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Yield and Quality Parameters of Sweet Pepper Fruits as Affected by P-Fertilization and Compost Town Refuse

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ABSTRACT

In season of 2018, an experiment was established as field experiment to evaluate the effect of different raets of phosphorus fertilization (control, 25, 50, 75 and 100% from recommended dose, 60 kg.fed^{-1}calcium superphosphate SP; 15% P_2O_5 as main plots along with presence and absence of compost town refuse as sub-plots on growth, chemical contenst and productivity of sweet pepper plant (*Capcicum annum*) at the Experimental Farm of Faculty of Agricultural, El-Mansoura University.The experiment tested was arrauged in an experimental split plot design with three replicates.The results showed that growth of sweet pepper plants were affected signifiently according to application of P-fertilization, addition of 75% followed by 50% which recorded the highest values of average fresh weight (g), number of fruits per plant, total fruit yield per plant (g/plant) and total yield (ton/fed) as well as DM%, an increase in photosynthetic pigments, TSS% and V.C (mg/100g) and minerals composition (N, P and K% in leaves and fruits) was also recorded, while Fe, Mn and Zn in sweet pepper fruits decreased with increasing P-fertilization comparing with the control which treatment recorded the lowest values,where the highest values were recorded with 25% of P-fertilization. Heavy metals were increased until 100% P-fertilization. All studied parameters under investigation were increased due to application of compost town refuse. So, it could be recommended for using both 75% from P-fertilization recommended dose and compost town refuse for optimum sweet pepper performance. Therefore, the organic fertilizers might help in reducing the need of high rates of P-fertilization to maintain proper P amount and also in reducing the expenses.

Keywords: P-fertilization, compost town refuse, quality, yield, pepper plant

INTRODUCTION

Pepper (*Capsicum annuum*) belongs to the solanaceous family and can be grown throughout the year (Kabura*et a*l., 2008). The crop is ranked the third position among most important vegetable crops after tomato and onion in the world (Islam *et al*., 2011).It has occupied an essential rank in Egyptian agriculture because of its high income and nutritional value for human health (Ghoname*et al.* 2010). Pepper is a respectable source of numerous antioxidant compounds. Such example, pepper fruits contain more than 20 different carotenoids, vitamin C and abundant phenolic compounds (including flavonoids) (Igbokwe *et al*., 2013).

Using organic and meniral fertilizers has a great significance in last few years in vegetable production for two reasons. Firstly, the need for improved sustainable increase in production; and per fedden yield of vegetables requires an increased amount of nutrients. Secondly, the results of a numerous experiments on chemical and organic fertilizers managed in numerous countries detect that mineral fertilization alone cannot sustain productivity of soils heavy cropping system (Khan *et al*., 2010).

After nitrogen (N), phosphorus (P) is the second most oftentimes restricting macronutrient for plant development. Phosphorus (P) is a component of key molecules such as ATP, phospholipids, and nucleic acids. An adequate supply of P is required for optimum growth and reproduction. It is involved in a few key plant functions, including photosynthesis, energy transfer, transformation of starches and sugars, nutrient movement within the plant and transfer of genetic characteristics from one generation to the next. Phosphorus promotes root growth and provides resistances to root diseases (Taiz *et al.*, 2015). Phosphorus deficiency affects not only plant growth, development and crop yield, but also the seeds formation and the fruit quality (Njira and Nabwami, 2015). Effectiveness of phosphorus and its availability to plants depends on many factors like pH, dominant climate, physicochemical properties of the soil, and organic matter content of soil and sources of P fertilizer (El -Bassiouny *et al*., 2012).

One of the agrotechnical events permitted in biological production is the use of products obtained as a result of composting of organic waste with the help of various types of microorganisms (Singh *et al.* 2008). For realizing higher yields and quality of production, soil health is a critical factor. Therefore, chemical fertilizers must be integrated with organic manures such as, compost town refuse, which are renewable and eco-friendly to achieve sustainable productivity with minimum deleterious effects of chemical fertilizers on soil health and environment. The yield per unit area can be increased along with the improvement of its quality through the balanced application of organic and mineral fertilizers in proper combination. Sweet pepper responds well to the application of both organic manures and inorganic fertilizers. Organic wastes serve not only as a source of plant nutrients but also in restoring soil fertility and soil quality, thereby improving the physical, chemical and biological properties of soil. A major component of organic production is providing organic sources of nutrients to promote plant growth as well as sustain soil quality (Dimitri and Greene, 2002). One of the most abundant organic materials, locally available in Egypt is organic town refuse, which could easily be used as sources of organic material and nutrients. Large number of experiments on mineral and organic fertilizers conducted in several countries reveal that inorganic fertilizer alone can sustain the productivity of soils under highly intensive cropping systems (Singh and Jain, 2004). Optimum dose of fertilizers increase the proper growth, development and maximize the yield of sweet pepper. Therefore, the present investigation was undertaken to study the effect of P-fertilization under organic fertilization on sweet pepper plant, growth, yield and quality.

