	0.72	0.33
Alanine	0.45	0.34	0.63	0.37	0.79	0.39	0.31	0.2.4	0.52	0.29	0.69	0.36
Valine	0.42	0.31	0.74	0.39	0.85	0.42	0.29	0.21	0.66	0.32	0.73	0.38
Methionine	0.066	0.031	0.081	0.067	0.14	0.034	0.049	0.020	0.10	0.016	0.15	0.044
Isoleucine	0.56	0.35	0.72	0.68	0.99	0.40	0.32	0.26	0.42	0.25	0.84	0.36
Leucine	0.76	0.45	0.96	0.52	1.05	0.54	0.43	0.35	0.91	0.49	0.98	0.57
Tyrosine	0.21	0.12	0.39	0.13	0.48	0.23	0.13	0.085	0.21	0.039	0.36	0.14
Phenylalanine	0.52	0.29	0.66	0.35	0.61	0.34	0.39	0.24	0.64	0.29	0.69	0.37
Histidine	0.32	0.067	0.41	0.14	0.55	0.28	0.27	0.15	0.45	0.17	0.49	0.18
Lycine	0.49	0.31	0.56	0.44	0.64	0.27	0.26	0.15	0.40	0.27	0.49	0.22
Argenine	0.51	0.29	0.59	0.29	0.65	0.37	0.34	0.19	0.49	0.26	0.51	0.32

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

Table (9): Amino acids composition of protein (mg/ g dry wt.) in grains of two wheat varieties as affected by different biofertilizer treatments under salinity conditions (combined analysis of 2006/2007 and 2007/2008).

Treatments / Amino acids	Gemiza (9)						Sahka (94)					
	Treat. 1		Treat. 2		Treat. 3		Treat. 1		Treat. 2		Treat. 3	
	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm	3500 ppm	7000 ppm
Aspartic	0.32	0.20	0.89	0.41	1.13	0.81	0.39	0.26	0.5.3	0.26	0.71	0.30
Therionine	0.18	0.12	0.69	0.36	0.80	0.67	0.26	0.14	0.31	0.27	0.49	0.27
Serine	0.37	0.23	0.87	0.64	0.89	0.76	0.47	0.28	0.53	0.32	0.59	0.46
Glutamic	1.68	1.57	2.09	1.79	2.48	2.15	1.64	1.45	2.01	1.54	2.13	1.92
Proline	0.87	0.57	1.97	1.58	2.32	2.18	0.74	0.38	2.46	1.88	2.65	2.03
Glycine	0.57	0.34	0.84	0.74	0.91	0.82	0.40	0.32	o.47	0.38	0.64	0.39
Alanine	0.46	0.23	0.69	0.42	0.85	0.69	0.42	0.24	0.69	0.52	0.73	0.35
Valine	0.58	0.28	0.73	0.41	1.06	0.88	0.49	0.39	0.55	0.38	0.59	0.47
Methionine	0.052	0.042	0.095	0.069	0.15	0.12	0.047	0.032	0.051	0.042	0.086	0.032
Isoleucine	0.58	0.36	0.69	0.59	0.93	0.87	0.48	0.39	0.56	0.28	0.55	0.42
Leucine	0.52	0.21	0.74	0.52	0.98	0.89	0.50	0.46	0.64	0.47	0.69	0.59
Tyrosine	0.28	0.10	0.38	0.18	0.59	0.29	0.20	0.087	0.26	0.15	0.29	0.19
Phenylalanine	0.41	0.36	0.52	0.30	0.58	0.47	0.33	0.24	0.48	0.37	0.56	0.4 4
Histidine	0.17	0.15	0.39	0.19	0.47	0.35	0.25	0.10	0.26	0.20	0.34	0.15
Lysine	0.39	0.26	0.64	0.37	0.76	0.63	0.29	0.15	0.30	0.28	0.36	0.33
Argenine	0.49	0.37	0.62	0.45	0.77	0.68	0.34	0.25	0.53	0.31	0.55	0.45

Treat.1 = 100 % NPK (control) Treat. 2 = Cerealien 50% + 50% Phosphorien + 50% NPK Treat.3 = Cerealien 100% + 100% Phosphorien + 50% NPK

Conclusion:

It could be concluded that biofertilizers cerealien and phosphorien stimulated plant growth and yield and induced salinity tolerance by enhancing the accumulation of certain metabolites i.e. sugars and proline. Which are considered to be a sort of plant adaptation to stress. Accordingly, the present work was designed to investigate the effectiveness of bio-fertilizers applications which increased the availability of N, P and K for improving the wheat cultivars, at different levels of salinity; 3500 and 7000 ppm. It is of a great importance to mention here that the obtained data clearly revealed that, each cerealien and phosphorien gave the highest effect on the improvement of the growth parameters. The used of bio-fertilizers as mixture gave superiority in inducing the highest degree of adaptation to the applied levels of salinity was 100% cerealien + 100%phosphorien treatment supported with 50 NPK, which resulted in the highly significant increases in all studied growth parameters; dry matter accumulation,yield and yield components. In addition, the accumulation of considerable quantities of sugars, proline and required nutrients in the stressed wheat plant was also studied. It is clear that inoculation improves all the tolerance feature of wheat plants and increase plant adaptation to saline irrigation.

