Research Journal of Agriculture and Biological Sciences, 3(2): 95-104, 2007

Growing Onion Plants Without Chemical Fertilization

Shaheen, A.M., Fatma, A. Rizk and S.M. Singer

National Research Centre, Vegetables Research Department, Dokki, Giza, Egypt.

Abstract: Two field experiments were carried out during the two successive seasons of 1998/1999 to study the effect of two organic manures, i.e. chicken and cattle at rates of 60 and 120 N units/fed. and with or without bio-fertilizer on the productivity of onion plants in both Bani Sweef and Minia Governorate, and the following are the important obtained results: Using microbein as bio-fertilizer resulted in an increase in plant growth criteria's. Moreover, caused a slow enhancement effect on total bulbs yield and its components. Also, using microbein caused an increase in N, P, K, Fe, Mn, Zn, Cu, Pb, NO3 and NH_4. Mixing chicken manure with bio-fertilizer gained the highest values of plant growth characteristics as well as total bulbs yield, marketable and culls bulbs. Also, chicken manure with microbein caused slow increase in mineral contents of onion bulb tissues. The vigour onion plant growth was associated with that plants which received microbein as bio-fertilizer and applied by cattle manure at the higher rate, i.e. 120 N unit /fed. But, the highest yield of total bulbs in both experiments were obtained with that plants applied by chicken manure at 120 N unit /fed. with microbien.

Key words: Onion , bio-fertilizer, chicken, cattle manure, plant growth and yield

INTRODUCTION

Egypt like all developed countries is facing a critical food problem and unless concentrated efforts are directed to maximize the agricultural production, the problem will develop to be crisis. The production of the best, yield requires that the soil must have favorable physical, chemical nutritional and biological conditions. It is worth to mention that, good effect of organic nitrogen treatment as well as bio-fertilizer inoculation in increasing root growth parameters may be mainly due to improving root rhizosphere condition, i.e. soil structure and moisture content. In addition, adding organic nitrogen and bio-fertilizer had beneficial return to increase population of microorganisms especially in the surface layer-root rhizosphere, that produce substances, which stimulate plant growth[1]. Many investigators studied the role of organic manures, which incorporated with bio-fertilizer as stimulating the plant growth, yield of vegetables. In Egypt, such as Warade, *et al*.[2], Abdalla, *et al*.[3] on pepper; Tantawy *et al*.[4] on tomatoes Abou-Hussein, *et al*.[5] on potatoes; Safia Adam, *et al*.[6] on cantaloupe; Fatma, *et al*.[7] on squash; Shaheen *et al*.[8] on onion. In addition, other workers studies the response of onion plant to mixing bio-fertilizer with organic, such as Jayathilak, *et al*.[9] in India; Jayathilake *et al*.[10] in Srilanka; Prabu *et al*.[11] in Srilanka and Tadav *et al*.[12] in India.

The aim of this study, to confirm the effect of some locally organic manures which incorporated with microbein as bio-fertilizer under the condition of the exportation area of onion bulbs production.

MATERIALS AND METHODS

Two field experiments were carried out at the extension fields of Ministry of Agriculture at Bini Sweef and Minia Governorate in 1998/1999 season, to study the response of onion plant to the application of microbein as bio-fertilizer and different sources (Cattle and Chicken manure) at rates (60 and 120 N units/fed.) of organic nitrogen fertilizers on the growth and yield and its some nutritional values of onion plants. The texture of the experimental soils is loamy in both two sites. The physical and chemical properties of soil as well as the organic manures, which used are presented in Table (1) for the two experiments. Onion seedling cv. Giza 20 were sown on 3rd and 5th of November, 1998 at Bini Sweef and Minia, respectively, at distance of 20 cm apart within the rows and 15 cm within the plants.

Each experiment included 8 treatments, which resulted from the interaction between without and with bio-fertilizer and 2 sources as well as two rates or organic nitrogen fertilizers. Whereas, the organic fertilizers were added during preparing the soil for plantation. Microbein as bio-fertilizer was mixed well with organic manures at rate of 4 packages (500 g. for each) per one ton and wetted by water before mixed in the soil.

Corresponding Author: Shaheen, A.M., National Research Centre, Vegetables Research Department, Dokki, Giza, Egypt.

Table 1: The chemical analysis of the experimental soil and the used of organic manure in Bini Sweef and Minia.

