The 3rd Conf. of SSFOP "Recent Techniques in Ornamental Plants Scope", Cairo, Egypt, 26/2/2017
Scientific J. Flowers & Ornamental Plants
www.ssfop.com/journal
ISSN: 2356-7864

EFFECT OF COMPOST AND SOME BIOSTIMULANT TREATMENTS ON GUAR PLANTS A-VEGETATIVE GROWTH AND SEED YIELD

M.A. Abdou*, A.A. El-Sayed*, R.A.I. Taha*, M.A. Abd-El Sayed** and W.S.E. Botros**

* Hort. Dept., Fac. Agric., Minia Univ., Egypt.
** Medicinal and Aromatic Plants Res. Dept., Hort. Res. Inst., ARC, Giza, Egypt.

Scientific J. Flowers & Ornamental Plants, 4(1):143-157 (2017).

Received: 3/1/2017
Accepted: 31/1/2017

ABSTRACT: This experiment was conducted at Abo Qurkas district, Minia Governorate during the two successive seasons of 2014 and 2015 to study the effect of compost and biostimulant treatments on growth and yield of guar plants. The data indicated that the application of compost (2.5, 5.0 and 7.5 ton/fed) significantly increased plant height, number of branches/plant, leaf area, fresh and dry weights of shoot/plant and per fed, root system traits, number of pods/plant, seed yield/plant and /fed comparing with control. The plants treated with Vit. E and plant extracts (garlic, moringa, aloe and green tea) each at two concentrations showed significant increases in all investigated parameters, in both seasons, as compared with the control. Among the ten treatments either garlic extract (300 ppm) or green tea extract at (150 ppm) gave the best results in this concern. The interaction was significant and the highest values in all measurements were obtained with compost (5 ton/fed) plus garlic extract (300 ppm) or green tea (150 ppm).

Key words: *Cyamposis tetragonoloba*, compost, vitamin E, garlic extract, moringa extract, aloe extract, green tea extract, vegetative growth.

INTRODUCTION

Guar *(Cyamposis tetragonoloba*, L. Taub), is an annual summer plant well adapted to arid and semi-arid climatic zones (Thakure, 1975). It is also known as saline and drought resistant plant. It belongs to family Fabaceae (Vinizky and Ray, 1988). It is grown in Egypt as a forage crop, green manure and seed production are considered as animal nutritive substances as its protein is 16%, the seeds are used as a laxative (Whistler and Hymowitz, 1980).

The effect of compost fertilizer on increasing growth and yield of economic plants was reported by many investigators such as Nattudurai *et al.* (2013); Shehata (2013) and Chavan *et al.* (2015) on guar plants; Taiwo *et al.* (2001) on cow pea, Ngoc Son *et al.* (2001) and Nilanthi and Alawasthugoda (2015) on soybean, Mahmoud *et al.* (2013) on pea plant and Verma *et al.* (2014) on fenugreek plant.

Many investigators studied the effect of biostimulant treatments (Vit. E and plant extract) on growth and yield of many species of different plants as El-Bassiouny *et al.* (2005) on faba bean, El-Tohamy and El-Greadly (2007) and Nour *et al.* (2012) on snap beans, Hussein *et al.* (2007) on cowpea and Shehata (2013) on guar plant who found that spraying plants with Vit. E increased plant height, stem diameter, number of branches/plant, leaf area, shoot fresh and dry

weights, number of pods/plant, number of seeds/pod, number of seeds/plant, weight of 100 seeds and seed yield/plant. Ahmed *et al.* (2005) confirmed that greater increase in growth and number of pods and seed of pea (cv. Metor) was obtained with garlic extract at 10 g/ 8 liters. While, Balakumbahan and Rajamani (2010) on senna plants, Aamir *et al.* (2014) on canola and Emongor (2015) on snap beans mentioned that all concentrations of moringa leaf extract from 11 to 50% significantly increased vegetative growth parameters (plant height, leaf area, leaf number and shoot dry matter) and yield traits (pod length, pod fresh and dry matter and yield/h). over control. El-Shayeb (2009) on *Oenothera biennis* concluded that Aloe vera extract (75%) increased plant height, number of branches, plant fresh weight and fresh and dry weights of flowers. Moreover, Abd El-Moneim *et al.* (2015) on onion plant found that the green tea treatment increased fresh weight of whole plants, fresh bulbs, bulb diameter and cured yield/fed.

Therefore, the present study was carried out to investigate the effect of compost and biostimulant treatments (Vit. E and garlic, moringa, aloe and green tea extracts) on the vegetative growth and seed yield of *Cyamopsis tetragonoloba*, L. plants.

MATERIALS AND METHODS

The present work was concluded at Abo Qurkas district, Minia governorate during 2014 and 2015 seasons.

Guar seeds were obtained from floriculture, Faculty of Agriculture Nursery, Minia University. Seeds were sown at the end of March (25^{th} and 30^{th} in the first and second seasons, respectively). The experimental unit (plot) was 1.8×1.5 meters, containing 3 rows, 60 cm apart and seeds were sown in hills, 25 cm apart on one side of the row, each plot contained 8 hills and plants were thinned to two plants/hill after one month from sowing date. The experiment was arranged in a split plot design with three replicates. The main plots (A) included four levels of compost (0, 2.5, 5.0 and 7.5 ton/fed), while, the sub-plots were devoted to eleven treatments; control, alpha tocopherol (Vit. E) at 10 and 20 ppm, garlic extract at 150 and 300 ppm, moringa extract at 150 and 300 ppm, aloe extract at 150 and 300 ppm and green tea extract at 150 and 300 ppm. Compost was added during soil preparation in both seasons. Table (a) and (b) shows the analysis of the used soil and compost, respectively.

Both Vit. E and plant extract were manually sprayed 3 times. The first one was added after 35 days from planting date and two weeks thereafter. The plants were harvested on the fourth of August in both seasons.

- Vegetative growth characters: plant height (cm), number of branches/plant, leaf area (cm^2) and shoot fresh and dry weights/plant and /fed (g/plant and ton/fed).

Table a. Physical and chemical analysis of the experimental soil according to (Jackson, 1973).

Soil character	Values		Soil character	Values	
	1st season	2nd season		1st season	2nd season
Sand %	29.00	30.00	**Available P %**	14.98	15.00
Silt %	30.00	30.00	**Exchangeable K^+ mg/100 g soil**	2.16	2.16
Clay %	41.00	40.00	**Exch. Ca^{++} mg/100 g soil**	31.55	31.50
Soil type	Clay loam		**Exch. Na^+ mg/100 g soil**	2.39	2.40
Organic matter %	1.68	1.71	**Fe**	7.54	7.50
$CaCO_3$ %	2.08	2.10	**Cu-**	2.16	2.20
pH 1:2.5	7.85	7.78	**Zn**	2.65	2.64
E.C. m mhose/cm	1.04	1.08	**Mn**	7.35	7.39
Total N %	0.09	0.10			

Table b. Physical and chemical properties of the used compost according to Arid Land Agricultural Research Unit, Fac. of Agric. Ain Shams Univ.

Properties	Value	Properties	Value
Dry weight of 1 m^3	450 kg	**C/N ratio**	14.1-18.5
Fresh weight of 1 m^3	650-700 kg	**NaCl %**	1.1-1.75
Moisture (%)	25-30	**Total P %**	0.5-0.75
pH (1:10)	7.5-8	**Total K %**	0.8-1.0
E.C. (m mhose/cm)	2-4	**Fe ppm**	150-200
Total N %	1-1.4	**Mn ppm**	25.56
Org. matter %	32-34	**Cu ppm**	75-150
Org. carbon %	18.5-19.7	**Zn ppm**	150-225

Table c. Some chemical constituents of garlic according to Arid Land Agricultural Research Unit, Fac. of Agric. Ain Shams Univ.