MATERIALS AND METHODS

In season of 2018, an experiment was established as field experiment to evaluate the effect of different rates of phosphorus fertilization under compost town refuse on growth, chemical content and productivity of sweet pepper plant (*Capcicum annum*) at the Experimental Farm of Faculty of Agricultural, El-Mansoura University.California Wonder seedlings were planted on the 1st week of April in both seasons, in rows 30 cm apart with an intra -row spacing of 70cm with plot area of 3 x 3.5 m in Silty clay loam field as described in Table 1.The normal agricultural practices were used for the sweet pepper production, i.e. irrigation and fertilization (except for P sources, 140 kg N as ammonium nitrate (33.5 % N), 50 kg K_2O in the form of potassium sulfate (48 % K_2O) were followed according to the recommendation of the Egyptian Ministry of Agriculture.

Table 1. soil properties of the experimental site soil.

Particle size distribution (%)				**Textural class**	**EC, dSm^{-1} 1:5 1:5**	**pH $^{1:2.5}$**	**$CaCO_3$ (%)**	**O.M (%)**	**SP (%)**
Coarse sand	**Fine sand**	**Silt**	**Clay**						
5.33	27.36	38.36	38.15	Silty clay loam	0.95	8.05	4.93	1.67	59.5

Available element, ($mg.kg^{-1}$soil)			DTPA extractable ($mg.kg^{-1}$soil)					
N	P	K Mn	Zn	Fe	Mn	Cd	Ni	Pb
53.9	6.75	102.5	0.87	3.41	1.95	0.45	1.18	3.74

The physical and chemical properties of the soil are presented in Table (1). Mechanical analysis was determined according to the methods of Haluschak, (2006). Available N, P and K weredetermined according to Reeuwijk, (2002). Fe, Zn, Cu, Ni, Pb and Cd were estimated using afumle absorbtion according to Mathieu and Pieltain (2003).

The experiment tested an experimental split- plot design with three replicates, the main plots were the rates of phosphorus fertilization (control, 25, 50, 75 and 100% from recommended dose, 60 $kg.fed^{-1}$calcium superphosphate (SP; 15% P_2O_5) added one time before transplanting and sub plots were the organic fertilizers in form of compost town refuse (with and without). Compost town refuse was taken from Mansoura manufactory for organic manure. Surface layer of the soil during soil preparation before seed sowing, at the rate of 10 $m^3.fed^{-1}$ was mixed with CTR and irrigated up to field capacity ages. Then, after two weeks for elucidate the damage on seedlings and their roots resulted from the heat of decomposition. The chemical analysis of organic manure used in this study is shown in Table 2.

Table 2. Chemical composition of the applied compost town refuse.

pH (1:10) Susp.	**EC, dSm^{-1} (1:10) Soil ext.**	**SP%**	**%**						**Available, ppm**			**mg kg^{-1}soil**		
			OM	**OC%**	**T.N**	**C/N**	**T.P**	**T.K**	**Fe**	**Mn**	**Zn**	**Pb**	**Ni**	**Cd**
7.83	4.71	95.5	21.6	12.57	0.61	20.6	0.43	0.66	45.52	19.71	9.14	9.14	1.87	2.15

Vegetative samples were taken after 75 days from transplantingto record chlorophyll content as the method described byGavrilenko and Zigalova (2003).Leaf samples were oven dried at 68 C^0 for 72 hours, then fine grinded and used to determine NPK ions percentageon the dry weight basis according to Chapman and Pratt, (1982).