Treatments Character	Bini Sweef			Minia		
	Soil	Cattle manure	Chicken manure	Soil	Cattle manure	Chicken manure
PH	7.97	8.11	7.30	7.97	7.92	6.75
EC. (mmhos/cm)	0.43	3.24	4.93	0.48	2.95	5.85
Carbonate (%)	3.04	-	-	2.06	-	-
Nitrogen (ppm)	1540	4100	10310	1218	3300	10160
Phosphorus (ppm)	160	6640	7408	104	6000	5496
Potassium (ppm)	548	392	762	486	495	699
Iron (ppm)	17.10	948	487	16.8	824	203
Manganese (ppm)	2.00	289	312	4.0	347	220
Cupper (ppm)	4.30	53	124	4.1	37	28
Zinc (ppm)	1.20	78	30	1.10	115	52

A split-plot design with three replicates was used where, microbein treatments were allocated to the main plots, while the sources and rates of organic manures were randomly assigned to sub and sub sub -plots. Each sub sub plot consisted of four rows, each of 5 meters in length and 3.2 m in widths. The plot area was 20 m^2.

The normal cultural practices used for the onion production, i.e. irrigation and pest control were followed according to the traditional cultivation in the experimental location.

Plant growth expressed as plant length (cm), number of leaves per plant, diameter (cm) of neck and bulb, as well as fresh and dry weight of leaves, neck, bulb and whole plant as g./plant were recorded in representative samples (5 plants) which were taken randomly from every experimental plot at 90 days after planting in both investigated areas.

At harvesting time, fresh onion yield and its components were calculated in terms of total bulbs yield, marketable yield, exportable yield (ton/fed.), i.e. 4200 m2 and culls bulbs as tons/fed., as well as exportable bulbs yield as percentages in both two experimental fields. The chemical constituents as nutritional values (N, P, K, NO_3-N and NH_4) in bulb tissues were estimated where total nitrogen, phosphorus, potassium, NO_3-N andNH_4 were determined according to the methods which described by Pregl[13], Troug and Mayer[14], Brown and Lilleland[15] and Blak[16], respectively. As well as Fe, Mn, Zn, Cu, Ni and Pb concentration were determined using Flame ionization atomic absorption, spectrometer of Chapman and Pratt[17].

The obtained data were subjected to the analysis variance procedure and treatment means were compared to the L.S.D. test according to Gomez and Gomez[18].

RESULTS AND DISCUSSIONS

A. Vegetative plant growth properties:

1. Effect of Bio-fertilizer: The obtained data (Table 2) clearly indicated that, in both experiments (Bini sweef and Minia) microbein treatment as a bio-fertilizer for onion plant caused no significant enhancement in values of plant length, average leaves number/plant, diameter of neck, dry weight of whole plant and its different organs. On the contrary, the diameter of onion bulb, as well as fresh weight of whole plant and its leaves, neck, bulb, all of them responsed significantly by the microbein treatment. In spite of the no significant effect of bio-fertilizer on some vegetative growth characters, but it could be concluded that, the microbein bio-fertilizer resulted an increase in all growth properties of onion plant if compared with no microbein treatment. These findings are in good accordance in the two site of plant growing. Many investigators gained a results which are in good agreement with those mentioned here (Jayathilake *et al.*[10], Prabu, *et al.*[11] on okra; Yadav *et al.*[19]; on onion Shafeek *et al.*[20] and Ghoname and Shafeek[21] on sweet pepper.

2. Effect of the interaction within Bio-fertilizer and different organic manures: The data presented in Table (3) illustrated the onion plant growth characters in Bini Sweef and Minia experiments as affected by the interaction treatments of microbein and organic manures. In both experiments, length of onion plant, average leaves number/plant, diameter of neck and bulb as well as dry weight of neck, bulb and leaves all of these characters recorded no great enough variation to reach the 5% level of significant. Also the dry weight of whole onion plant only in Minia experiment

Table 2: Effect of bio-fertilizer treatments on the vegetative plant growth characters in the two experiments (Bini Sweef and Minia).

Treatments	Bini Sweef			Minia		
	Bio-fertilizer treatments					
Character	Without	With	L.S.D. at 5 %	Without	With	L.S.D. at 5 %
Plant length (cm)	50.3	52.05	N.S	61.2	63.8	N.S
No. of leaves /plant	9.1	9.14	N.S	5.98	6.28	N.S
Diameter of neck (cm)	1.5	2.02	N.S	2.33	2.55	N.S
Diameter of bulb (cm)	5.9	6.40	0.71	4.8	5.25	0.15
Fr. wt. of leaves (g/plant)	20.8	25.87	3.3	32.28	34.35	1.05
Fr. wt. of neck (g/plant)	8.8	11.15	1.9	19.6	25.72	2.61
Fr. wt. of bulbs (g/plant)	69.7	74.42	3.09	43.02	48.0	3.11
Fr. wt. of whole (g/plant)	99.3	111.44	5.5	94.9	108.1	5.75
Dry wt.of leaves (g/plant)	3.2	3.62	N.S	3.42	3.44	N.S
Dry wt. of neck (g/plant)	1.87	2.11	N.S	2.42	2.67	N.S
Dry wt. of bulb (g/plant)	12.02	13.61	N.S	3.97	4.13	N.S
Dry wt. of whole (g/plant)	17.11	19.34	N.S	9.79	10.23	N.S

Table 3: Effect of the interaction between bio-fertilizer and different organs manures on the vegetative plant characters in the two experiments.

