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EFFECT OF DIFFERENT LEVELS OF COMPOST ON AIR AND SOIL BORNE DISEASES, VEGETATIVE GROWTH AND YIELD OF CUCUMBER UNDER PROTECTED CULTIVATION .

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ABSTRACT

Greenhouse experiments has been conducted during 2006 and 2007 season at Sakha Greenhouse Station, Kafr El-Sheikh to study the impact of different compost levels (crop residuals) on damping-off caused by *Pythium ultimum, Fusarium solani* and *Sclerotinia sclerotiorum* on growth productivity and quality of cucumber as well as their effect on powdery and downy mildew diseases .The applied compost levels were 0.68, 1.36, 2.05, 2.73 and 3.41 kg/m^2 while the control treatment was cattle manure fertilizers . Application of 0.68 and 1.36 kg/m^2 compost gave maximum protection against post emergence damping-off and reduced the disease incidence to 7.5 and 11.25%, respectively compared with the fungicide Topsin M_{70}(1.25%). While, the compost levels of 2.73 & 3.41 kg/m^2 gave less effect in this respect. The levels of compost 0.68 &1.36 kg /m^2 were most effective in controlling powdery and downy mildew and 1.36 kg/m^2 recorded the best results of the plant growth, i.e. stem length, leaf area, number of branches and leaves, total chlorophyll as well as fresh and dry weight followed by the compost levels of 0.68, 2.73 and 3.41 kg/m^{2,} respectively. Data also showed that the highest increased in cucumber yield , number of fruits, diameter and length of fruits had been achieved when compost at the rate of 2.05 and1.36 kg/m^2 were applied.

INTRODUCTION

Cucumber represents one of the important and economic vegetable crops in Egypt under plastic-house cultivation. It is exposed to various plant disease i.e soil borne diseases (damping-off , root-rot , wilt and stem rot) caused by *Fusarium spp, Pythium ultimium and Sclerotinia sclerotiorum* and air borne diseases (powdery and downy mildew) sush disease affect plant stand causing great losses in cucumber fruit yield. Several reports suggested that compost may alter resistance of plants to disease. Trankner, (1992) observed that powdery mildew of wheat and barley was less sever with compost application in amended than in unamended soils. Roe *et al*., (1993) reported lower incidence of early blight and bacterial spot of tomato on plants grown in compost-amended soil than in the control. Tuitart *et al*, (1998) found that compost from two commercial composting facilities suppressed growth of *Rhzoctonia. solani* in potting mixtures with 20% of the product when the compost was fresh. The effect on suppressiveness depends on curing time and origin of the compost. Zhang *et al*., (1998) found that a bio-control agent-fortified compost mix was suppressive to several diseases caused by soil borne plant pathogen, where it induced systemic acquired resistance (SAR) in cucumber against anthracnose caused by *Colletrichum orbculare* and in arabiolopsis against bacterial speck caused by *Pseudomonas syringae*

. Compost type municipal bio-solids (MC)and leaves (LC)at doses (40,80,160,320 mg/cm^3) on suspension of damping-off different hosts. In dose-response experiments, LC was suppressive at dosage rates 80 mg compost/cm^3 of sand, whereas MC was suppressive at a rate of 80 mg/cm^3. Both composts significantly suppressed damping-off caused by *Pythium* spp. i.e *P .irrgulare* 85 % suppression in MC and 60 % suppression in LC. Under these conditions, LC significantly suppressed damping-off of cucumber seedlings by *P.aphenidermatum* (20% supperssion) or *P.myriotylum* (37% suppression). Increasing productivity and improving fruit quality of cucumber, tomato pepper and cantaloupe are mainly depended on using healthy and high quality seedlings. Plant growth is affected by physical and chemical properties of media substrates.Tomato plants grown soil from field plots amended with composted forms of paper mill residuals (PMR) exhibited reduced symptoms of bacterial speck caused by *Pseudomonas syrinqae* compared with plants grown in soil from field plots amended with a non – composted PMR or non-amended soils. The reduction of foliar disease symptoms ranged from 34 to 65% depending on the type of composted PMR amendment. It is concluded that plants grown in soils with composted PMR amendments were more resistance to disease caused by *P.syringae* due to the induction of plant defenses, similar to systemic acquired resistance(Ben-Yephet and Nelson, 1999).