Components	GA_3	IAA	ABA	Ca^{+2}	Mg^{+2}	SO_4^{-2}	Zn^{+2}	Mn^{+2}
Concentration	16.33 mg/100 g f.w.)	Trace	Trace	1.36 %	1.23 %	0.18 %	66.5 ppm	94.4 ppm

Table d. Determination of phytohormones (GA_3, IAA and ABA) in *Aloe vera* plant according to Arid Land Agricultural Research Unit, Fac. of Agric. Ain Shams Univ.

Component	GA_3	IAA	ABA	Carbohydrates
Concentration (mg/100 g fresh weight)	16.00	0.63	3.06	10.01 %

Table e. Analysis of Moringa fresh leaves according to Arid Land Agricultural Research Unit, Fac. of Agric. Ain Shams Univ.

Component	Leaves	Component	Leaves	Amino acids	Leaves
Calories/100 g leaves	91	Sulfur (mg) /100 g leaves	137	Arginine (mg) /100 g leaves	402
Protein (g)/ 100 g leaves	6.7	Selenium (mg) /100 g leaves	0	Histidine(mg) /100 g leaves	141
Fat (g) /100 leaves	1.8	Zinc (mg) /100 g leaves	0	Isoleucine(mg) /100 g leaves	422
Carbohydrate (g) /100 g leaves	13.4	Oxalic Acid (mg) /100 g leave	101	Leucine (mg) /100 g leaves	623
Fiber (g) /100 g leaves	0.8	Vitamin A (mg) /100 g leaves	6.8	Lysine (mg) /100 g leaves	288
Calcium (mg) /100 g leaves	435	Vitamin B (mg) /100 g leaves	423	Methionine(mg) /100 g leaves	134
Copper (mg) /100 g leaves	1.1	Vitamin B_1 (mg) /100 g leaves	0.21	Phenylalanine(mg) /100 g leaves	429
Iron (mg) /100 g leaves	8	Vitamin B_2 (mg) /100 g leaves	0.05	Threonine(mg) /100 g leaves	328
Potassium (mg) /100 g leaves	261	Vitamin B_3 (mg) /100 g leaves	0.8	Tryptophan(mg) /100 g leaves	127
Magnesium (mg) /100 g leaves	25	Vitamin C (mg) /100 g leaves	220		
Phosphorus (mg) /100 g leaves	71	Vitamin E (mg) /100 g leaves	0		

- Root system traits: number of nodules/plant and fresh weight of nodules (g/plant).
- Dry seed yield/plant g/plant and kg/fed.

The plant extracts (garlic, moringa, aloe, green tea) were prepared according to (El-Desouky *et al.*, 1998; Phiri and Mbewe, 2010; Wilfred *et al*., 1990 and Nie *et al.*, 2002).

Statistical analysis: The data of the two experiments were subjected to the statistical analysis of variance using MSTAT-C (1986). L.S.D. test at 0.05 was used to compare the average means of treatments.

RESULTS AND DISCUSSION

Vegetative growth characters:

Data presented in Tables (1 and 2) show that plant height, number of branches/plant, leaf area cm^2 and shoot fresh and dry weights g/plant, were significantly increased due to all compost treatments over control (without compost) in both seasons. The highest values for the characters were obtained when compost was applied at the medium level (5 ton/fed). Similar results were found by Nattudurai *et al.* (2013) and Shehata (2013) on guar; Taiwo *et al.* (2001) on cow pea and Nilanthi and Alawasthugoda (2015) on soybean. The increment in all aforementioned characters of guar plants due to compost treatments reflected the positive biological and physiological roles of organic manure on the vegetative growth and root system, which were concluded by many authors as follows, Adding organic manure in the soil improves soil permeability and releases carbon dioxide and certain organic acids during decomposition (Mashali, 1997). Applying organic manure is not only relieved material inhibition an autotoxic substance in the root exudates by cinnamic acid but also promoted growth, increased the content and composition of plant secondary metabolites (essential oils or alkaloids), improved root dehydrogenase, ATPase and microorganism activities and nutrients uptake (Lu *et al.*, 2002; Reuveni *et al.*, 2002 and Zheljazkov, 2005). Concerning the effect of biostimulant treatment, data in Tables (1 and 2) revealed that all used treatments significantly increased the aforementioned characters, in both seasons, in comparison with untreated plants. Ultimate increase resulted from the treatments of garlic extract (300 ppm) followed by green tea extract (150 ppm) then Vit. E (20 ppm) without significant differences among them in most cases. Tocopherol are a group of compounds synthesized only by photosynthetic organisms. The best characterized and probably most important function of α-tocopherol is to act as recyclable chain reaction terminators of polyunsaturated fatty acids, free radicals generated by lipids oxidation. In plants, tocopherol are believed to protect chloroplast membranes from photooxidation and help to provide an optimal environment for the photosynthetic machinery (Munne-Bosch and Algere, 2002), and added that tocopherol accumulation also occurs in response to variety of a biotic stresses including high light, drought, salt and could provide an addition line of protection from oxidative damage. Ayad *et al.* (2009) proved that chemical constituents of medicinal plants positively responded to foliar application of α-tocopherol. It might be due to that α-tocopherol can be considered a major antioxidant protecting membrane lipids from photo-oxidation especially those of chloroplast (Hess, 1983; Zhang *et al.*, 2000; Havaux *et al.*, 2000).

Concerning the effect of garlic extract, our results are similar to the results of El-Shayeb (2009) on *Oenothera biennis* and Ahmed *et al*. (2014) on basil plants. However, Ahmed *et al.* (2014) on keitte mango tree found that spraying plants with green tea extract significantly increased vegetative growth (shoot length, number of leaves/shoot and leaf area). The positive effect of alpha-tocopherol (Vit. E) on improving the aforementioned parameters was reported by Abdou *et al.* (2012) on mint plant and Shehata (2013) on cluster bean

Table 1. Effect of compost, vitamin E and some plant extracts (garlic, moringa, aloe and green tea) treatments on plant height (cm), number of branches/plant and leaf area (cm^2) of guar (*Cyamopsis tetragonoloba*, L.) plants, during the first and second seasons.