Treatments	Bini Sweef					Minia				
	Without Bio -fertilizer		With Bio -fertilizer		L.S.D. at 5 %	Without Bio -fertilizer		With Bio -fertilizer		L.S.D. at 5 %
Character	Cattle	Chicken	Cattle	Chicken		Cattle	Chicken	Cattle	Chicken	
Plant length (cm)	49.5	51.5	50.1	54.0	N.S	58.5	6.4	61.5	66.0	N.S
No. of leaves /plant	9.4	8.7	9.25	9.1	N.S	6.2	5.8	6.3	6.3	N.S
Diameter of neck (cm)	1.55	1.5	2.25	1.8	N.S	2.25	2.4	2.5	2.6	N.S
Diameter of bulb (cm)	6.0	5.8	6.7	6.1	N.S	4.75	4.85	5.0	5.5	N.S
Fr. wt. of leaves (g/plant)	18.65	22.9	25.65	26.1	2.1	30.9	33.6	32.6	36.1	3.35
Fr. wt. of neck (g/plant)	7.15	10.4	8.9	13.4	3.77	15.15	24.1	23.9	27.6	4.51
Fr. wt. of bulbs (g/plant)	68.3	71.1	76.25	72.6	5.81	44.6	41.4	46.9	49.1	4.66
Fr. wt. of whole (g/plant)	93.95	104.4	110.8	112.1	6.75	90.7	99.1	103.5	112.65	5.67
Dry wt. of leaves (g/plant)	2.91	3.46	3.34	3.91	N.S	3.16	3.68	3.26	3.61	N.S
Dry wt. of neck (g/plant)	2.1	1.64	2.30	1.92	N.S	2.47	2.36	2.87	2.46	N.S
Dry wt. of bulb (g/plant)	11.16	12.87	13.24	13.99	N.S	4.09	3.85	4.19	4.07	N.S
Dry wt. of whole (g/plant)	16.45	17.97	18.88	19.81	1.33	9.73	9.86	10.33	10.14	N.S

followed the same pattern which above mentioned. However, the whole fresh weight of plant and its leaves, neck and bulb in both experiments obtained the significant variation within different interaction treatments. The best plant growth of onion resulted from that plants received chicken manure which mixed with microbein. These findings are true in Bini Sweef and Minia experiments. On the contrary, the poorest plant growth observed with that plants applied cattle manure without bio-fertilizer treatment in both experiments with some low exception.

It could be concluded that, addition of chicken manure as mixed with microbein gained the best plant growth parameters of onion plant. Other studies were

Table 4: Effect of the interaction between bio-fertilizers, organic manures and the different rates on the vegetative plant growth characters in the two experiments.

A. Bini Sweef

Treatments	Without Bio-fertilizer				With Bio-fertilizer				L.S.D. at 5% level
	Cattle		Chicken		Cattle		Chicken		
Characters	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	
Plant length (cm)	44.0	55.0	49.0	53.0	45.0	56.0	51.0	57.0	N.S
No. of leaves /plant	9.1	9.7	8.3	9.2	9.0	9.5	8.3	9.8	N.S
Diameter of neck (cm)	1.4	1.7	1.4	1.6	1.5	3.0	1.7	1.9	N.S
Diameter of bulb (cm)	5.8	6.2	5.5	6.1	5.9	7.5	5.6	6.6	N.S
Fr. wt. of leaves (g/plant)	12.5	24.8	19.8	26.0	16.8	34.5	23.3	29.0	4.45
Fr. wt. of neck (g)/plant)	5.3	9.0	4.8	11.0	6.8	11.0	12.0	14.8	N.S
Fr. wt. of bulbs (g/plant)	67.8	68.3	66.8	75.5	71.0	81.5	67.8	77.3	6.18
Fr. wt. of whole (g/plant)	85.6	102.6	96.4	112.5	94.6	127.0	103.1	121.1	8.50
Dry wt. of leaves (g/plant)	2.07	3.76	3.31	3.62	2.79	3.89	3.88	3.93	N.S
Dry wt. of neck (g/plant)	1.41	2.8	1.05	2.23	1.49	3.11	1.19	2.64	N.S
Dry wt. of bulb (g/plant)	7.21	14.61	10.87	14.87	9.28	17.2	11.4	16.58	3.17
Dry wt. of whole (g/plant)	11.20	21.7	15.23	20.72	13.56	24.2	16.47	23.15	4.12
B. Minia									
Plant length (cm)	56.0	61.0	63.0	65.0	60.0	63.0	65.0	67.0	N.S
No. of leaves /plant	6.0	6.3	5.5	6.1	6.1	6.5	6.0	6.0	N.S
Diameter of neck (cm)	2.2	2.3	2.3	2.5	2.3	2.7	2.5	2.7	N.S
Diameter of bulb (cm)	4.6	4.9	4.6	5.1	4.9	5.1	5.1	5.9	N.S
Fr. wt. of leaves (g/plant)	30.3	31.5	32.3	35.0	31.5	33.8	33.8	38.3	3.5
Fr. wt. of neck (g/plant)	13.3	17.0	21.3	26.8	20.0	27.8	24.3	30.8	N.S
Fr. wt. of bulbs (g/plant)	43.8	45.5	39.5	43.3	45.8	48.1	45.3	52.8	4.75
Fr. wt. of whole (g/plant)	87.4	94.0	93.1	15.1	97.3	109.7	103.4	121.9	14.41
Dry wt. of leaves (g/plant)	3.15	3.18	3.38	3.98	3.15	3.38	3.28	3.93	N.S
Dry wt. of neck (g/plant)	2.35	2.60	2.08	2.65	2.8	2.93	2.40	2.53	N.S
Dry wt. of bulb (g/plant)	3.79	4.39	3.13	4.57	3.88	4.51	3.53	4.61	0.78
Dry wt. of whole (g/plant)	9.29	10.17	8.53	11.2	9.83	10.82	9.21	11.07	1.33