Vallad *et al.* (2003) conclude that plants grown in soils with composted PMR . amendments were more resistance to disease due to the induction of plants defenses, similar to systemic acquired resistance. Horticultural potting media have amended with compost to enhance biological suppression and with $Al_2(so_4)_3$ to enhance a biotic suppression of plant pathogen. Potting medium enhanced suppression of *Phytophthora parasitica* and biotic suppression occurred before biological suppression developed. (Fichtner *et al.* 2004). Peatmos based potting mix was amended with either of two composted swice wasres CSW, and CSW_2 at rates from 4 to 20%(v/v.) to evaluate suppression of impatiens caused by *Rhizoctania solani* and *pythium ultimum*. Their results suggest that enhanced microbial activity, functional and population diversity of stable compost –amended mix associated with supressivenss *Rhizoctonia* and *Pythium* damping –off in impatiens.(Diab and Benson2003). Zang *et al*.,(1996) stated that peroxides activity a putative marker of systemic acquired resistance (SAR) in cucumber was significantly enhanced in plant growth in compost amended mixes than in the peat mixs. The activity peroxidase isozyme in the leaf of cucumber plants was greater when plants were grown in compost as well as after prior inoculation with *Pythium spp* and *Colletotrichum orbiculare* than if grown in peat and with or without prior inoculation. The interaction of compost and the pathogen appreared critical for rapid activation systematic acquired resistance associated gene expression in cucumber plants. Stanely, (1991) indicated that the size of individuals units of cucumber can be significantly potential, market selection and final use. He added that size may be determined by one of three general means:(1) Dimension (length , width , diameter) (2)Weight (3)Volume. . El-sheikh *et al*., (1993) showed that adding chicken manure at the rate of 45 kg/540 m^2 at each irrigation significantly resulted in higher yield than the chemical fertilizer treatments. They added that, the increase in total yield due to injected extract of chicken manure at 45 kg per 540 m^2 each irrigation was 20.7% over the control (chemical fertilizer). The increase in crop productivity, though less marked and less immediate than that obtained with the addition of mineral fertilizers, has been found to be longer-lasting, probably due to more progressive release of the nutrients. A further effect observed is a particular stimulation of root . The positive effects of some composts have been found to diminish at higher dosages due to the onset of phytotoxic effects. (Chu and Wong, 1984 and Wang *et al* ., 1984) .

Eissa, (1996) reported that adding organic manures from different sources, viz., cattle, CM or PM at the rate of 20 kg/row (9 m long) significantly increased cucumber fruit yield. CM or PM showed the highest values in this respect. On the other hand, the highest uptake values of N.P and Fe were associated with PM application, while higher K uptake was associated with the addition of CM. Abou- Hussein, (2001) using chicken and compost manure reported that such fertilizers at different levels increased plant vegetative growth expressed as plant height, number of leaves and branches as well as dry matter of plant foliage

Aly, (2002) studied the effect of applying organic and chemical fertilizers on cucumber yield and fruit characteristic. He found that the organic treatment (10m^3 compost) gave significantly greater early, exportable and total yield than in organic (chemical) treatment. He also added that average fruit weight, length, diameter, length / width ratio, fruit firmness, T.S.S., total sugar, chlorophyll and ascorbic acid content were significantly increased by using compost of organic materials over the inorganic treatment.

The objective of this study was to investigate the response of the soil borne and foliar diseases ,vegetative growth and yield of cucumber to compost as alternative of organic fertilizers.

MATERIALS AND METHODS

This experiment was carried out under plastic-houses conditions at the protected agriculture location, Sakha during two successive spring seasons of 2006 and 2007 to study the effect of different compost levels on growth, productivity and quality of cucumber plants in addition to their effect on disease control i.e wilt or root rot, damping-off and stem rot *(Fusarium oxysporium, F.solani, Pythium ulyimum* and *Sclerotinia sclerotioum).* Besides, these fungi were isolated from disease cucumber plants, powdery and downy mildew disease severity to improve their growth, flowering, fruit yield and quality.