Generally, increasing salinity level in the irrigation water decreased yield and its components of wheat plants. These results agree with those reported by Kumar *et al*., (1987), Hank *et al*., (1989) and Mass and Crieve (1990).

Moreover, Munns and Rawson (1999) found that salinity decreased of spikelet primordial formation and final spikelet numbers at spike emergence were reduced. Khater *et al*., (2002) reported that salinity significantly reduced the values of spike length and grain yield of wheat plant.

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تأثير بعض المخصبات الحيوية على النمو والمحصول والمكونات البيوكيميائية لصنفين من القمح تحت الظروف الملحية

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أجريت هذة الدراسة بمحطة بحوث مركز بحوث الصحراء بمنطقة راس سدر بمحافظة جنوب سيناء خلال موسمين الشتويين 2007/2006 و 2008/2007 لدراسة مدى استجابة صفات النمو للمحصول ومكوناته والمركبات البيوكيميائية لصنفين من القمح (جميزة 9 و سخا 94) باستخدام مستويين مختلفين من مياه الرى المالحة [(3500 و 7000 جزء فى المليون) استخدم كل مستوى رى على حدة فى تجربة منفصلة] ومعاملات المخصبات الحيوية (السيريالين والفوسفورين) حيث استخدمت المخصبات الحيوية بمعدل 100% و 50% تسميد حيوى من المعدل الموصى به (4 لتر/فدان) و(2لتر/فدان) بالترتيب مضاف اليهما 50% من السماد المعدنى الموصى به بينما استخدمت المعدلات السمادية المعدنية الموصى بها تحت ظروف المنطقة كمقارنة (دون اضافة تسميد حيوى) . تم الحصول على افضل النتائج عند المعاملة بمعدل 100% من الاسمدة الحيوية من المعدل الموصى به (سيريالين + فوسفورين) + 50% سماد معدنى حيث أدت هذة المعاملة الى تحمل صنفى القمح لمعدلات الاجهاد الملحى والحصول على افضل القراءات الفسيولوجية والمحصولية تحت مستويات مياه الرى المالحة المضافة. النتائج المتحصل عليها لصنفى القمح تحت معاملة المخصبات الحيوية السابقة اظهرت زيادة معنوية فى كل قراءات النمو والمحصول ومكوناته والمركبات البيوكيميائية كما اوضحت النتائج تفوق الصنف جميزة (9) على الصنف سخا (94) فى كل قراءات المحصول ومكوناته خلال موسمى النمو. كما لوحظ الزيادة معنويا لكل المركبات الكيميائية تحت الدراسة مثل البرولين والبروتين الخام والكربوهيدرات والسكريات الكلية والسكريات الذائبة والمختزلة والغير المختزلة وصبغات الكلورفيل والكالسيوم والبوتاسيوم والاحماض الامينية مقارنة بمعاملة المقارنة لكلا من صنفى القمح.

التوصية :

وتوصى هذه الدراسة بإمكانية زراعة صنف جميزة (9) حيث انه من الأصناف الجديدة عالية المحصول المقاومة للأمراض خاصة مرض الصدأ الاصفر حيث تجود زراعته فى الاراضى الجديدة وقد أوضحت النتائج ان صنف جميزة (9) اعطى نتائج عالية للمحصول ومكوناته والمركبات البيوكيميائية كما أظهرت نتائج التحليل البيوكيمائى لهذا الصنف أن نسبة المركبات الكيميائية مثل البرولين الحر والبروتين والكربوهيدرات والكلورفيل والسكريات الذائبة والمختزلة والعناصر أعلى من صنف سخا-94 وايضا وجد ان التسميد الحيوى يوفر نصف كمية التسميد المعدنى الموصى به فى منطقة الزراعة ويعطى نتائج مرتفعة للمحصول ومكوناته بالاضافة الى تحسين المركبات البيوكيميائية ولذلك يجب ان نرشد المزارعين على استخدام التسميد الحيوى لخفض استعمال التسميد المعدنى وخفض التكاليف ونقص نسبة التلوث وانتاج محاصيل عالية الانتاج.