carried out and concluded that, the growth of onion in terms of plant length, number of leaves per plant, dry matter accumulation in plant organs significantly increased with the application of bio-fertilizer in combination with organic manures (Warade *et al.*[2]; Abdalla *et al.*[3]; Jayathilake *et al.*[9]; Safia Adam[22]; Jayathilake *et al.*[10] and Prabu *et al.*[11]

3. The interaction between bio-fertilizer and source, rates of organic manures: Fresh weight of whole onion plant and its leaves and bulb as well as dry weight of whole plant and its bulb in both experiments affected significantly by the three factors of interaction treatments (bio-fertilizer X source of organic manure X rates of organic application) as shown in Table (4).

Table 5: Effect of bio-fertilizer treatments on total bulbs yield and its components in the two experiments.

Treatments	Bini Sweef			Minia		
Character	Bio-fertilizer treatments					
	Without	With	L.S.D. at 5 %	Without	With	L.S.D. at 5 %
Total bulbs yield (ton/fed.)	8.37	8.93	N.S	7.083	7.492	N.S
Marketable yield (ton/fed.)	7.839	8.34	N.S	6.684	6.683	N.S
Exportable yield (ton/fed.)	4.33	4.317	N.S	4.09	4.44	0.21
Exportable/total %	52.03	49.1	N.S	58.19	59.36	N.S
Cull bulbs yield (ton/fed.)	0.504	0.59	0.033	0.398	0.515	0.078

Table 6: Effect of the interaction between bio-fertilizer and different organs manures on the total bulbs yield and its components in the two experiments

Treatments	Bini Sweef					Minia				
	Without Bio -fertilizer		With Bio -fertilizer		L.S.D. at 5 %	Without Bio -fertilizer		With Bio -fertilizer		L.S.D. at 5 %
Character	Cattle	Chicken	Cattle	Cattle		Cattle	Chicken	Cattle	Chicken	
Total bulbs yield (ton/fed.)	8.48	8.20	8.71	9.16	0.251	6.625	7.54	7.26	7.72	0.323
Marketable yield (ton/fed.)	8.00	7.67	8.12	8.56	N.S	6.267	7.101	6.862	6.505	0.465
Exportable yield (ton/fed.)	4.753	3.907	4.64	3.98	N.S	3.87	4.305	4.645	3.69	N.S
Exportable/total %	56.35	47.7	54.05	44.15	N.S	59.29	57.09	64.14	54.57	N.S
Cull bulbs yield (ton/fed.)	0.493	0.524	0.589	0.593	N.S	0.357	0.439	0.382	0.498	N.S

Table 7: Effect of the interaction between bio-fertilizer organic manures and different rates on the total bulbs yield and its components in the two experiments.