The chemical and physical properties of the experimental soil were determined before planting, data are shown in Tables (1 and 2)

Cucumber hybrid f_1 delta star seeds were sown on 15^{th} of January in seedling trays (40x67x6 cm)filled with a mixture of 50% peat and 50% vermiculate V/V. Each 50 kg of the mixture were fertilized with 150 gm ammonium nitrate(33.5% N) mono calcium phosphate(15.5% P_2O_5), 100gm potassium sulphate (48% K_2O), 16 gm magnesium sulphate (16% MgO_2) and

4000 gm calcium carbonate. In addition to 25 gm of Penlet fungicide were also applied to each 50 kg of the mixture.

All seedling were sprayed twice with 1 g/l foliar fertilizer (Kristanlon) after one and two weeks from sowing. A complete randomized blocks design was used. The experiment treatments which were used in this study (media mixture) for seedlings production were as follow:

1- Cattle manure (control).
2- A 0.68 kg compost per m^2.
3- A 1.36 kg compost per m^2.
4- A 2.05 kg compost per m^2.
5- A 2.73 kg compost per m^2.
6- A 3.41 kg compost per m^2.

Fungicide treatment :

a- Post emergence damping off :

Seedlings, 30 days after planting were soaked into Topsin M_{70} (3 g/l) for 15 minutes.

Table(1): Soil physical analysis

Season	Texture	Sand (%)	Silt (%)	Clay (%)
2006	Clay	32.4	29.8	37.8
2007	Clay	33.4	28.2	38.4

Table(2): Soil chemical analysis

Season	PH	EC	N	P	K	S	Na	Ca	Mg	Fe	Zn	Mn	Cu	CaCO3
			ppm											
2006	7.6	3.42	70	64	1312	14.6	2.95	8	4.2	18.2	1.6	8	11	2.2
2007	7.9	4.37	50	100	1472	12	2.71	7	2.4	14.0	1.9	7.6	10.4	3.1

b- Powdery and downy mildew diseases:

The plants received the first spray as soon as infection signs appeared. Domark fungicide was used at the rate of 50 cm/100 L against powdery mildew and Equagene Pro fungicide was used at the rate of 45 g/100 L against downy mildew. The chemical analysis of the compost were accomplished on the dry weight basis at the Environmental, Water and Soil Research Institute and the data is summarized in Table 30 days after seed sowing, seedlings were transplanted in an unheated plastic-house (60x16x3.5 m) which was prepared according to the common practices. The plastic-house had been divided into ten ridges for cultivation, each bed was 100 cm wide, 60 m long and 20 cm high and 50 cm apart. Cucumber seedlings were transplanted at a spacing of 50 cm using double row on each ridge. The treatments were arranged in complete randomized blocks design with five replicates, each plot had 15 plants. Agricultural practices, managements and fertigation were carried out as recommended by Ministry of Agriculture, Egypt.

Experimental parameters.

Vegetative growth characters were recorded after 65 days from transplanting using five plants from each treatment per plot for : plant height (cm), no. of leaves / plant, no. of branches /plant, leaf area (cm^2) and total chlorophyll content(%). Fruit yields /plant were recorded every two days, respectively. Data of the two experiments were statistically analyzed,according to Snedecor and Cochran (1972).

Chlorophyll content in cucumber leaves were determined in the fifth leaf from the growing tip of 10 plants by a spectrophotometer using N. N-Dimethyl formamide according to Moran (1982).