The fruits were harvested five times when having attained full size for fresh use. Average fresh weight (g), number of fruits per plant, total fruit yield per plant (g/plant) and total yield (ton/fed) as well as DM% and vitamin C according to (AOAC 2000)were also recorded. Fruits samples were oven dried at 68°C for 72 hours, then fine grinded and used to determine mineral contents on a dry weight basis as N, P, K% and TSS% according to the method described in the (AOAC 2000), Fe, Zn, Mn, Cd, Ni, Pb concentrations were determined according to Kumpulainenet al., (1983) and Khazaeiet al., (2017).

The obtained data of experiments were subjected to the statistically analysis of variance procedure and means were compared using the LSD method at 5% level of significance according to Gomez and Gomez (1984).

RESULTS AND DISCUSSION

1. Yield and its components:

Yield is the most important goal and ultimate objective for which crops are grown. Average one fruit fresh weight (g), number of fruits per plant, total fruit yield per plant (g/plant) and total yield (ton/fed) as well as DM%as affected by different rates of phosphorus in presence or absence of compost town refuse are shown in Table 3.

Data in Table 3 relating to the average fresh weight (g), number of fruits per plant, total fruit yield per plant (g/plant) and total yield (ton/fed) as well as DM% of pepper plant in response to varying levels of phosphorus, revealed the significant differences. Treatment of 75% phosphorus from recommended dose (RD) attained the superiority and maximum values from previous parameters followed by 50% RD. increasing in parameters previous may be due to the beneficial role played by phosphorus for the growth of the root system epidermal osmotic adjustment and fundamental role in the number of enzimatic reaction that depends on phosphorelation. Phosphate ions availability causes plant's resistance to lodging, higher quality, early maturity of product, increase of plant growth from emergence to the beginning of flowering and pollination and consequently the crop yield will increase. The obtained results are in harmony with those of Bahuguna *et al*., 2015; Akram *et al*., 2017; Hegazi *et al*., 2017.

Results showed significant superiority of compost town refuse over the untreated plant to the average one fruit fresh weight (g), number of fruits per plant, total fruit yield per plant (g/plant) and total yield (ton/fed) as well as DM% of sweet pepper plant. These results might be discussed by the results of Ogundare*et al.* (2015) and Rajya*et al.* (2015) who resulted that, increasing in nutrient availability due to integrated use of organic and mineral fertilizers increased nutrient uptake by the plant, which in turn lead to dry matter production and tomato fruit yield.

The interactive effects of P-fertilizer and compost town refuse on studied parameters previously in Table 3, indicated that the highest mean values of these parameters recorded with using 75% from recommended dose of P-fertilization in presence of compost town refuse at rate of 10 m^3.fed.

Table 3. Effect of P-fertilization and compost town refuse as well as their interaction on yield of sweet pepper plants and its components during the seasons of the experiment.

Treatments		Average one fruit fresh weight g	No. of fruits/plant	yield/plant (g)	yield (ton/fed)	DM%
Phosphorus fertilization rates						
Control		37.85	17.67	783.50	5.71	11.86
25% P		39.90	22.00	917.33	7.06	12.76
50% P		41.02	24.33	991.00	7.85	13.27
75%P		41.58	25.83	1031.00	8.19	13.37
100%P		40.52	23.17	956.83	7.45	13.02
LSD $_{at\ 5\%}$		0.50	0.93	17.56	0.06	0.33
Compost town refuse						
Without		39.11	20.53	872.67	6.60	12.39
Compost town refuse		41.23	24.67	999.20	7.89	13.32
LSD $_{at\ 5\%}$		0.32	0.63	11.69	0.06	0.15
Interaction						
Control	Without	37.53	17.00	761.67	5.52	11.74
	Compost town refuse	38.17	18.33	805.33	5.89	11.97
25% P	Without	38.73	19.67	843.33	6.30	12.25
	Compost town refuse	41.07	24.33	991.33	7.83	13.26
50% P	Without	39.80	22.00	919.00	7.08	12.77
	Compost town refuse	42.23	26.67	1063.00	8.61	13.77
75% P	Without	40.30	23.33	956.00	7.44	12.69
	Compost town refuse	42.87	28.33	1106.00	8.93	14.05
100% P	Without	39.20	20.67	883.33	6.68	12.51
	Compost town refuse	41.83	25.67	1030.33	8.21	13.53
LSD $_{at\ 5\%}$		0.72	1.41	26.15	0.13	0.34