Vitamin E and some plant extracts treatments (B)	Compost levels (ton/fed) (A) 1st season (2014)					2nd season (2015)				
	0.0	2.5	5.0	7.5	Mean (B)	0.0	2.5	5.0	7.5	Mean (B)
Plant height (cm)										
Control	148.2	158.9	164.8	153.4	156.3	139.5	159.7	164.1	144.4	151.9
Vitamin E at 10 ppm	158.5	165.4	172.1	160.7	164.2	145.4	167.5	172.3	148.7	158.5
Vitamin E at 20 ppm	170.4	180.5	187.3	178.0	179.1	171.2	180.6	183.9	176.2	178.0
Garlic extract 150 ppm	160.9	168.7	176.3	164.5	167.6	149.1	170.6	174.5	152.4	161.7
Garlic extract 300 ppm	179.2	185.7	190.3	183.2	184.6	176.3	184.4	187.2	179.2	181.8
Moringa extract 150 ppm	167.4	178.0	184.7	172.1	175.6	166.7	176.9	181.5	171.1	174.1
Moringa extract 300 ppm	168.4	179.2	187.0	174.2	177.2	169.2	178.9	183.5	173.1	176.2
Aloe extract 150 ppm	163.5	172.7	179.7	167.3	170.8	152.8	173.9	177.5	154.8	164.8
Aloe extract 300 ppm	164.7	176.4	181.0	169.8	173.0	164.4	175.5	179.7	168.8	172.1
Green tea extract 150 ppm	174.6	184.0	188.7	180.9	182.1	173.4	180.9	184.6	177.7	179.2
Green tea extract 300 ppm	156.7	161.5	169.7	157.9	161.5	143.3	163.9	169.5	146.5	155.8
Mean (A)	164.8	173.7	180.1	169.3		159.2	173.9	178.0	163.0	
L.S.D. at 5 %	A: 2.70		B: 3.21		AB: 6.36	A: 2.04		B: 3.18		AB: 6.42
Number of branches/plant										
Control	13.61	15.52	16.23	14.36	14.93	10.75	15.13	15.38	13.29	13.64
Vitamin E at 10 ppm	16.36	18.53	19.23	17.82	17.99	14.43	16.67	17.15	15.56	15.95
Vitamin E at 20 ppm	24.24	27.74	29.08	26.42	26.87	22.50	27.44	28.69	25.12	25.94
Garlic extract 150 ppm	17.27	19.29	20.66	18.91	19.03	16.17	18.55	19.17	17.05	17.74
Garlic extract 300 ppm	27.70	29.89	31.72	28.47	29.45	26.44	29.16	30.96	28.26	28.71
Moringa extract 150 ppm	22.14	24.37	25.97	23.24	23.93	19.53	24.13	25.50	21.85	22.75
Moringa extract 300 ppm	22.91	26.12	28.06	24.59	25.42	20.06	25.93	27.31	23.38	24.17
Aloe extract 150 ppm	19.08	20.41	21.88	20.21	20.40	18.12	20.07	21.47	19.61	19.82
Aloe extract 300 ppm	20.61	23.27	24.42	22.62	22.73	18.42	22.37	23.68	20.06	21.13
Green tea extract 150 ppm	25.34	28.73	30.55	28.04	28.17	25.24	28.27	28.94	27.14	27.40
Green tea extract 300 ppm	15.78	17.54	18.79	16.94	17.26	13.06	16.00	16.13	14.19	14.85
Mean (A)	20.46	22.86	24.24	21.97		18.61	22.16	23.13	20.50	
L.S.D. at 5 %	A: 1.11		B: 1.28		AB: 2.56	A: 1.21		B: 1.36		AB: 2.73
Leaf area (cm^2)										
Control	25.40	28.47	29.53	26.93	27.58	20.87	27.57	28.50	25.93	25.72
Vitamin E at 10 ppm	28.13	29.90	31.00	29.37	29.60	23.80	28.93	29.53	27.17	27.36
Vitamin E at 20 ppm	32.50	34.90	36.03	33.40	34.21	30.73	34.23	36.00	32.57	33.38
Garlic extract 150 ppm	28.80	30.97	31.87	29.83	30.37	24.80	29.83	30.60	27.37	28.15
Garlic extract 300 ppm	34.80	36.70	37.77	35.67	36.24	32.27	35.83	37.73	33.67	34.88
Moringa extract 150 ppm	31.00	33.43	34.87	31.80	32.78	28.63	32.80	34.03	30.77	31.56
Moringa extract 300 ppm	31.67	34.27	35.43	32.30	33.42	30.20	33.27	34.97	31.77	32.55
Aloe extract 150 ppm	29.50	31.77	32.97	30.60	31.21	25.87	31.87	32.77	28.03	29.64
Aloe extract 300 ppm	29.87	32.60	34.10	30.83	31.85	27.77	32.53	33.03	29.23	30.64
Green tea extract 150 ppm	33.43	35.83	36.83	34.97	35.27	31.20	34.50	36.50	32.63	33.71
Green tea extract 300 ppm	27.13	29.10	30.37	28.57	28.79	22.87	28.27	29.23	26.63	26.75
Mean (A)	30.20	32.54	33.71	31.30		27.18	31.78	32.99	29.62	
L.S.D. at 5 %	A: 0.55		B: 0.71		AB: 1.42	A: 0.85		B: 1.04		AB: 2.08

Table 2. Effect of compost, vitamin E and some plant extracts (garlic, moringa, aloe and green tea) treatments on shoot fresh and dry weights (g/plant) of guar (*Cyamopsis tetragonoloba*, L.) plants, during the first and second seasons.

Vitamin E and some plant extracts treatments (B)	Compost levels (ton/fed) (A) 1st season (2014)					2nd season (2015)				
	0.0	2.5	5.0	7.5	Mean (B)	0.0	2.5	5.0	7.5	Mean (B)
Shoot fresh weight (g/plant)										
Control	227.8	262.1	290.7	258.1	259.7	226.2	256.0	283.7	237.7	250.9
Vitamin E at 10 ppm	263.2	302.4	320.9	298.2	296.2	265.7	294.9	316.1	282.7	289.9
Vitamin E at 20 ppm	344.7	366.9	382.3	365.6	364.9	330.8	362.3	378.6	345.0	354.2
Garlic extract 150 ppm	287.3	322.5	334.8	312.0	314.2	281.4	317.7	326.3	308.3	308.4
Garlic extract 300 ppm	353.6	380.9	393.9	374.4	375.7	347.3	371.1	388.4	359.9	366.7
Moringa extract 150 ppm	330.0	347.7	370.6	344.4	348.2	317.7	350.2	365.7	330.6	341.1
Moringa extract 300 ppm	338.4	355.8	375.6	350.3	355.0	323.1	357.6	372.5	338.7	348.0
Aloe extract 150 ppm	305.9	332.0	345.2	323.6	326.7	306.7	326.4	344.7	318.4	324.1
Aloe extract 300 ppm	321.9	344.5	360.1	339.5	341.5	311.8	343.1	357.9	323.3	334.0
Green tea extract 150 ppm	350.1	371.9	385.9	369.6	369.4	339.3	366.1	380.2	355.9	360.4
Green tea extract 300 ppm	246.8	286.3	309.2	274.4	279.2	249.5	283.8	305.6	262.7	275.4
Mean (A)	306.3	333.9	351.7	328.2		300.0	329.9	347.2	314.8	
L.S.D. at 5 %	A: 9.2		B: 11.9		AB: 23.8	A: 9.4		B: 12.5		AB: 25.0
Shoot dry weight (g/plant)										
Control	125.2	159.6	186.2	154.4	156.4	124.0	147.1	181.1	132.7	146.2
Vitamin E at 10 ppm	161.4	202.6	215.7	195.5	193.8	161.8	195.3	207.1	180.5	186.2
Vitamin E at 20 ppm	241.4	267.7	278.2	261.2	262.1	221.7	258.0	267.5	242.5	247.4
Garlic extract 150 ppm	185.1	218.0	229.2	210.3	210.7	175.3	210.7	219.5	203.8	202.3
Garlic extract 300 ppm	249.2	277.9	291.3	272.3	272.7	234.5	268.2	279.1	255.5	259.3
Moringa extract 150 ppm	226.7	252.9	264.4	242.1	246.5	212.6	242.1	255.2	227.3	234.3
Moringa extract 300 ppm	233.1	262.1	270.2	252.9	254.6	218.0	247.5	265.4	237.0	242.0
Aloe extract 150 ppm	203.6	227.2	240.6	222.5	223.5	201.0	221.4	234.9	212.2	217.4
Aloe extract 300 ppm	219.3	245.0	256.7	235.5	239.1	207.0	234.0	249.2	222.8	228.3
Green tea extract 150 ppm	245.5	275.8	283.8	268.9	268.5	228.0	261.7	271.2	246.2	251.8
Green tea extract 300 ppm	144.1	184.1	212.9	173.8	178.7	146.7	175.1	198.8	151.1	167.9
Mean (A)	203.1	233.9	248.1	226.3		193.7	223.7	239.0	210.1	
L.S.D. at 5 %	A: 6.1		B: 10.6		AB: 21.2	A: 5.4		B: 11.9		AB: 23.8

(guar plant). Spraying guar plants with garlic extract at 150 and 300 ppm led to significantly increased vegetative growth characters in comparison with untreated plants. The high concentration of garlic extract (300 ppm) was superior than other all treatments in this concern. The positive effect of the garlic extract on guar plants could be examined in the light of biological and physiological roles of garlic extract which was conducted by many researches as follows. It is distinguished by containing high amount of amino acids, which contain sulfur element, such as: cystein and methionine (Synge, 1971). As well, garlic contains the following materials : volatile oil, allicin, alliin, sugar, iodine and vitamins (Al-Rawi and Chakravarty, 1964). The garlic extract has many effects due to its hormonal (Auxin-like) nature, which has an important role in lateral extension and elongation of cells (Abou Hussein *et al*., 1975 a and b)

The interaction between compost and biostimulant treatments was significant, in both seasons, for the studied parameters, except for leaf area in the first season. The highest values were obtained due to fertilizing plants with the medium level of compost (5.0 ton/fed) and spraying the plants with garlic extract (300 ppm) or green tea extract (150 ppm) in all cases or with Vit. E (20 ppm) in most cases (Tables, 1 and 2).