Treatments	Without Bio-fertilizer				With Bio-fertilizer				L.S.D.
Characters	Cattle		Chicken		Cattle		Chicken		at 5% level
	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	
	A. Bini Sweef								
Total bulbs yield (ton/fed.)	7.96	9.0	8.14	8.26	8.13	9.28	8.52	9.8	1.39
Marketable yield (ton/fed.)	7.498	8.497	7.635	7.716	7.62	8.63	8.019	9.114	N.S
Exportable yield (ton/fed.)	4.91	4.596	4.581	3.233	5.321	3.97	4.498	3.481	N.S
Exportable/total %	61.6	51.1	56.3	39.1	65.4	42.7	52.8	35.5	N.S
Cull bulbs yield (ton/fed.)	0.462	0.504	0.505	0.544	0.528	0.650	0.501	0.686	N.S
	B. Minia								
Total bulbs yield (ton/fed.)	6.11	7.14	7.33	7.75	7.01	7.51	7.42	8.02	1.35
Marketable yield (ton/fed.)	5.859	6.676	6.927	7.275	6.66	7.065	6.975	6.036	0.91
Exportable yield (ton/fed.)	61.58	53.0	57.8	56.38	69.04	59.25	62.4	46.75	-
Exportable/total %	3.673	4.7	4.24	4.37	4.84	4.45	4.63	3.75	N.S
Cull bulbs yield (ton/fed.)	0.251	0.464	0.403	0.475	0.351	0.413	0.445	0.551	0.71

Whereas the vigor onion plant growth was associated with that plants which received microbein as bio-fertilizer and applied by cattle manure at the higher rate, i.e. 120 N units/fed. On other hand, the poorest plant growth was correlated with that plants which applied by cattle manure at lower rate (60 N units/fed.)

and no bio-fertilizer treatment. These results mostly were similar in both Bini Sweef and Minia experiments with some little exception.

Generally, it could be summarized that, the stimulating effect of bio-fertilizer may be due to the effect of different strains group such as nitrogen fixes, nutrient mobilizing microorganisms, which help in availability of total and their forms in the composted materials and hence, increased the levels of extractable N, P, K and Fe, Mn, Zn, Cu, … etc. as macro- and micro-nutrients. The role of external addition of microorganisms to growing media (soil and for organic manures) studied by other investigators and obtained results are in good agreement with that mentioned here (Jayathilake *et al*.[10]; Yadav *et al*.[19] and Tadav *et al*.[12]).

B. Total bulbs yield and its components:

1. Effect of bio-fertilizer: Using the microbein as a bio-fertilizer with onion plant resulted a slow increase in the tonnage of total bulbs yield as well as culled bulbs in Bini Sweef and Minia experiments, and marketable yield in Bini Sweef only (Table 5). On the contrary, the exportable bulbs yield (diameter within 4-6 cm) recorded a slow significant value when the experiment applied in Minia only, but its percentage/total bulbs yield fluctuated within the two experimental sites.

The slow effect of external addition of micro-organisms for onion plant was explained as the bio-fertilizer treatment slow encouraged or caused no significant increase in values of plant length, average leaves number/plant, dry weight of whole plant and its different organs as shown in Table (2), whose metabolic activities are expected to affect negatively the total bulbs yield and its components. The obtained results are in good agreement with those of Radwan and Hussein[23] and Alkaff *et al*.[24]

It could be summarized that, microbein as bio-fertilizer caused a slow enhancement effect on total bulbs yield and its components.

2. Effect of the interaction within bio-fertilizer and different organic manures: Addition microbein as a bio-fertilizer for each of cattle and chicken as an organic manures caused an enhancement in values of total bulbs yield, and marketable bulbs as well as culls yield if compared with that onion plants which received each cattle or chicken alone (without microbein). This findings were true in both sites of experiments with exception of marketable bulbs yield of Minia experiment. Concerning to the exportable bulbs yield the obtained data (Table 6) showed that the heaviest tonnage yield in Bini Sweef experiment was associated with that plants which applied cattle manure without microbein treatment, but in Minia experiment the highest values of exportable bulbs yield were recorded with that onion plants which received cattle manure with microbein treatment. These results were true for both the weight of exportable bulbs as tons/fed. and/or as percentage value to the total bulbs yield. It could be concluded that, the obtained results regarding exportable yield recorded a fluctuation within the different two sites of the experiments. These are expected due to the variation in climatic and soils condition. Moreover, the statistical analysis of the obtained data reveals that only total bulbs yield as tons/fed., varied significantly in both two experiments, but the marketable bulbs yield was significantly only in Minia site. Generally, it could be summarized that, addition microbein to the organic manure (cattle and/or chicken) had a slow effect for rising the total bulbs yield and its components at least under the condition of these experiments. This may be attributed to one or more of the following factors: **a-** small quantity of microbein package (4 package of 0.5 kg for each one ton of organic manure). **b-** The variation in experimental sites, consequently variation in soil and weather condition. Many investigators studied the role of Bio-fertilizer in vegetable production and reported that, their effects may be due to the different strains groups such as nitrogen fixers, nutrient mobilizing microorganisms which help in availability of metals and their forms in the composted materials and increased the level of extractable, macro- or micro-nutrients (Serrano Vazquez *et al*.[25] and Warade *et al*.[2]).