2. Growth parametars:

Data in Table 4 illustrated the effect of different phosphorus rates and compost town refuse on chl a, chl b and total chl in leaves of pepper plant. Table 4 showed that pepper plants fertilized with different rates of P-fertilizers increased significantly the photosynthesis content in plant leaves over the control, which recorded 5.74, 8.96, 10.50 and 7.17% for 25, 50, 75 and 100% P-fertilization respectively for chl.a. So, it means that the highest values were indicated with 75% followed by 50% P-fertilization from recommended dose. Phosphorus had an effective role on the chlorophyll pigment synthesis or chlorophyll molecule in the plant tissues.The above results are in conformity with the findings ofHegazi*et al.*, 2017;Zhu and Ozores-Hampton 2017.

Presence and absence of compost town refuse effect on photosynthesis content in plant leaves and the highest mean values recorded in presence of compost town refuse. Actually Chl a is the primary photosynthetic pigment and Chl b is the accessory pigment that collects the energy to pass on to Chl a. The obtained results are in agreement with those of Berova *et al.*, 2010; Chrysargyris and Tzortzakis, 2015.

There was a highly significant interaction between the rates of P-fertilization and compost town refuse. The highest mean values achieved with using 75% followed by 50% P-fertilization under presence of compost town refuse.

Table 4. Effect of P-fertilization and compost town refuse as well as their interaction on chlorophyll content of sweet pepper plants during the seasons of the experiment.

Treatments		Chlorophyll a ($mg.g^{-1}$ FW)	Chlorophyll b ($mg.g^{-1}$ FW)	Total chlorophyll ($mg.g^{-1}$ FW)
Phosphorus fertilization rates				
Control		0.714	0.498	1.212
25% P		0.755	0.528	1.283
50% P		0.778	0.547	1.325
75%P		0.789	0.555	1.344
100%P		0.765	0.537	1.301
LSD $_{at\ 5\%}$		0.006	0.003	0.007
Compost town refuse				
Without		0.741	0.517	1.258
Compost town refuse		0.779	0.549	1.328
LSD $_{at\ 5\%}$		0.002	0.004	0.004
Interaction				
Control	Without	0.708	0.493	1.201
	Compost town refuse	0.721	0.503	1.223
25% P	Without	0.733	0.509	1.242
	Compost town refuse	0.777	0.546	1.323
50% P	Without	0.755	0.528	1.283
	Compost town refuse	0.801	0.566	1.366
75% P	Without	0.767	0.537	1.304
	Compost town refuse	0.810	0.574	1.384
100% P	Without	0.742	0.518	1.260
	Compost town refuse	0.787	0.555	1.342
LSD $_{at\ 5\%}$		0.004	0.008	0.010

3. Chemical composition:

N, P and K concentration in leaves:

Data in Table 5 show the effect of phosphorus rates in presence and absence of compost town refuse on N, P and K concentration of sweet pepper leaves.

Table 5. Effect of P-fertilization and compost town refuse as well as their interaction on N, P and K concentration of sweet pepper plants during the seasons of the experiment.

Treatments		N%	P%	K%
Phosphorus fertilization rates				
Control		2.14	0.173	2.33
25% P		2.52	0.192	2.71
50% P		2.74	0.209	2.91
75%P		2.84	0.234	3.04
100%P		2.62	0.246	2.82
LSD at 5%		0.05	0.004	0.06
Compost town refuse				
Without		2.38	0.203	2.57
Compost town refuse		2.76	0.218	2.95
LSD at 5%		0.03	0.003	0.03
Interaction				
Control	Without	2.10	0.168	2.26
	Compost town refuse	2.19	0.178	2.40
25% P	Without	2.29	0.188	2.50
	Compost town refuse	2.74	0.195	2.93
50% P	Without	2.52	0.204	2.69
	Compost town refuse	2.96	0.213	3.14
75% P	Without	2.60	0.222	2.81
	Compost town refuse	3.08	0.246	3.27
100% P	Without	2.41	0.233	2.60
	Compost town refuse	2.82	0.260	3.04
LSD at 5%		0.07	0.006	0.07

The average values of N, P and K concentration in leaves as affected by P-fertilization rates were indicated in Table 5. All rates of P-fertilization significantly increased concentration of nutrients in leaves and the average values recorded with using 75% followed by 50% from recommended dose. It might be because of that fertilization with phosphorus assumes a role for enhancing the growth of root system and, consequently improvement the capacity of root to absorb more nutrients. Also, such increases might be due to corresponding increases in N, P, K availability in the studied soil. Our result is in line with that of the study of Akram *et al*., 2017; Hegazi *et al*., 2017.