Table(3): Chemical an lysis of the used composte:

Chemical analysis	
Weight of m^3	100 kg
Moisture	13.2%
Ph(1:10)	6.31
Ec(1:10)	0.95 ds/m
Total	0.53%
Ammonium nitrogen	113.0 ppm
Nitrate nitrogen	**----**
Organic matter	95.01%
Organic carbon	55%
Ash	4.99
C:N ratio	104:1
Total phosphorus	0.05%
Total potassium	0.45%
Water saturation percentage	1000

RESULTS AND DISCUSSION

1- Post-emergence damping-off of cucumber plants:

The resulted presented in Table(4) show that, all treatments used for compost application differed significantly in their effect. Increasing compost levels increased the percentage of post-emergence damping-off and decreased the percentage of survival plants and the loss of yield was also increased. The aim of fertilizer was to increase the nature fitness of cucumber plants to disease infection, if we consider plant nutrition one of possibilities enhancing other control measures against a given pathogen and can incorporate into the integrated control system.

Data also revealed that, adding 0.68 and 1.36 kg compost to the soil gave the lowest percentage of post-emergence damping-off (7.5and 11.25%), while adding 2.73 and 3.41 kg compost to the soil were less effective in reducing the diseases incidence and gave (21.25 and 27.5%) damping-off, when compared with control (32.5 %). The level of compost (2.05 kg) fell in between, Topsin M_{70} fungicide application had the best effect in reducing the percentage of damping-off (12.5%). Zang *et al*., (1996) found that composted spruce and pine bark-amended mixs induced systemic aquired resistance (S.A.R) in cucumber against *Pythium* root rot and anthracnose caused by *colletotrichum orbiculare*. Also they stated that the interaction of compost and the pathogen appeared critical for rapid activation of systemic aquard resistance associated gene expression in cucumber plants. Tuitert *et al*.,(1998) found that compost from two commercial composting facilities suppressed growth of *R.Solani* in potting mixtures with 20% of the product when the compost was fresh. The effect on suppressiveness depends on curing time and origin of the compost.

The results obtained in 2006were more or less similar to those obtained during 2007 season. These results are in line with those obtained by Ben-Yephet and Nelson(1999) who found that, compost type municipal biosolids (MC) leaves (LC), and compost dose (40,80,160,320 mg/cm^3) induced suppression of damping-off caused by different *Pythium* isolates obtained from different hosts. Indose-response experiments, LC was suppressive at dosage rates 80 mg compost/cm^3, MC was suppressive at 40 mg compost/ cm^3. Both composts significantly suppressed damping-off caused by *Pythium spp*. (approximately 60.5% suppression in both composts). Bulluk and Ristaino (2002)indicated that some organic amendments, such as cotton-gin trash, reduced the incidence of southern blight caused by *Sclerotium rolfsii* in processing tomato and also enhanced populations of beneficial soil microbes. Diab *et al*., (2003) suggested that enhanced microbial activity, functional and population diversity of stable compost – amended mix were associated with suppressiveness to *Rhizoctonia* damping-off in impatiens. Competition among microbial population for available carbon or nitrogen has been proposed as the principal mechanism of disease suppression.The mechanisms proposed include mycoparasitism, iron competition, production of inhibitors or hydrolylic enzymes by soil microflora and interaction with some saprophytes. Horticultural potting media have been amended with compost to enhance biological suppression and with $Al_2(SO_4)_3$ to enhance abiotic suppression of plant pathogens Fichtner *et al.,*(2004).

Table (4) : Effect of different levels of composts fertilizer and Topsin M70 on post-emergence damping-off of cucumber plants under plastic-houses conditions at Sakha location.

Compost (Kg/m^2)	2006		2007		Mean of the two seasons	
	Disease incidence	Survival (%)	Disease incidence	Survival (%)	Disease incidence	Survival (%)
0.68	10.0	90.0	5.0	95.0	7.5	92.5
1.36	12.5	87.5	10.0	90.0	11.25	88.75
2.05	20.0	80.0	12.5	87.0	16.25	83.75
2.73	25.0	750	17.5	82.5	21.25	78.75
3.41	30.0	70.0	25.0	75.0	27.5	72.5
Topsin M_{70} 3g/L	2.5	97.5	0.0	100.0	1.25	98.75
Control	35.0	65.0	30.0	70.0	32.5	67.5
L.S.D at 5 %	4.25	5.32	3.98	5.72	-------	--------

2- Disease severity of powdery and downy mildew:

Data present in Table (5) indicated that, the fungicides (Domark and Equagen Pro) applications had the best effect on reducing powdery and downy mildew disease severity to be 10.38 and 9.23 % , respectively and these were correlated by substantial increase in the yield. All the levels tested of compost differed significantly in their response to powdery and downy mildew infection .Increasing compost levels increased the disease severity infection in both powdery and downy mildew diseases . Data also revealed that, compost level 0.68 kg showed the lowest percentage of infection in powdery and downy mildew disease 29.84 and 21.39 %, respectively. While the highest percentage of infection was observed with level 3.41 kg (66.00 and 40.12 %). The differences between the two levels was significant, when compared to control (55.98 and 40..58 %) respectively. The other treatments of compost levels were in between. These results are in agreement with those obtained by Weltzien (1992) who stated that foliar disease also may be affected by composts corporated into soil, when the systemic acquired resistance (S.A.R) has been proposed as a mechanism under lying this activity . Yahalem *et al.,(* 1994) found that compost extracts reduced the severity of foliar diseases such as powdery mildew of grape caused by *Uncinula necator* downy mildew of grape caused by *Plasmopara viticola*, grey mold of strawberries and late blight of potato. Compost extracts contain biocontrol agents as well as unidentified chemical factors that appears to play a role in efficacy. These result are line with those obtained by Tranker (1992) and Roe *et al.,* (1993) who found that powder mildew of wheat and barley and early blight of tomato were lower incidence in compost-amended than in unamended soils. Krause *et al.,*(2003) concluded that systemic suppression of foliar disease induced by compost amendments potting mixes with biocontrol agents such as T_{382} that induce systemic resistance in plants can significantly increase the frequency of systemic disease control obtained with natural compost amendments. Stone *et al.,* (2003) suggested that the application of raw and composted paper mill residuals (PMR)to sandy soils has the potential control several foliar diseases. Vallad *et al.,* (2003) stated that the reduction of foliar disease symptoms ranged between 34 and 65% depending on type of composted PMR amendment, and was associated with reduced *Pseudomonas syringae pv. Tomato*. They concluded that plants grown in soils with composted PMR amendments were more resistant to disease caused by *P.syringe* due to the induction of plant defenses similar to systemic acquired resistance.

Table (5): Effect of different levels of compost fertilizer on disease severity (%) of powdery and downy mildew under plastic houses conditions at Sakha location.

Compost (Kg/m²)	Disease severity, (%)				Mean of two season	
	2006		2007			
	Powdery mildew	Downy mildew	Powdery mildew	Downy mildew	Powdery mildew	Downy mildew
0.68	23.25	28.28	36.42	14.50	29.84	21.39
1.36	32.24	38.28	39.25	15.72	35.75	27.00
2.05	37.29	46.05	42.69	15.83	39.99	30.89
2.73	42.67	53.25	47.75	17.25	45.21	35.25
3.41	57.50	56.49	74.50	23.75	66.00	40.12
Fungicides	6.80	15.62	13.95	2.84	10.38	9.23
Control	54.62	60.50	57.34	20.66	55.98	40.58
L.S.D. 5%	5.02	10.42	7.94	3.27	-----	-----

3- Plant growth

Data listed in Table (6) represent the effect of different levels of compost on plant growth during the two successive seasons of 2006 and 2007. It could be noticed that application of the compost with a rate of 2.05 kg/m2 to cucumber plants increased vegetative growth characteristics expressed as stem length, leaf area, number of branches and leaves per plant as well as fresh and dry matter percentage for leaves and stems per plant compared to the other fertilizer treatments. Thus, the compost level of 2.05 kg/m^2 recorded the highest values of the vegetative growth of cucumber plants during the two seasons 2006 and 2007. These results may be due to the organic manures which support the number of leaves, fresh and dry matter % of plant through the stimulation effect on the meristematic activity of tissues, where these organic manures are rich in NPK and other nutrients which are compulsory for plant growth.