3. The interaction between bio-fertilizer and source and rate of organic manure: Table (7) clearly indicated that, addition of bio-fertilizer for each cattle and/or chicken manure resulted the higher values of total onion bulbs yield, marketable bulbs as well as culls bulbs if compared with that plants which fertilized by organic manure only. These findings are in good accordance for total bulbs yield, marketable bulbs as well as culls yield in both two experiment sites, with some little exception. Generally, the obtained data showed that, the heaviest yield of total bulbs, and culls (in both two experiments and marketable yield in Bini Sweef only were weighted with that onion plant received microbein as bio-fertilized mixed with chicken manure at rate of 120 N unit/fed.

Tadav *et al*.[12] with their studies on onion plant reported that, the highest net profits were obtained with microbein, which mixed with organic manure. Also, Jayathilake *et al*.[10] stated that, the total bulb yield of onion and its components significantly increased with the application of bio-fertilizers in combination with organic nitrogen fertilizers. Other investigators obtained a similar

Table 8: Effect of the bio-fertilizer treatments on the nutrition values of onion bulbs tissues in the two experiments.

Treatments	Bio-fertilizer treatments		
Character	Without	With	L.S.D. at 5%
N %	1.42	1.51	0.07
P %	0.31	0.37	0.03
K %	0.61	0.63	N.S
Fe ppm	2.77	2.81	N.S
Mn ppm	29.0	31.0	N.S
Zn ppm	36.0	38.0	N.S
Cu ppm	11.5	12.8	0.35
Ni ppm	1.3	1.21	N.S
Pb ppm	1.37	1.42	N.S
NO_3 ppm	28.5	33.5	1.66
NH_4 ppm	60.0	71.7	N.S

Table 9: Effect of the interaction between bio-fertilizer and different organic manures on the nutrition values of onion bulb tissues.

Treatments	Without Bio-fertilizer		With Bio-fertilizer		L.S.D. at 5 %
Character	Cattle	Chicken	Cattle	Chicken	
N %	1.36	1.48	1.41	1.60	0.110
P %	0.26	0.37	0.32	0.43	0.171
K %	0.69	0.53	0.75	0.52	N.S
Fe ppm	3.00	2.55	2.98	2.65	N.S
Mn ppm	27.5	30.5	28.0	34.0	1.75
Zn ppm	33.0	38.0	36.5	40.0	N.S
Cu ppm	11.0	12.0	12.0	13.5	N.S
Ni ppm	1.3	1.4	1.1	1.3	N.S
Pb ppm	1.6	1.2	1.7	1.2	N.S
NO_3 ppm	23.5	33.5	27.0	40.0	3.75
NH_4 ppm	52.5	67.5	67.5	76.0	5.53

direction (Varu, *et al.*[1]; Abdel-Mouty *et al.*[26]; Ali *et al.*[27]; Fatma Rizk *et al.*[7]; Prabu *et al.*[11]; Yadav *et al.*[19]

However, the exportable onion yield recorded its highest values as tons/fed. with addition of cattle manure at rate of 60 N unit/fed. with (in Minia) or without bio (in Bini Sweef). It could be concluded that, the exportable onion bulbs had no great response to the bio-fertilizer addition at least under the condition of this work. Whereas, the statistical analysis of the obtained data reveals that no significance variation was found within the different interaction treatment concerning to their effects on exportable yield (two experiments), culls yield (only in Bini Sweef).

C. Nutrition values of onion bulbs:

1. Effect of Bio-fertilizer: Generally, the presented data in Table (8) shows clearly that using microbein as bio-fertilizer for onion plants resulted an increase in N, P, K, Fe, Mn, Zn, Cu, Pb, NO_3 and NH_4, but decreased the values of Ni. However, there were no great differences within that treatments of using or no using microbein to reach the 5 % level of significant. These were true for all studied elements except N, P

Table 10: Effect of the interaction between bio-fertilizer and source and rate of organic manures on the nutrition values of onion bulb tissues (Averages of Bini Sweef and Minia experiments).

Treatments	Without Bio-fertilizer				With Bio-fertilizer				L.S.D. at 5% level
	Cattle		Chicken		Cattle		Chicken		
Characters	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	60 N.U/fed.	120 N.U./fed.	
N %	1.35	1.37	1.45	1.51	1.41	1.42	1.55	1.65	0.22
P %	0.25	0.27	0.33	0.41	0.31	0.33	0.41	0.44	0.19
K %	0.66	0.71	0.50	0.55	0.73	0.77	0.49	0.55	N.S
Fe ppm	290	310	250	260	281	315	255	275	N.S
Mn ppm	26.0	29.0	30.0	31.0	27.0	29.0	33.0	35.0	N.S
Zn ppm	31.0	35.0	36.0	40.0	36.0	37.0	38.0	42.0	N.S
Cu ppm	10.0	12.0	11.0	13.0	11.0	13.0	12.0	15.0	N.S
Ni ppm	1.1	1.4	1.3	1.5	1.1	1.2	1.25	1.3	N.S
Pb ppm	1.5	1.7	1.1	1.2	1.6	1.7	1.2	1.2	N.S
NO_3 ppm	22.0	25.0	30.0	37.0	26.0	28.0	35.0	45.0	N.S
NH_4 ppm	50.0	55.0	60.0	75.0	60.0	75.0	67.0	85.0	N.S

and Cu, where recorded a significant increase when microbein is used. It could be concluded that, the microbein as bio-fertilized had a slow effect on the nutritional elements content of onion bulbs tissues.