Regarding to the effect of organic manure on N, P and K concentration in Table 5, it was found that adding compost town refuse at rate of 10 m3.fed. increased the concentration of these nutrients compared to the untreated plants. The increase might be attributed to the organic manures roles in soil properties, which produce humus substances wherein enhancement the physical and chemical soil properties and leading to increasing nutrients release availability, i.e., N, P and K uptake. Moreover, incorporation of organic materials in soils can further increase available contents of NPK by increasing CO_2 forming H_2CO_3 in the soil solution. In the same connection, it was found that increasing of mineral N, P & K fractions may be due to application of organic amendments such as compost town refuse. These increases were reported by Altintas and Acikgoz 2012; Alhrout, 2017.

A highly significant interaction between P-fertilizer rates and organic manures had an effect on the concentration of N, P and K in leaves of sweet pepper. During the season the treatment of 75% P-fertilization in presence of compost town refuse maintained significantly higher N, P and K concentration than other treatments as shown in Table 5.

4. Quality of sweet pepper fruits:

Concentration of studied nutrients:

The results obtained with different rates of phosphorus fertilization in presence or absence compost town refuse on concentration of studied nutrients in fruits of sweet pepper plant are presented in Table 6.

Table 6. Effect of P-fertilization and compost town refuse as well as their interaction on N, P, K, Fe, Mn and Zn concentration of sweet pepper fruits during the seasons of the experiment.

Treatments		N%	P%	K%	Fe $mg.Kg^{-1}$	Zn $mg.Kg^{-1}$	Mn $mg.Kg^{-1}$
Phosphorus fertilization rates							
Control		1.87	0.134	2.04	29.31	10.47	22.17
25% P		2.26	0.151	2.43	31.36	12.49	23.94
50% P		2.48	0.171	2.64	31.09	12.26	23.66
75%P		2.59	0.192	2.77	30.82	11.95	23.39
100%P		2.37	0.201	2.55	29.88	11.09	22.64
LSD at 5%		0.03	0.004	0.05	0.21	0.16	0.16
Compost town refuse							
Without		2.13	0.164	2.30	30.16	11.34	22.89
Compost town refuse		2.50	0.176	2.67	30.82	11.96	23.44
LSD at 5%		0.04	0.002	0.02	0.08	0.08	0.06
Interaction							
Control	Without	1.81	0.129	1.99	29.17	10.33	22.05
	Compost town refuse	1.93	0.138	2.10	29.44	10.61	22.29
25% P	Without	2.04	0.147	2.22	30.92	12.03	23.54
	Compost town refuse	2.49	0.155	2.64	31.79	12.95	24.35
50% P	Without	2.26	0.166	2.42	30.62	11.87	23.28
	Compost town refuse	2.71	0.175	2.86	31.56	12.65	24.03
75% P	Without	2.37	0.183	2.56	30.37	11.55	23.03
	Compost town refuse	2.81	0.201	2.98	31.26	12.34	23.75
100% P	Without	2.16	0.193	2.33	29.73	10.93	22.53
	Compost town refuse	2.57	0.210	2.78	30.04	11.25	22.76
LSD at 5%		0.09	0.005	0.05	0.18	0.17	0.14

Table 6, showed that significantly increase was happened due to the soil application of different rats of phosphorus fertilization comparing with the untreated plants. Treatment of 75% recorded high values of N and K% in fruits of sweet pepper plant followed by 50% then decreased with 100% P-fertilization, this increase in line with that of the study of Akram*et al*., 2017; Hegazi*et al.,* 2017. On contrast was P% in fruits increased with increasing P-fertilization till 100%, the previous findings are in conformity with those of Deshpande and Lakhdive (1994), who reported that phosphorus application increased P uptake and content in leaf, stem and reproductive part like seed. While nutrients of Fe, Mn and Zn in sweet pepper fruits decreased with increasing P-fertilization comparing with the control which recorded the lowest values were the highest values recorded with 25% of P-fertilization. This reduction can be explained on the base of antigonism effect and also by taking into account different mechanisms, but as Marschner(1995) remarked, the main effect is considered to be related with the formation of insoluble phosphate compounds for microelements. Similar result was happened in study of Çimrin*et al*., 2010.