Data presented in the same Table revealed that, the compost level of 3.41 kg/m^2 recorded the least effect on cucumber growth i.e stem length, leaf area, number of branches and leaves in addition to fresh and dry weight per plant. There were no significant differences between the compost level of 3.41 kg/m^2 and the control treatment.

Generally, the compost level of 2.05 kg/m^2 (plastic-house area) achieved the best growth parameters of cucumber plants followed by the compost levels of 1.36, 0.68 and 2.73 kg/m^2 . However, the compost level of 3.41 kg/m^2 and the control treatment (inorganic fertilizer) gave the lowest values of growth parameters for cucumber production under unheated plastic-houses conditions. Finally, it could be concluded that using compost in the media of cucumber production resulted in enhancement of plant growth which was better than the control. The obtained results agreed those of Abo-Hussin (2001).

Table (6) : Effect of the different rates of compost on vegetative growth of cucumber plants at 2006 and 2007 seasons.

Compost (Kg/m^2)	Stem length (cm)		Leaf area (cm^2)		No . of branches /plant		No. of leaves / plant		Fresh weight (gm/plant)		Dry weight (gm/plant)	
	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Control	339	261	187	117	7.3	4.8	56.9	39.8	940.0	599.9	83.8	55.7
0.68	350	274	215	140	7.8	4.7	62.4	43.0	993.3	663.5	96.9	58.2
1.36	359	279	222	146	8.7	5.1	63.6	45.1	1040.0	685.7	106.6	70.2
2.05	366	289	236	159	9.6	5.8	66.4	49.3	1153.3	808.8	132.3	88.6
2.73	339	271	210	136	7.6	4.5	61.4	40.9	976.7	635.2	86.8	56.7
3.41	291	245	184	115	5.4	4.4	55.4	38.9	930.0	556.5	86.1	53.7
L.S.D 0.05	12.73	12.73	12.09	8.81	2.89	0.75	15.03	4.67	200.34	101.56	16.60	12.46

4- Yield:

Data presented in Table (7) show the effect of different levels of compost on total yield of fruits and number of fruits. The highest fruit yield 4.354 kg/plant or 21.770 kg/plot were producted by fertilizing cucumber with compost at 2.05 kg/m^2 followed by 1.36, 0.68, 2.73 and 3.41 kg/m^2 during 2006season. Data also indicated that increasing or decreasing the compost level than2.05 kg/m^2 tended to decrease the total yield of fruits during 2006 and 2007seasons. Meanwhile, the treatment which received 3.41 kg per m^2 recorded the minimum total yield of fruits(2.188 kg/plant or 10.490 kg/plot) compared with the other compost treatments during 2007season. However, the number of fruits per plant and number of fruits per m^2 were similar in terms of the total yield where, the compost level of 2.05 kg recorded the highest number of fruits and productivity of cucumber compared with the other compost levels of 0.68, 2.05, 2.73 and 3.41 kg/m^2.

It could be concluded that in order to produce higher total fruit yield of cucumber plants compost at the rate of 2.05 kg/m^2 may be applied. The increase in total produced yield , might be due to the function of the increase in the vegetative growth and dry matter contents of the plant and turn to the increase in first number one and average fruit weight, as reported by Eissa(1996).

Table (7) : Effect of the different rates of compost on fruit yield and number of cucumber plants at 2006 and 2007 seasons.

Compost	Yield (kg/plant)		Yield (kg/plot)		No. of fruits/plant		No. of fruits/m^2	
(Kg/m^2)	2006	2007	2006	2007	2006	2007	2006	2007
Control	2.722	2.256	13.860	11.280	25.007	21.703	62.517	54.260
0.68	3.557	2.627	17.785	13.135	33.62	28.586	92.517	71.473
1.36	3.852	2.886	19.260	14.430	36.297	31.117	102.03	82.193
2.05	4.354	3.245	21.770	16.225	42.182	36.309	116.46	96.277
2.73	3.393	2.230	16.965	11.150	32.110	25.877	89.270	64.693
3.41	3.281	2.188	16.405	10.940	34.397	18.943	83.993	47.357
L.S.D. 0.05	0.37	0.355	1.181	1.390	2.601	3.841	4.001	5.604

5- Cucumber quality:

Table (8) shows the quality of cucumber fruits as affected by different levels of compost at 2006 and 2007seasons. The results clear that the compost levels had a significant influence on the average length and diameter of fruit as well as dry matter percentage and total soluble solids (T.S.S) percentage during both seasons. It can be concluded that the maximum values of dry matter, and T.S.S, as well as fruit length and diameter have been obtained with the compost levels of 1.36 and 2.05 kg/m^2. While, the compost level of 3.41 kg/m^2 recorded minimal values of quality parameters during the two seasons .