2. Effect of the interaction within bio-fertilizer and different organic manures: Mixing bio-fertilizer (microbein) with organic manures (cattle and/or chicken) caused an enhancement in minerals content in onion bulbs tissue if compared with using organic manures only (Table 9). Generally, in spite of the no significant response of most nutritional elements to the interaction between bio-fertilizer and organic manure, but the highest values were recorded with that plants which received chicken as organic manure and microbein as bio-fertilizer. On the contrary, the lowest values were detected when cattle manure was applied without bio-fertilizer. More addition, the statistical analysis of the obtained data reveals that, only N, P, NO_3 and NH_4 were significantly responsed with the interaction treatments.

It could be concluded that, chicken manure addition resulted the higher nutritional values either with or without bio-fertilizer if compared with that values which obtained when cattle manure was used. However, bio-fertilizer treatment caused a rise in all nutritional values either with using cattle or chicken manures. This increment might be attribute to the role of microbein as bio-fertilizer to accelerate the composting processes of organic manures to be more available and soluble for plants. The obtained data are in good accordance of that which recorded by Mondal *et al*.[28] and Tadav *et al*.[12] who reported that, bio-fertilizer mixed with Farm-yard manure increased the available N which was more available for plant absorption.

3. Effect of the interaction between bio-fertilizer and source and rate of organic manures: The presented data in Table (10) shows that, within the interaction treatments, the addition of microbein as bio-fertilizer to the high rate (120 N units/fed.) of chicken manure gained the highest significant values of N and P and/or no significant values of Mn, Zn, Cu, NO_3 and NH_4 in onion bulb tissues. On the contrary, the lowest values of N, P, Mn, Zn, Cu, Ni, NO_3 and NH_4 were recorded with that plants which applied cattle manure at 60 N units/fed. and without microbein treatment. Generally, it could conducted that, the no significant response of most nutritional values of onion bulbs to the interaction treatments may be owned to that factors of the interaction acting individually and un-independent.

REFERANCES

1. Awad, F.K., W. Khalil and A.H. Maksoud, 1993. Comparative effects of some organic manures and bentonite as soil amendments. Agrochemical 37: 101-106.
2. Warade, S.D., S.B. Desale and K.G. Shinde, 1996. Effects of organic inorganic and bio-fertilizers on yield of onion bulbs cv.B-780. Journal of Maharashtra Agricultural Universities, Publ. 1996, 0(3): 467-468.