Number of nodules/root and fresh weight of nodules g/plant:

Data in Table (3) indicated that number of nodules/root and fresh weight of nodules/root was gradually decreased by the

Table 3. Effect of compost, vitamin E and some plant extracts (garlic, moringa, aloe and green tea) treatments on number of nodules/root and fresh weight of nodules/root of guar (*Cyamopsis tetragonoloba,* L.) plants, during the first and second seasons.

Vitamin E and some plant extracts treatments (B)	Compost levels (ton/fed) (A) 1st season (2014)					2nd season (2015)				
	0.0	2.5	5.0	7.5	Mean (B)	0.0	2.5	5.0	7.5	Mean (B)
Number of nodules/root										
Control	8.40	10.20	9.43	8.93	9.24	8.00	9.90	9.23	8.67	8.95
Vitamin E at 10 ppm	10.10	11.50	11.27	10.67	10.89	10.00	11.03	10.77	10.40	10.55
Vitamin E at 20 ppm	14.34	17.20	16.30	14.77	15.65	14.00	16.93	16.30	14.50	15.43
Garlic extract 150 ppm	10.47	12.20	11.87	11.27	11.45	10.37	11.80	11.27	11.07	11.13
Garlic extract 300 ppm	15.67	18.07	17.07	15.97	16.70	14.97	17.90	17.07	15.73	16.42
Moringa extract 150 ppm	12.80	14.77	14.57	13.13	13.82	12.67	13.93	13.53	13.03	13.29
Moringa extract 300 ppm	13.23	16.60	15.13	13.93	14.72	13.03	16.07	15.83	13.67	14.65
Aloe extract 150 ppm	11.40	13.00	12.80	12.13	12.33	11.33	12.07	11.80	11.50	11.68
Aloe extract 300 ppm	12.30	13.73	13.57	12.63	13.06	12.03	13.03	12.63	12.43	12.53
Green tea extract 150 ppm	15.10	17.70	16.53	15.53	16.22	14.77	17.60	16.63	15.27	16.07
Green tea extract 300 ppm	9.33	10.77	10.73	9.87	10.18	9.07	10.27	9.93	9.60	9.72
Mean (A)	12.10	14.16	13.57	12.62		11.84	13.68	13.18	12.35	
L.S.D. at 5 %	A: 1.65		B: 1.91		AB: 3.09	A: 1.02		B: 1.67		AB: 3.45
Fresh weight of nodules/root g/plant										
Control	3.94	5.11	5.43	4.56	4.76	3.58	4.91	5.21	4.19	4.47
Vitamin E at 10 ppm	4.34	5.85	5.96	5.37	5.38	4.03	5.45	5.68	4.95	5.03
Vitamin E at 20 ppm	7.32	9.21	10.08	7.99	8.65	7.01	9.03	9.92	7.60	8.39
Garlic extract 150 ppm	5.26	6.23	6.53	5.76	5.95	4.40	5.92	6.21	5.32	5.46
Garlic extract 300 ppm	7.95	9.82	11.36	8.50	9.41	7.77	9.72	11.10	8.20	9.20
Moringa extract 150 ppm	6.17	7.68	8.11	6.61	7.14	5.97	7.38	7.90	6.35	6.90
Moringa extract 300 ppm	6.81	8.40	9.13	7.20	7.89	6.42	7.99	9.04	7.02	7.62
Aloe extract 150 ppm	5.94	6.51	6.91	6.11	6.37	4.91	6.33	6.51	5.83	5.90
Aloe extract 300 ppm	6.01	7.13	7.45	6.39	6.75	5.41	6.87	6.89	6.23	6.35
Green tea extract 150 ppm	7.80	9.53	10.71	8.47	9.13	7.46	9.33	10.38	8.01	8.80
Green tea extract 300 ppm	4.15	5.42	5.62	5.05	5.06	3.89	5.09	5.39	4.74	4.78
Mean (A)	5.97	7.35	7.94	6.55		5.53	7.09	7.66	6.22	
L.S.D. at 5 %	A: 0.96		B: 1.29		AB: 1.93	A: 0.85		B: 1.16		AB: 1.85

gradual increase in compost level. The maximum values were obtained with the low level of compost (2.5 ton/fed). Many research workers gained best number of nodules and its fresh weight by the use moderate level of compost for several legume species such as Singh and Vijayalakshmi (2013) and Shehata (2013) on guar; Taiwo *et al*. (2001) and Otieno *et al.* (2007) on *Vigna* spp. and Singh *et al*. (2011) on French bean. Data presented in Table (3) showed that all ten treatments of Vit. E and plant extracts increased number and fresh weight of nodules/root in comparison with control. Garlic extract treatment (300 ppm) gave the highest improve followed by green tea extract (150 ppm) then Vit. E (20 ppm). Similar results were obtained by Shehata (2013) on guar and El-Ghamriny *et al*. (2005) on cowpea regarding the effect of vitamins.

Roots fresh and dry weights of nodules/plant:

It is clear from the data presented in Table (4) that all used compost treatments markedly affected the fresh and dry weights of roots per plant. The significantly heaviest weight of roots (74.00 and 66.75 g F.W. in both seasons and 63.60 and 56.30 g. D.W. in both season, respectively) resulted from the treatment of 5 ton/fed. On the line with these results were obtained by Shehata (2013) on

Table 4. Effect of compost, vitamin E and some plant extracts (garlic, moringa, aloe and green tea) treatments on fresh and dry weights of roots per plant of guar (*Cyamopsis tetragonoloba*, L.) plants, during the first and second seasons.