The data listed in Table (8) demonstrated that the compost level of 2.05 kg/m^2 improved the quality of cucumber fruits such as fruit length diameter, dry matter and T.S.S followed by the compost levels of 1.36, 0.68, 2.73 and 3.41 kg/m^2 in both seasons. So, the most suitable treatment for fertilizing cucumber plant was to use compost at the level of 2.05 kg/m^2 to produce fruits with good physical quality of cucumber. This increase in physical fruit quality might indicate that applying compost increased the uptake of macro- and micro elements necessary for plant growth and fruit development requirements. These data is in accordance with those observed by Stanely,(1991).

Table (8): Effect of the different rates of compost on cucumber quality during 2006and 2007 seasons.

Compost (Kg/m^2)	Fruit length (cm)		Fruit diamete, (cm)		Dry matter (%)		T.S.S. (%)	
	2006	2007	2006	2007	2006	2007	2006	2007
Control	15.627	17.733	3.287	3.050	4.133	3.343	3.733	3.467
0.68	16.500	17.933	3.860	3.198	4.460	3.800	4.300	3.633
1.36	17.040	18.133	4.183	3.533	4.870	3.627	4.733	3.933
2.05	18.913	18.800	4.827	3.933	5.367	3.910	5.200	4.267
2.73	16.433	17.800	3.653	3.067	4.170	3.377	3.833	3.667
3.41	14.543	16.333	3.127	3.933	3.733	3.127	3.600	3.333
L.S.D. 0.05	1.146	0.884	0.330	0.337	0.371	0.211	0.393	0.539

6- Total chlorophyll:

Results reported in Table (9) showed that the highest amounts of chlorophyll a, b and total chlorophyll content of cucumber plants were obtained from the plants which were fertilized with compost at the level of 2.05 kg/m^2 in both seasons of (2006and 2007). Mean while, the lowest quantities of chlorophyll a, b and total chlorophyll (a + b) were resulted from the leaves of plants which were fertilized with compost at the level of 3.41 kg/m^2.

However, increasing or decreasing the compost applied to cucumber plants than 2.05 kg/m^2 tended to decrease their chlorophyll content during the two different seasons of 2006 and 2007. In this regard, composted organic materials contain considerable amounts of macronutrients such as nitrogen, phosphorus and micronutrients, i.e. Fe, Mn and Mg that contribute to chlorophyll synthesis in plant. Similar results were obtained by Aly,(2002).

Table (9): Effect of the different rates of compost on chlorophyll contents of cucumber leaves at 2006 and 2007 seasons

Compost (Kg/m^2)	Chl. a u /cm^2		Chl. b u /cm^2		Total Chl. u /cm^2	
	2006	2007	2006	2007	2006	2007
Control	45.570	41.46	11.66	10.63	55.10	50.90
0.68	50.263	46.66	13.16	10.95	60.83	57.09
1.36	52.530	50.13	14.01	11.36	63.74	59.84
2.05	59.500	52.34	15.21	11.99	67.48	62.54
2.73	46.527	45.72	16.99	13.10	59.54	52.37
3.41	43.363	40.15	11.33	10.51	53.35	47.29
L.S.D 0.05	5.642	5.21	1.714	1.746	8.656	6.530

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تأثير مستويات مختلفة من الكمبوست على مقاومة أمراض الهواء والتربة والنمو الخضرى والمحصول وجودته على الخيار تحت ظروف الصوب البلاستيكية

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تعتبر أمراض التربه(اعفان الجذور والذبول وموت البادرات) وامراض الهواء(البياض الدقيقي والزغبي) من الأمراض واسعة الإنتشار فى مصر فى الصوب وقد اجرى هذا البحث لدراسة تأثير مستويات الكمبوست المختلفة (المخلفات النباتيه) وهى ٠,٦٨ و ١,٣٦ و ٢,٠٥ و ٢,٧٣ و ٣,٤١ كج كمبوست / م٢علىهذه الأمراض وايضا على جودة وإنتاجية محصول الخيار خلال موسمى ٢٠٠٦-٢٠٠٧.