Data in Table 6, clearly show that soil application with organic manure as compost town refuse form significantly affected nutrients by fruits of sweet pepper plant compared with the untreated plants. It is known that compost is used as a soil amendment which improves holding capacity of soil and also increases availability of elements. These increases were also reported by Altintas and Acikgoz 2012;Alhrout, 2017.

The result in the same Table, illustrated that the interaction effect among treatments under investigation, significantly affected the average values of N, P, K, Fe, Mn and Zn concentration in sweet pepper fruits by adding different rats of P-fertilization under applying compost town refuse. The highest values of N, P, K, Fe, Mn and Zn contents were generally attained in plant treated with soil application of 75% P-fertization grown under compost town refuse for N and K%, then 100% P-fertilization under organic fertilization and decreased at 25% P-fertilization for Fe, Mn and Zn under compost town refuse.

Heavy metals in fruits:

Table 7, indicated the effect of P-fertilization and compost town refuse as well as their interaction on heavy metals Pb, Cd and Ni (mg.Kg^{-1}) in sweet pepper fruits.

Illustrated data in Table (7), revealed the effect of P-fertilization on Pb, Cd and Ni (mg.Kg^{-1}) in sweet pepper fruit. All present treatment significantly affected content of Pb, Cd and Ni in fruits, all treatments increased the heavy mineral content comparing with the control. In addition,the highest mean values were recorded with using 100% P-fertilization.

Concerning the effect of compost town refuse, it could be noticed that heavy metals under investigation increased by using this form of organic fertilization comparing with the untreated plants. This may be due to the fact that CTR containing the highest concentrations of heavy metals and the CTR fractions contributing the total amount of heavy metals in soil which reflected on the plant Similar findings were observed in Studies with Awokunmi *et al.,* (2015); Nanven*et al*., (2015); Danilcenko *et al.,* (2016).

Table 7. Effect of P-fertilization and compost town refuse as well as their interaction on Pb, Cd and Ni concentration of sweet pepper fruits during the seasons of the experiment.

Treatments		Pb mg.Kg^{-1}	Cd mg.Kg^{-1}	Ni mg.Kg^{-1}
Phosphorus fertilization rates				
Control		6.94	0.886	3.71
25% P		7.36	1.189	4.10
50% P		7.75	1.500	4.42
75%P		8.25	1.857	4.88
100%P		8.44	1.941	5.04
LSD $_{at\ 5\%}$		0.13	0.017	0.15
Compost town refuse				
Without		7.61	1.388	4.31
Compost town refuse		7.88	1.561	4.55
LSD $_{at\ 5\%}$		0.05	0.009	0.08
Interaction				
Control	Without	6.84	0.809	3.61
	Compost town refuse	7.04	0.963	3.81
25% P	Without	7.26	1.113	3.99
	Compost town refuse	7.47	1.264	4.21
50% P	Without	7.65	1.423	4.34
	Compost town refuse	7.85	1.576	4.49
75% P	Without	8.04	1.721	4.72
	Compost town refuse	8.45	1.994	5.05
100% P	Without	8.27	1.873	4.89
	Compost town refuse	8.62	2.008	5.19
LSD $_{at\ 5\%}$		0.11	0.021	0.17

As for the interaction effect between the data under investigation found that using P-fertilization at the rate of 100% P-fertilization under application of compost town refuse realized the highest mean values of heavy metals in pepper fruits.

TSS% and Vitamin C (mg/100g):

Results in Table 8, show the mean values of TSS% and V.C (mg/100g) as affected by P-fertilization and compost town refuse as well as their interaction.

It has been reported that the addition of P-fertilization to soil way increased significantly TSS% and V.C mg/100g as indicated in Table 8. The data recorded than highest values were achieved with using 75% followed by 50% P-fertilization and decrease at 100% P-fertilization comparing with untreated plants.This response may be due to factors in the soil affecting phosphorus availability (Eltelib*et al*., 2006). It is known that supply of phosphorus is usually associated with a significant increase in number and mass of roots which resulted in absorption of mineral nutrients from soil including nitrogen resulting in increased growth and total chlorophyll. In this respect, high phosphorus content and high water solubie from gave the highest content of plant, nutrients, TSS% and Vit C.These findings are in agreement with these obtained by Çimrin*et al*., 2010; Akram*et al*., 2017; Hegazi*et al*., 2017.