Vitamin E and some plant extracts treatments (B)	Compost levels (ton/fed) (A) 1st season (2014)					2nd season (2015)				
	0.0	2.5	5.0	7.5	Mean (B)	0.0	2.5	5.0	7.5	Mean (B)
Roots fresh weight (g)										
Control	24.11	42.22	55.97	38.08	40.10	22.25	41.17	51.47	37.33	38.06
Vitamin E at 10 ppm	37.24	51.81	61.83	48.05	49.73	29.38	48.14	56.13	44.22	44.47
Vitamin E at 20 ppm	54.33	73.39	85.59	63.95	69.32	51.81	68.84	77.84	61.56	65.01
Garlic extract 150 ppm	37.38	55.59	65.41	50.84	52.31	33.21	49.88	58.81	47.37	47.32
Garlic extract 300 ppm	60.50	78.83	91.04	70.66	75.26	57.98	74.05	84.18	68.69	71.23
Moringa extract 150 ppm	49.65	68.36	78.83	59.29	64.03	43.77	61.18	70.41	55.60	57.74
Moringa extract 300 ppm	51.84	69.44	83.48	62.23	66.75	48.55	65.21	74.80	58.53	61.77
Aloe extract 150 ppm	40.37	60.42	70.14	54.53	56.37	35.71	53.74	60.76	50.72	50.23
Aloe extract 300 ppm	44.61	65.57	74.27	57.30	60.44	40.13	57.62	66.00	52.98	54.18
Green tea extract 150 ppm	58.36	76.11	87.81	67.30	72.40	55.54	71.14	80.53	66.62	68.46
Green tea extract 300 ppm	28.98	45.91	59.64	45.33	44.97	27.48	43.79	53.31	40.34	41.23
Mean (A)	44.31	62.51	74.00	56.14		40.53	57.71	66.75	53.09	
L.S.D. at 5 %	A: 1.56		B: 2.88	AB: 5.76		A: 2.22		B: 2.80	AB: 5.60	
Roots dry weight (g)										
Control	13.11	31.10	44.96	28.56	29.43	12.42	30.77	39.05	26.25	27.12
Vitamin E at 10 ppm	23.61	40.56	51.26	38.53	38.49	18.68	37.39	45.08	32.89	33.51
Vitamin E at 20 ppm	43.69	63.31	75.32	52.60	58.73	41.30	57.81	67.27	51.71	54.52
Garlic extract 150 ppm	27.78	45.17	54.64	41.14	42.18	22.28	39.19	46.97	37.03	36.37
Garlic extract 300 ppm	49.91	68.06	80.41	61.05	64.86	49.32	64.63	75.18	59.93	62.27
Moringa extract 150 ppm	39.21	57.06	68.38	49.26	53.48	33.14	49.91	61.05	44.88	47.25
Moringa extract 300 ppm	40.72	58.73	73.49	50.75	55.92	38.25	54.69	64.66	48.85	51.61
Aloe extract 150 ppm	30.35	50.51	59.25	44.28	46.10	26.14	43.02	51.14	39.01	39.83
Aloe extract 300 ppm	34.57	54.79	64.37	47.12	50.21	30.02	47.31	56.25	42.63	44.05
Green tea extract 150 ppm	46.53	65.12	78.62	56.85	61.78	45.93	61.13	70.42	56.06	58.39
Green tea extract 300 ppm	20.12	35.97	48.92	33.40	34.60	18.04	33.18	42.19	28.48	30.47
Mean (A)	33.60	51.85	63.60	45.78		30.50	47.18	56.30	42.52	
L.S.D. at 5 %	A: 2.36		B: 3.08	AB: 6.16		A: 2.76		B: 3.88	AB: 7.76	

guar, Otieno *et al.* (2007) on *Vigna radiate* and Singh *et al.* (2011) on French bean.

The fresh and dry weights of roots/plant were significantly influenced by the application the ten treatments of vit. E and plant extracts. The significantly heaviest weights resulted from garlic extract (300 ppm) and green tea extract (150 ppm) without significant differences between such two superior treatments in both seasons. The interaction between main and sub plots (A×B) treatments was significant for fresh and dry weights of roots/plant in both seasons. The best interaction treatment was compost (5.0 ton/fed) with 300 ppm garlic extract or150 ppm green tea extract (Table, 4). In agriculture, aloe plant extract is used to improve the vegetative growth and flowering (Youssef, 1997 on *Delphinium ajacis*, L., *Antirrhinum majus*, L. and *Callistephus chinenis*, L. plants). It is used also as fungicides (Lindsey *et al*., 2002). The raw pulp of *A. vera* contains approximately 98.5% water, while the mucilage or gel consists of about 99.5% water (Eshum and He, 2004). The remaining 0.5-1% solid material consists of a range of compounds including fat-soluble vitamins (B_1, B_2, B_6, C, B-carotene, choline, folic acid, alpha tocopherol, minerals (calcium, copper, iron, magnesium, manganese, potassium, phosphorus, sodium, zinc), enzymes, essential amino acids, gibberillin (Boudreau and Beland, 2006). It has been reported by several authors that different fractions of *A. vera*, as well as, unfracionated whole gel

have anti-oxidant effects (Langmead *et al.*, 2004).

Yield and yield component parameters:

Data in Table (5) indicated significant effect on number of pods/plant, seed yield/plant and /fed in both experimental seasons. Supplying guar plants with the medium level of compost (5.0 ton/fed) gave the maximum values comparing with other treatments as gave 113 and 110.8 pods/plant, 18.13 and 17.75 g/plant and 966.9 and 946.7 kg/fed, in the first and second seasons, respectively. Similar results were obtained by Gomaa and Mohamed (2007); Shehata (2013) and Chavan *et al.* (2015). It is clear from data in Table (5) that all used ten treatments of Vit. E and plant extracts had significantly positive effect on pods number/plant, seed yield/plant and /fed in both seasons comparing with control. The highest values were resulted from the treatments of garlic extract (300 ppm) and green tea extract (150 ppm). In confirming with the obtained results in the present study that vitamin E and plant extracts augmented the number of pods/plant, seed yield/plant and /fed coincided by Ahmed *et al.* (2005) on pea plants concerning garlic extract and Al-Wasfy *et al.* (2013) on Washington Noval orange three regarding the effect of green tea extract. The interaction between compost and the treatments of Vit. E and plant extracts (garlic, moringa, aloe and green tea) was significant, in both seasons, for the three studied characters as clearly shown in Table (5). The highest number and heaviest seed yield were obtained due to compost (5.0 ton/fed) in combination with garlic extract (300 ppm) or green tea extract (150 ppm) during both seasons. Spraying guar plants with moringa extract (150 and 300 ppm) significantly increased all studied characteristics comparing with control treatment. Many investigators emphasized the beneficial role of moringa extract to stimulate plant growth and yield ,In agriculture and horticulture, use of *Moringa oleifera* leaf extract has proved beneficial for the growth and yield (Chang *et al.*, 2007), deeper root development and better seed germination (Kannaiyan, 2000), delay of fruit senescence, improve plant vigour and yield quality/quantity (Phiri and Mbewe, 2010; Hossain *et al*., 2012), stimulate the ability to withstand adverse environmental conditions (Chang *et al*., 2007).Moringa contain major and minor nutrients (K, Ca, Fe), amino acids, vitamins (A, B, C), cytokinins (zeatin), auxin like growth substances, antioxidants (Ascorbate, phenolics), leaf extracts exhibited more pest and diseases resistance, higher sugar levels and an overall 20-35% increase in yield (Foidle *et al.,* 2001 and Makkar and Becker, 1996).The active growth enhancing substances in Moringa leaf extract are reported to be zeatin, dihydrozeatin and isopentyladenine which are natural (endogenous) cytokinins (Andrews, 2006).

The improvement of guar plant growth yield as a result of spraying green tea extract at 150 ppm could be explained in the light of the important physiological roles of certain chemicals that are contained in green tea. These chemicals are found in the tannins released from the tea leaves when it is steeped in hot water. Tannis contain polyphenols and flavonoids which are subgroups that contain the antioxidant chemicals (Nie *et al*., 2002). Antioxidants with their protectant properties play an important role in plant defense against oxidative stress, as well as, biosynthesis of most organic foods and activation of cell division process (Oertli, 1987). Also, contains vitamins (A, C and E), minerals that protecting cells and their genetic material, DNA, from damage (Hanafy *et al*., 2012).

REFERENCES

Aamir, J.M.; Akbar, A.N.; Abbas. R.; Khan, H.Z. and Maqsood, Q. (2014). Response of canola to foliar application of moringa and brassica water extracts. Int. J. Agric. and Crop Sci., 7(14):1431-1433.

Abd El-Moneim, M.M.; El-Mazny, M.Y.; Abd El-Mageed, Y.T.; Moustafa, Y.M. and Yamani, S.H.S. (2015). Effect of

Table 5. Effect of compost, vitamin E and some plant extracts (garlic, moringa, aloe and green tea) treatments on number of pods/plant and seed yield/plant and /fed of guar (*Cyamopsis tetragonoloba*, L.) plants, during the first and second seasons.