ويمكن تلخيص نتائج البحث المتحصل عليها فيما يلي:

١- مستويات الكمبوست ٠,٦٨ و ٢,٠٥ كجم/ م٢ أعطت اعلى حماية ضد أمراض التربة (**بيثيم ، أولتيم ، فيوزاريوم سولانى ، اسكليروتينا ، اسكليروشيورم**) وأدى إلى خفض متوسط التاثير المرضي لنباتات الخيار من٣٢,٥% إلى ٧,٥% و ١١,٢٥ %على التوالى بينما أعطى المبيد الفطرى توبسن أعلى متوسط تأثير في هذا الخصوص (١,٢٥%) لكن المستويات الأعلى من ذلك أعطت تأثيرا أقل.

٢- كانت مستويات الكمبوست ٠,٦٨، ١,٣٦ كج / م٢ أكثر تأثيرا في مقاومة أمراض البياض الدقيقي والزغبي وأدت الى خفض متوسطالشدة المرضيه من ٥٥,٩٨% و ٤٠,٥٨% الى ٢٩,٨٤% و ٢١,٣٩% على التوالى بينما المستويات الأعلى من ذلك ٢,٧٣ و ٣,٤١ كج كانت أقل تاثيرا في هذا الخصوص . بينما اعطت المبيدات المستخدمه دومارك واكواجين برو احسن متوسط تاثيرا في خفض الشدة المرضية علىالنباتات ١٠,٣٨% و ٩,٢٣% على التوا لى .

٣- إضافة سماد الكمبوست بمعدل ٢,٠٥ كج/م٢ أعطى اعلى معدلات النمو الخضري لنبات الخيار"طول النبات – مساحة الورقة – عدد الأفرع لكل نبات – عدد الأوراق لكل نبات – الوزن الطازج والجاف لكل نبات" مقارنة بمستويات الكمبوست الأخرى.

٤- اعطى معدل التسميد العضوى من الكمبوست ٣,٤١ كجم/ م٢ وأيضا استخدام السماد العضوى البلدى فقط (كنترول)أقل معدلات النمو الخضرى لنبات الخيار مقارنة بمستويات الكمبوست الأخرى.

٥- كان لإضافة السماد العضوى من الكمبوست بمعدل ٢,٠٥ كجم/م٢ اثرا إيجابيا فى زيادة المحصول الكلى من الخيار ٤,٣٥٤وعدد الثمار لكل نبات ،بينما سجل معدل التسميد العضوى البلدى (كنترول) اقل محصول.

٦- أدى إضافة السماد العضوى من الكمبوست ٢,٠٥ كجم/م٢ أفضل صفات لثمرة الخيار (طول الثمرة – قطر الثمرة – وزن المادة الجافة – المواد الصلبة الذائبة) بالإضافة لمحتوى الثمرة من الكلوروفيل يليها المستويات ١,٣٦ ، ٠,٦٨ ، ٢,٧٣ والكنترول ٣,٤١ كجم/م٢٠٨١.

٧- تم الحصول على أعلى المعدلات من النمو الخضرى لمحصول الخيار" طول النبات – مساحة الورقة – عدد الأفرع / نبات – عدد الأوراق / نبات – الوزن الطازج والجاف" وإنتاجية المحصول وصفات الثمار خلال موسم ٢٠٠٧ مقارنة بالموسم الزراعى ٢٠٠٦ وذلك عند جميع مستويات التسميد العضوى من الكمبوست المستخدمة.

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