3. Abdalla, A.M., Fatma A. Rizk and Safia M. Adam, 2001. The productivity of pepper plants as influenced by some bio-fertilizer treatments under plastic house conditions.. Bull. Fac. Agric. Cairo Univ., 52(4): 625-640.
4. Tantawy, A.S., S.A. Shehata and S.E.S. Mustafa, 2001. Effect of some Bio-fertilizers on the yield and its Components and Fruit Quality of Tomato. First Conference of Role of Biochemistry in Environment and agriculture, 6-8 February 2001, p: 312-322.
5. Abou-Hussein, S.D., I. El-Oksh, T. El-Shourbagy, and A.M. Gomaa, 2002. Effect of cattle manure, bio-fertilizers and reducing mineral fertilizer on nutrient content and yield of potato plant. Egypt. J. Hort. 29, No. 1, pp: 99-115.
6. Safia, M. Adam, A.M. Abdalla and Fatma, A. Rizk, 2002. Effect of the interaction between the mineral and bio-fertilizers on the productivity of cantaloupe (*Cucumis melo, L.*) under the newly reclaimed soils conditions. Egypt . J. Hot. 29(2): Accepted (2002).
7. Fatma, A. Rizk, M.R. Shafeek and Y.I. Helmy, 2003. A comparison study between the application of bio and/or mineral fertilizers with squash plant.. Egypt. J. Appl. Sci., 18(4A): 257-269.
8. Shaheen, A.M., Fatma, A. Rizk. And Z.F. Fawzy, 2005. Yield and some chemical constituents of onion as influenced by organic manures. The Second International Conference of Scientific Research and Applications is delighted to inform you that your paper entitled.
9. Jayathilake, P.K.S., I.P. Reddy, D. Srihari, Neeraja, and G. Ravinder, Reddy, 2002. Effect of nutrient management on growth, yield and yield attributes of rabi onion (*Allium capa,* L.). Vegetable Science Indian Society of vegetable Science, Varanasi, India, 29(2): 184-185.
10. Jayathilake, P.K.S., I.P. Reddy, D. Snhan, K.R. Reddy and G. Neeraja, 2003. Integrated nutrient management in onion (*Allium cepa* L.). Tropical Agricultural Research Postgraduate Institute of Agriculture (PGAI), University of Peradenlya, Peradeniya, SriLanka, 15: 1-9.
11. Prabu, T., P.R. Narwadkar, A.K. Sajindranath and R.S. Jadhav, 2003. Correlation studies of okra. Journal of Soils and Grops., Association of Soils and Crops Research Scientists, Nagpur, India, 13(1): 170-171.
12. Tadav, B.D., R.B. Khandelwal and Y.K. Sharma, 2005. Use of bio-fertilizer (*Azosprillum*) in onion. Indian Journal of Horticulture Horticultural Society of India, New Delhy, India. 62(2): 168-170.
13. Pregl, F., 1945. Quantitative organic, micro analysis, 1st Ed. J. and A. churdill. Ltd. London.
14. Troug, E. and A.H. Mayer, 1939. Improvement in the deiness calorimetric method for phosphorus and areseni Indian Engineering chemical annual Ed. 1: 136-139.
15. Brown, J.D. and O. Lilleland, 1946. Rapid determination of potassium and sodium in plant material and soil extracts by flam photometry. Proc. Amer. Spoc. Hort. Sci., 46: 341-364.
16. Black, C.A., 1983. Methods of plant analysis. Parts I and II. Amer. Soc. Agron. Inc. Publ., Madison, Wisc, USA.
17. Chapman, H.D. and P.F. Pratt, 1978. Methods of analysis for soils. Plant and water Univ. California. Div. Agric. Sci., 16-38.
18. Gomez, K.A. and A.A. Gomez, 1984. Statistical procedures for Agriculture Research Second Willey Inter. Science, Bubl.
19. Yadav, K.S., B.K. Nehra, K. Lkshminarayana, Y.S. Malk and Narendra Singh, 2003. Role of *Azotobacter* bio-fertilizer in seed production of onion. New Letter–National Horticultural Research Development Foundation. National Horticultural Research and Development Foundation, Nashik, India, 23(3): 19-22.
20. Shafeek, M.R., S. Faten, Abd El-Al and H. Aisha, Ali, 2004. The productivity of broad bean plant as affected by chemical and/or natural phosphorus with different bio-fertilizer. J. Agric. Sci. Mansoura Univ., 29(5): 2727-2740.
21. Ghoname, A.A. and M.R. Shafeek, 2005. Growth and productivity of sweet pepper (*Capsicum annum*, L.) grown in plastic house as affected by organic, mineral and bio-N-fertilizer. Pakistan Journal of Agronomy, 4(4): 369-372.
22. Safia M. Adam, 2002. Growth and productivity of *Vicia faba* plants as influenced by some different bio- and chemical nitrogen fertilizers. Safia M. Adam. Egypt. J. Hort., 29(1).
23. Radwan, S.M.A. and H.F. Hussein, 2001. Response of onion (*Allium* cepa, L.) plants and associated weeds to bio-fertilization under some plant mulches. Annals of Agricultural Science, (Cairo) Faculty of Agriculture, Ain Shams Univ. Cairo, Egypt, 46(2): 543-564.
24. Alkaff, H.A., O.S. Saeed and A.Z. Salm, 2002. Effect of bio-fertilizer inorganic organic and foliar application of of power 4 on the productivity of onion (Arabic). University of Aden Journal of Natural and Applied Sciences University of Aden, Aden, Yemen, 6(1): 1-14.
25. Serrano Vazquez, J.O., A. Curiel Rodrigue and J. Ayala Hernndez, 1995. Use of bio-fertilizer in onion (Allium cepa L.) cultivation in Chapingo, Mexico. (Sappanish). Sevista Chapingo Serie Horticultural, 1(4): 95-99.

26. Abdel-Mouty, M.M., A.H. Ali and Fatma, A. Rizk, 2001. Potato yield as affected by the interaction between bio- and organic fertilizers. Egypt. J. Appl. Sci., 16(6): 267-286.
27. Ali, A.H., M.M. Abdel-Mouty and A.M. Shaheen, 2001. Effect of bio-nitrogen, organic and in-organic fertilizer, on the productivity of garlic (*Allium sativum*, L.) plants. Egypt. J. Appl. Sci., 16(3): 173-188.
28. Mondal, S.S., Debabrata Acharya, Anup Ghosph and U. Thapa, 2004. Integrated management of organic and inorganic sources of nutrient to improve productivity and qualitative characters of rice and onion in rice onion cropping sequence. Environment and Ecology, MKK Publication, Calculata, India, 22(1): 125-128.