Vitamin E and some plant extracts treatments (B)	Compost levels (ton/fed) (A) 1st season (2014)					2nd season (2015)				
	0.0	2.5	5.0	7.5	Mean (B)	0.0	2.5	5.0	7.5	Mean (B)
Number of pods/plant										
Control	64.1	83.8	88.4	78.8	78.8	62.6	79.7	87.5	74.6	76.1
Vitamin E at 10 ppm	73.3	89.3	97.6	85.1	86.3	69.3	88.1	94.1	80.6	83.0
Vitamin E at 20 ppm	110.7	127.7	130.5	125.0	123.5	109.7	124.4	127.8	123.7	121.4
Garlic extract 150 ppm	76.9	91.8	100.5	88.6	89.5	75.7	89.6	97.9	85.7	87.2
Garlic extract 300 ppm	120.5	135.1	141.0	130.7	131.8	119.5	133.4	138.9	127.2	129.8
Moringa extract 150 ppm	91.8	104.8	112.1	100.6	102.3	89.2	101.8	111.0	98.3	100.1
Moringa extract 300 ppm	108.8	122.4	126.2	121.5	119.7	105.6	120.6	123.1	120.1	117.4
Aloe extract 150 ppm	79.6	97.3	105.6	91.8	93.6	76.4	94.8	103.4	89.0	90.9
Aloe extract 300 ppm	84.3	100.0	110.2	97.7	98.1	81.6	97.9	108.4	95.5	95.9
Green tea extract 150 ppm	118.0	131.1	137.3	129.1	128.9	116.4	127.3	135.6	126.7	126.5
Green tea extract 300 ppm	71.3	85.7	93.4	81.5	83.0	67.6	82.7	91.4	78.6	80.1
Mean (A)	90.8	106.3	113.0	102.8		88.5	103.7	110.8	100.0	
L.S.D. at 5 %	A: 1.8		B: 3.0		AB: 6.0	A: 1.3		B: 3.4		AB: 6.8
Dry weight of 100 seeds (g)										
Control	2.31	2.55	2.65	2.49	2.50	2.28	2.50	2.63	2.43	2.46
Vitamin E at 10 ppm	2.53	2.77	2.95	2.63	2.72	2.45	2.70	2.91	2.59	2.66
Vitamin E at 20 ppm	3.26	3.49	3.53	3.41	3.42	3.18	3.44	3.48	3.39	3.37
Garlic extract 150 ppm	2.61	2.93	3.06	2.73	2.83	2.58	2.94	2.99	2.72	2.81
Garlic extract 300 ppm	3.39	3.68	3.72	3.56	3.59	3.29	3.60	3.70	3.48	3.52
Moringa extract 150 ppm	3.01	3.20	3.28	3.13	3.16	2.96	3.16	3.23	3.09	3.11
Moringa extract 300 ppm	3.17	3.39	3.40	3.26	3.31	3.14	3.35	3.36	3.20	3.26
Aloe extract 150 ppm	2.75	3.05	3.15	2.88	2.96	2.70	2.99	3.13	2.82	2.91
Aloe extract 300 ppm	2.88	3.17	3.23	3.01	3.07	2.82	3.12	3.19	2.96	3.02
Green tea extract 150 ppm	3.30	3.59	3.66	3.50	3.51	3.22	3.54	3.59	3.43	3.45
Green tea extract 300 ppm	2.43	2.64	2.89	2.58	2.64	2.36	2.60	2.80	2.47	2.56
Mean (A)	2.88	3.13	3.23	3.02		2.82	3.09	3.18	2.96	
L.S.D. at 5 %	A: 0.05		B: 0.06		AB: 0.12	A: 0.06		B: 0.08		AB: 0.15
Seed yield/plant (g)										
Control	8.28	10.76	11.72	9.59	10.09	8.06	10.25	11.55	9.17	9.76
Vitamin E at 10 ppm	9.84	12.61	14.35	11.00	11.95	9.83	12.00	13.81	10.75	11.60
Vitamin E at 20 ppm	16.74	20.78	22.54	18.71	19.69	16.26	20.01	22.09	18.11	19.12
Garlic extract 150 ppm	11.41	13.71	15.03	12.37	13.13	11.06	13.13	14.90	12.01	12.78
Garlic extract 300 ppm	18.94	22.76	24.97	20.72	21.85	18.27	22.08	24.16	20.03	21.14
Moringa extract 150 ppm	14.69	17.80	19.09	16.60	17.05	14.23	17.09	18.97	16.12	16.60
Moringa extract 300 ppm	16.12	19.17	20.39	17.93	18.40	15.78	18.82	19.94	17.24	17.95
Aloe extract 150 ppm	12.73	14.60	16.40	13.54	14.32	12.22	13.92	16.05	13.06	13.81
Aloe extract 300 ppm	13.87	16.26	17.87	15.96	15.99	13.24	15.86	17.60	15.25	15.49
Green tea extract 150 ppm	17.86	21.88	23.97	19.64	20.84	17.26	21.65	23.29	19.27	20.37
Green tea extract 300 ppm	9.17	11.45	13.10	10.44	11.04	8.77	11.10	12.91	10.09	10.72
Mean (A)	13.60	16.53	18.13	15.14		13.18	15.99	17.75	14.65	
L.S.D. at 5 %	A: 1.09		B: 1.01		AB: 2.02	A: 0.32		B: 0.79		AB: 1.58

Continued

Table 5. Continued

	Seed yield/fed (kg)									
Control	441.6	573.9	625.1	511.5	538.1	429.9	546.7	616.0	489.1	520.5
Vitamin E at 10 ppm	524.8	672.5	765.3	586.7	637.3	524.3	640.0	736.5	573.3	618.7
Vitamin E at 20 ppm	892.8	1108.3	1202.1	997.9	1050.1	867.2	1067.2	1178.1	965.9	1019.7
Garlic extract 150 ppm	608.5	731.2	801.6	659.7	700.3	589.9	700.3	794.7	640.5	681.6
Garlic extract 300 ppm	1010.1	1213.9	1331.7	1105.1	1165.3	974.4	1177.6	1288.5	1068.3	1127.5
Moringa extract 150 ppm	783.5	949.3	1018.1	885.3	909.3	758.9	911.5	1011.7	859.7	885.3
Moringa extract 300 ppm	859.7	1022.4	1087.5	956.3	981.3	841.6	1003.7	1063.5	919.5	957.3
Aloe extract 150 ppm	678.9	778.7	874.7	722.1	763.7	651.7	742.4	856.0	696.5	736.5
Aloe extract 300 ppm	739.7	867.2	953.1	851.2	852.8	706.1	845.9	938.7	813.3	826.1
Green tea extract 150 ppm	952.5	1166.9	1278.4	1047.5	1111.5	920.5	1154.7	1242.1	1027.7	1086.4
Green tea extract 300 ppm	489.1	610.7	698.7	556.8	588.8	467.7	592.0	688.5	538.1	571.7
Mean (A)	725.3	881.6	966.9	807.5		702.9	852.8	946.7	781.3	
L.S.D. at 5 %	A: 9.43		B: 10.22	AB: 20.45		A: 4.84		B: 8.16	AB: 16.32	

some natural antioxidants on the productivity and storage ability of Egyptian onion grown in sandy soil. Minia 2nd Inter. Conf. for Agric. and irrigation in the Nile Basin countries, 23rd-25th March 2015, Minia, Egypt pp. 411-429.

Abdou, M.A.H.; Attia, F.A.; Ahmed, E.T.; El-Sayed, A.A. and Abd-El-Naeem L.M. (2012). Physiological studies on mint plants. Proc. Second Inter. Conf. of Physiol. Microb. and Ecological Plant Sci. (29-30 April, 2012) Fac. of Science, Minia Univ., pp : 207-228.