Using compost town refuse as a source of organic fertilization is indicated in the same Table, It increased significantly TSS% and V.C (mg/100g) compared with the untreated plants with no organic fertilization. The beneficial effects of organic manure sources on physico chemical and biological characteristics of soil, which in turn influence the growth and increase plant production (Murphy, 2014)

Table 8. Effect of P-fertilization and compost town refuse as well as their interaction on TSS% and Vitamin C (mg/100g) of sweet pepper fruits during the seasons of the experiment.

Treatments		TSS%	V.C mg/100g
Phosphorus fertilization rates			
Control		5.95	123.42
25% P		6.27	130.97
50% P		6.43	135.00
75%P		6.52	137.30
100%P		6.34	133.13
LSD $_{at\ 5\%}$		0.05	1.14
Compost town refuse			
Without		6.15	128.29
Compost town refuse		6.45	135.63
LSD $_{at\ 5\%}$		0.03	0.78
Interaction			
Control	Without	5.91	122.30
	Compost town refuse	5.99	124.53
25% P	Without	6.10	126.63
	Compost town refuse	6.43	135.30
50% P	Without	6.23	130.67
	Compost town refuse	6.62	139.33
75% P	Without	6.33	133.07
	Compost town refuse	6.71	141.53
100% P	Without	6.17	128.80
	Compost town refuse	6.51	137.47
LSD $_{at\ 5\%}$		0.07	1.75

Interaction effect between treatments under investigation significantly increased TSS% and V.C (mg/ 100g) as showed in Table 8. The highest values recorded with using 75% P-fertilization under organic fertilization.

CONCLUSION

From the above mentioned results it is clearly established that P-fertilization and compost town refuse are sources critical nutrients needed for vegetative growth, total fruit yield, fruit quality and chemical composition of sweet pepper plants. In terms of effect of these nutrients alone or in combination, it can be concluded that using 75% from P-fertilization and compost town refuse had a significant effect on growth, yield, quality and nutrieuts content of sweet pepper plants under the condition of the experiment. So, it could be recommended this rate for farmers as an economically fit fertilizer treatment for obtaining high yieid and quality of sweet pepper crop.

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المحصول وجوده ثمار نبات الفلفل تحت تاثير التسميد الفوسفاتى وسماد قمامه المدن

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أجريت تجربه حقليه خلال موسم 2018 في قطاعات منشقه لثلاث مكررات لدراسه تأثير معدلات مختلفه من السماد الفوسفاتى (كنترول، 25، 50، 75 و 100% من الموصى به وهو60 كجم/ف سوبر فوسفات) كمعاملات رئيسيه في وجود او عدم وجود سماد القمامه كمعاملات منشقه على نمو النبات والمحصول و التركيب الكيماوى وجوده ثمار نبات الفلفل في المزرعهالخاصه بكليه الزراعه– جامعه المنصوره. أوضحت النتائج ان نمو نبات الفلفل تاثر معنويا باضافه السماد الفوسفاتى وسجلت أعلى القيم بإضافه 75% يليها 50% من الموصي من السماد الفوسفاتى لكل من (الوزن الجاف للنبات، عدد الثمار/نبات، المحصول الكلى للثمار جم/نبات و طن/ فدان بالاضافه الى النسبهالمئويه للوزن الجاف) كذلك أدت لزياده في الصبغات الملوثه و المواد الصلبه وفيتامين س و العناصر في الورقه والثمار (نيتروجين، فوسفور، بوتاسيوم) بينما انخفضت قيم الحديد و المنجنيز و الزنك بزياده التسميد الفوسفاتى حيث سجلت اعلى القيم عند 25% من التسميد الفوسفاتى. بالنسبه للعناصر الثقيله زادت باضافه التسميد الفوسفاتى وسجلت اعلى القيم عند اضافه 100%. جميع القيم تحت الدراسه سجلت اعلى القيم بإضافه سماد القمامه. ولذلك يمكن التوصيه باستخدام 75% من التسميد الفوسفاتى في وجود سماد القمامه للحصول على محصول أمثل من الفلفل حيث استخدام السماد العضوى قد أدى لانخفاض استخدام السماد الفوسفاتى وبالتالى انخفاض النفقات.