Abou Hussein, M.R.; Fadle, S.M. and Walley, Y.A. (1975a). Effect of garlic bulb extract on flowering, sex ratio and yield of squash. I- Effect of different fractions of partitioned garlic bulb extract on flowering in squash. Egypt. J. Hort., 2(1):3-10.

Abou Hussein, M.R.; Fadle, S.M. and Walley, Y.A. (1975b). Effect of garlic bulb extract on flowering, sex ratio and yield of squash. II- Modulation of sex ration by application of different fraction of garlic extract. Egypt. J. Hort., 2(1):11-22.

Ahmed, F.F.; Kamel, M.K. and Ibrahim H.I.M. (2014). The synergistic effects of using plant extracts and salicylic acid on yield and fruit quality of keitte mango trees. Stem Cell, 5: 30-39.

Ahmed, S.; Iqbal, J. and Attauddin, I. (2005). Time of application effect of phytobiocides on powdery mildew and yield in pea. Sarhad J. Agriculture, 21:729-731.

Ahmed, S.K.; Hammam, Kh. A. and Amer, A.A. (2014). Effect of bio-fertilization and some plant extracts on the growth, yield and chemical constituents of basil plant. J. Plant Production, Mansoura Univ., 5(2):193-210.

Al-Rawi, A. and Chakravarty, H.L. (1964). Medicinal plants of Iraq. Ministry of Agriculture and Irrigation. National Herbium of Iraq pp. 95-96.

Al-Wasfy, M.M.; Ahmed, F.F. and El-Masry, A.M. (2013). Behaviour of Washington Noval orange trees to foliar application of some plant extracts. Hort. Science Journal of Suez Canal Univ., 1:281-285.

Ayad, H.S.; Gamal El-Din, K.M. and Reda, F. (2009). Efficiency of stigmasterol and α-tocophrerol application on vegetative growth, essential oil pattern, protein and lipid peroxidation of geranium (Pelargonium graveolens, L.). Journal of Applied Sciences Research, 5(7):887-892.

Andrews, D. (2006). Nutraceutical Moringa Composition: Available: http:// www.google.com/Patents/US 20060222882.

Balakumbahan, R. and Rajamani, K. (2010). Effect of bio. stimulants on growth and

yield of senna (*Cassia angustifolia* var. KKM.1) J. of Hort. Sci. & Ornamental plants, 2(1):16-18.

Boudreau, M.D. and Beland, F.A. (2006). An evaluation of the biological and toxicological properties of *Aloe barbadensis*, *Aloe vera*. J. Environ. Sci. Health, 24:103-154.

Chang, Ed-Haun; Ren-Shih Chang and Tsai Young-How (2007). Effect of different application rates of organic fertilizer on soil enzyme activity and microbial population. Soil Sci. Plant Nutr., 53:132-140.

Chavan, B.L.; Vedpathak, M.M. and Pirgonde, B.R. (2015). Effects of organic and chemical fertilizers on cluster bean (*Cyamopsis tetragonoloba*, L.). European J. of Experimental Biology, 5(1):34-38.

El-Bassiouny, H.M.S.; Gobarah, M.E and Ramadan (2005). Effect of antioxidants on growth, yield, savism causative agents in seeds of *Vicia faba*, L. plants grown under reclaimed sandy soils. J. Agric. Pakistan.

El-Desouky, S.A.; Waneis, A.L.A. and Khedr, Z.M.A. (1998). Utilization of some natural plant extracts (garlic and yeast) as seed-soaked materials to squash (*Cucurbita pepo*, L.). Effect on growth, sex expression and fruit yield and quality. Ann. Agric., Sci., Moshtohor, 36(2):839-854.

El-Ghamriny, E.M.; Arisha, H.M. and Kamel, A.E. (2005). Effect of foliar spray with B-vitamins (B_1, B_6 and B_{12}) on growth and seed yield of cowpea plants. Zagazig J. Agric. Res., 32(6):1767-1783.

El-Shayeb, N.S.A. (2009). Physiological Studies (Bio-Fertilization & Plant Extracts) on *Oenothera biennis* (Evening Primrose). Ph.D. Thesis, Fac. Agric., Moshtohor, Benha Univ.

El-Tohamy, W.A. and El-Greadly, N.H.M. (2007). Physiological response, growth, yield and quality of snap beans in response to foliar application of yeast, vitamin E and zinc under sandy soil conditions. Australian Journal of Basic and Applied Sci., 1(3):294-299.

Emongor, V.E. (2015). Effects of *Moringa oleifera* leaf extract on growth, yield and yield components of snap beans (*Phaseolus vulgaris*). British J. of Applied Sci. and Technology, 6(2):114-122.

Eshum, K. and He, Q. (2004). Available ingredient for the food, pharmaceutical and cosmetic industries. A review, Crit.-Rev. Food Sci. Natr., 44:91-96.

Foidle, N.; Makkar, H.P.S. and Becker, K. (2001). The potential of *Moringa oleifera* for agricultural and industrial uses. In: The Mirale Tree: The Multiple Attributes of Moringa, pp: 45-76. (Lowell). Fuglie, ed.), CTA, Wageningen, The Netherlands.

Gomaa, A.M. and Mohamed, M.H. (2007). Application of bio-organic agriculture and its effect on guar (Cyamopsis tetragonoloba, L.) root nodules, forage, seed yield and yield quality. World J. of Agric. Sci., 3(1):91-96.

Hanafy, M.S.; Saadawy, F.M.; Milad, S.M.N. and Ali, R.M. (2012). Effect of some natural extracts on growth and chemical constituents of Schefflera arboricola plants. J. Hort. Sci. and Ornamental plants, 4(1):26-33.

Havaux, M.; Bonfils, J.; Lutz, C. and Niyogi, K. (2000). Photodamage of the photosynthetic apparatus and its dependence on the leaf developmental stage in the Arabidopsis mutant deficient in the xanthophylls cycle enzyme violaxanthin de-epoxidase. Plant Physiol., 1124:273-284.

Hess, J.L. (1983). Vitamin E, α-tocopherol. In: Antioxidants in Higher Plants. R.G. Alscher and J.L. Hess (Eds). CRC Press, Inc., Boca Raton., 111-134.

Hossain, M.; Miah, G.; Ahmed, T. and Sarmin, N.S. (2012). Allelopathic effect

of Moringa oliefera on the germination of Vigna radiata. Int. J. Agric. Crop Sci., 4(3):114-121.

Hussein, M.M.; Balba, L.K. and Gaballah, M.S. (2007). Developing a salt tolerant cowpea using α-tocophrerol. Journal of Applied Sciences Research, 3(10):1234-1239.

Jackson, M.L. (1973). Soil Chemical Analysis Englewood Cliffs., New Prentice-Hall INC., New York.

Kannaiyan, B. (2000). Bio-fertilizers - key factor in organic farming. Hindu Survey of Indian Agriculture, pp. 165-173.

Langmead, L.; Makins, R.J. and Rampton, D.S. (2004). Anti-inflammatory effects of *Aloe vera* gel in human colorectal mucosa in vitro. Aliment. Pharmacol. Ther., 19:521-527.

Lindsey, K.L.; Jager, A.K. and Viljoen, A.M. (2002). Cyclooxygenase inhibitory activity of aloe species. South African J. of Bot., 68(1):47-50.

Lu, W.; Zhang, C.; Yuan, F. and Pong, Y. (2002). Mechanism of organic manure relieving the autotoxicity to continuous cropping cucumber. Acta Agriculture Shanghai, 18(2):52-56 (Hort. Abst., 73(2):1525).

Mahmoud, R.; El-Desuki, M.; Abdel-Mouty, M. and Ali, A. (2013). Effect of compost levels and yeast extract application on the pea plant growth, pod yield and quality. Journal of Applied Sciences Research, 9(1):149-155.

Makkar, H.P.S. and Becker, K. (1996). Nutritional value and antinutritional components of whole and ethanol extracted *Moringa oleifera* leaves. Animal Feed Sci. Technol., 63:211-228.

Mashali, A.M. (1997). FAO global network on integrated soil management for sustainable use of salt affected soils. Proceedings of International Symposium on Sustainable Management of Salt Affected Soils in the Arid Ecosystem. 21-26 September, Cairo, Egypt, 31-51.

MSTAT-C (1986). A Microcomputer Program for the Design, Management and Analysis of Agronomic Research Experiments (Version 4.0), Michigan State Univ., U.S.

Munne-Bosch, S. and Algere, L. (2002). The function of tocopherol and tocotrienol in plants. Crit. Rev. Plant Sci., 21:31-57.

Nattudurai, G.; Ezhil Vendan, S.; Ramachandran, P.V. and Lingathurai, S. (2013). Vermicomposting of coirpith with cowdung by *Eudrilus eugeniae* Kingberg and its efficacy on the growth of *Cyamopsis tetragonoloba* Taub. Journal of the Saudi Society of Agric. Sci., (2013), http://dx.doi.org/10, 1016 jassas.

Ngoc Son, T.; Van Tnu, V.; Hong Man, L. and Hiraoka, H. (2001). Effect of organic and biofertilizer on quality, grain yield and soil properties of soybean under rice based cropping system. Japan Inter. Center for Agric. Sci., 9:55-61.

Nie, G.; Cao, Y. and Zhao, B. (2002). Protective effects of green tea polyphenols and their major component. Redox Rep., 7(3):171-178.

Nilanthi, D. and Alawasthugoda, C.J. (2015). Effect of mycorrhizae, NPK and compost on vegetative and reproductive parameters of soybean (*Glycine max*, L.). Int. J. Sci and Rec. Pub., 5:1-5.

Nour, K.A.M.; Mansour, N.T.S. and Eisa, G.S.A. (2012). Effect of some antioxidants on some physiological and anatomical characters of snap bean plants under sandy soil conditions. New York Sci. J., 5(5):1-9.

Oertli, J.J. (1987). Exogenous application of vitamins as regulators for growth and development of plant. A review Z. planzenernahr. Bodenk., 140:375-391.

Otieno, P.E.; Muthomi, J.W.; Chemining, G.N. and Nderitu, J.H. (2007). Effect of

rhizobia inoculation, farmyard manure and nitrogen fertilizer on growth, nodulation and yield of selected food grain legumes. Proc. African Crop Science Conference proc., 8:305-312.

Phiri, C. and Mbewe, D.N. (2010). Influence of *Moringa oliefera*, leaf extracts on germination and seedling survival of three common legumes. Int. J. Agric. Biol., 12:315-317.

Reuveni, R,; Raviv, M.; Krasnovsky, A.; Freiman, L.; Medina, S.; Bar, A.. and Orion, D. (2002). Compost induces protection against *Fusarium oxysporum* in sweet basil. Crop Protection, 21(7):583-587.

Shehata, A.M. (2013). Response of Guar Plants to Some Agricultural Treatments. Ph.D. Thesis, Fac. Agric., Minia Univ., Egypt.

Singh, A. and Vijayalakshmi, A. (2013). Residual effect of integrated nutrients management with farmyard manure, coirpith and pressmud compost on cluster bean (*Cyamopsis tetragonoloba*, L.). Int. J. Sci. and Nature, 4(3):405-407.

Singh. B.K.; Pathak, K.A.; Verma, A.K.; Verma, V.K. and Deka, B.C. (2011). Effect of vermicompost fertilizer and mulch on plant growth, nodulation and pod yield of French bean (*Phaseolus vulgaris*, L.). Vegatable Crops Research Bulletin, 74:153-165.

Synge, R.L.M. (1971). Proteins and poisons in plant. Nature Wissen Schaftliche Rundschar, 24(2):54-61.

Taiwo, L.B.; Osonubi, O. and Akano, M.J. (2001). Growth and nodulation of cowpea (*Vigna unguiculata*) in response to compost an inoculation with *Glomus etunicatum* and *Bradyrhizobium*. Tropical Agric. Res. and Extension, 4(2):101-107.

Thakure, C. (1975). Scientific Crop Production. Metropolitan Book. Co– PVT. Limited I, Nalaji Subhash Marg. Delhi, India.

Verma, S.A.; Shiran, A.C.; Bhanwaria, R. and Singh, M. (2014). Effect of vermicompost and sulfur on growth, yield and nutrient uptake of *Trigonella foenum*. The Bioscan, 9(2):667-670.

Vinizky, I. and Ray, D.T. (1988). Germination of guar seed under saline and temperature stress. J. Am. Soc. Hort. Sci., 113:437-440.

Whistler, R. and Hymowitz, T. (1980). Guar: Production, Nutrition and Industrial Use. Purdue University Press, Lafayette, India 47907.

Wilfred, T.B.; Alistar, M.S. and Borha, C. (1990). Carbohydrates polymers from *Aloe ferox* leaves. Phytochemistry, 29(11):3555-3558.

Youssef, H.M.A. (1997). Physiological Studies on Some Annual Plants. M.Sc. Thesis, Fac. Agric., Moshtohor, Zagazig Univ.

Zhang, R.; Schmidt, E. and Zhang, X.Z. (2000). Hormone containing products impact on antioxidants status of tall fescue and creeping betagrass subjected to drought. Crop. Sci., 40:1344-1349.

Zheljazkov, V.D. (2005). Assessment of wool waste as soil amendment and nutrient source. J. of Environmental Quality, 36(6):2310-2317.

تأثير معـــاملات الكمبوست وبعض المنشطات الحيوية على نباتات الجوار
أ- النمو الخضري ومحصول البذور

محمود عبد الهادي حسن عبده [*] ، أحمد عبد المنعم السيد [*] ، رجاء علي طه [*] ، محمد عبد القوي عبد السيد[**]
و وحيد سعد إسحاق بطرس [**]

[*] قسم البساتين، كلية الزراعة، جامعة المنيا، مصر.
[**]قسم بحوث النباتات الطبية والعطرية، معهد بحوث البساتين، مركز البحوث الزراعية، الجيزة، مصر.

أجري هذا البحث في مدينة أبو قرقاص محافظة المنيا خلال موسمين ٢٠١٤ و ٢٠١٥ لدراسة تأثير معاملات الكمبوست والمنشطات الحيوية على النمو ومحصول البذور.تشير النتائج أن إضافة الكمبوست (٢.٥ – ٥.٠ و ٧.٥ طن/فدان) أدت إلى زيادة معنوية في إرتفاع النبات، عدد الفروع/نبات ، مساحة الورقة ، وزن العشب طازج وجاف للنبات وللفدان و صفات المجموع الجذري وعدد القرون للنبات وللفدان مقارنة بمعاملة الكنترول. النباتات المعاملة بڤيتامين هـ والمستخلصات النباتية (الثوم – المورنجا – الصبار – الشاي) كل بتركيزين أدت إلى زيادة معنوية في كل الصفات المدروسة في الموسمين مقارنة بمعاملة الكنترول من بين المعاملات العشرة فإن مستخلص الثوم (٣٠٠ جزء/مليون) ومستخلص الشاي الأخضر (١٥٠ جزء/مليون) أدتا إلى الحصول على أحسن النتائج في هذا الشأن. تأثير التداخل كان معنوياً وأعلى القياسات تم الحصول عليها بمعاملة التداخل بين الكمبوست (٥ طن/فدان) بالإضافة إلى مستخلص الثوم (٣٠٠ جزء/فدان) أو مستخلص الشاي الأخضر (١٥٠ جزء/مليون).