



ORIGINAL ARTICLE

Evaluation Effect of Different levels of Vermicompost and Cocopeat on Photosynthesis Pigments in Pepper (*Capsicum annum L.*)

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ABSTRACT

In order to evaluation of effect of cocopeat and vermicompost biofertilizers at different ratio's as media on qualitative traits of pepper, a factorial experiment in randomized completely block design with three replication in research greenhouse of 10 municipality of Tehran is done. Experimental treatments were: 1-vermicompost: perlite(1:1) 2-cocopeat: vermicompost (1:1) 3-cocopeat: perlite: vermicompost (2:1:1) 4-cocopeat: perlite:vermicompost (1:2:1) 5-cocopeat: perlite: vermicompost(1:1:2) 6-cocopeat: perlite(1:1) and the three varieties of *Capsicum* were as follows: *Capsicum annum* var. Alonso, Roxy, Baiela. The result demonstrated that there are a significant difference in amount of Chlorophyll a in 1% and Chlorophyll b and Carotenoids was significant at the 5% level of significance. Different varieties have different answers to the substrates, so that chlorophyll a and b Alonso cultivar has highest average and in carotenoids Roxy has highest and Baiela least average. The results of vermicompost and perlite : cocopeat (2:1:1) in characters Chlorophyll a and b, has the highest average. Finally The vermicompost: perlite : cocopeat (1:1:2) was have highest average of carotenoids.

Keywords: Vermicompost, cocopeat, perlite, pepper.

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INTRODUCTION

Vermicompost is a nutrient-rich, microbiologically active organic amendment which results from the interactions between earthworms and microorganisms in the breakdown of organic matter. It is a stabilized, finely divided peat-like material with a low C/N ratio and high porosity and water-holding capacity that contains most nutrients in forms that are readily taken up by plants (5). Nutrients in vermicompost are present in readily available forms for plant uptake; e.g. nitrates, exchangeable P, K, Ca and Mg [2], and the use of coco peat in horticulture has recently been questioned from an environmental standpoint, since peat is a non-renewable resource and since it plays a major role in atmospheric CO₂ sequestration [6] therefore several investigation was carried out for evaluating of potential of other material for utilization of them as substrate. The substrate is one of the effective factors in plant growth and yield [9] so that stated perhaps the most important factor in production of greenhouse crops is the type of substrate. Vermicompost consist of available forms nutrition plant uptake such as nitrates, exchangeable phosphorus, potassium, calcium and magnesium.

Peppers, *Capsicum spp.*, are grown worldwide for vegetable, spice, ornamental, medicinal and lachrymator uses and is a significant source of vitamins A and C [3]. Peppers have been found along with other food fossils from as early as 6,000 years ago and are considered the first spice to have been used by humans. *C. annum* has subsequently become one of the most important spice commodities as well as an important vegetable crop globally [2]. Dehdashtizade [4] to investigate the effect of different levels of vermicompost as organic matter and alternative chemicals (fertilizers), carried out an experiment in greenhouse of College of Agriculture, Ferdowsi University of Mashhad, at (50 and 100 % by volume) and 2 levels, 10, 25. In this study, five levels of vermicompost in factorial experiment in completely randomized design were studied. Super Strain B in triplicate on the characteristics of tomatoes seedlings commercial cultivars. The results showed that the germination time based on the number of days after implantation in the treatment of 25% significantly the faster and more compared to other treatments. Length, diameter and chlorophyll content in seedlings treated with 50 % vermicompost showed

significant increase compared to control. Investigate the influence of substrate on the characteristics of cucumber seedlings growth and physiological changes, an experiment with randomized complete block design at agricultural college of moghanin 2009 performed. Substrates, including pure, pure vermicompost, pure peat moss, soil + vermicompost (1:1 by volume or weight), soil+ peat Moss (1:1), vermicompost + peat moss(1:1), respectively. Results showed that the highest seed germination medium vermicompost is obtained. Leaf chlorophyll concentration was significantly affected by substrate, so that the chlorophyll concentration in the soil+peat moss substrate (1:1) + vermicompost 44% higher than the bed of peat moss (1:1), respectively. (1) In order to evaluate the growth and characterization of vermicompost and compost of lettuce in a ratio of 80: 20 and 50:80 an experiment was performed that results of the aerial and chlorophyll ratio of 80: 20 enhanced because of increased activity of worms and humic acid and zinc [1].

Research concluded that vermicompost is a nutrient-rich organic environment on physiological and morphological characteristics of plants is effective. So an experiment was conducted in agronomy facility of Ferdowsi University at 2007, that 4 levels of vermicompost include of 10, 25, 50 and 100 percent and 1 level as control and also two levels of phosphorous for producing of tomatoes plantlets. The node characteristic was chlorophyll content, respectively. Among the characters chlorophyll content was not effected [4].

According to researches, results in indicated different reactions of growth stages of plant to differentiate levels of vermicompost. So the main goal of this research is effect of different levels of vermicompost and cocopeat on qualitative of pepper.

MATERIAL AND METHOD

This study was conducted to evaluate the effects of vermicompost and different substrates on pepper cultivations on 3 commercial varieties in a factorial experiment in a randomized complete block design with three replications and 18 treatments in greenhouse of Municipality of 10 region at 2011.

Treatments considered in this study include:

1. vermicompost: perlite 50:50. Cocopeat: 50:50 vermicompost
2. Cocopeat: perlite: vermicompost 50:25:25. Cocopeat: perlite: vermicompost 25:50:25. Cocopeat: perlite: vermicompost 25:25:56. Cocopeat: perlite: vermicompost 50:50

The study was conducted on three varieties of Capsicum:

Capsicum annuum var. Alonso, Roxy, Baiela

In September 2010 coco peat + perlite planting seeds in trays of peppers were planted. After preparing platforms and pots when the plants reached stage 4 sheets of 12 cm diameter and 10 cm in length were transferred. And after fruit reached commercial maturity traits were measured in vitamin C and nutrient elements.

Chlorophyll and Carotenoid

For the measurement of chlorophyll a, b and carotenoids of 0.05 g fresh leaves were weighed and 10 ml acetone, 80% worn, then the resulting mixture and flatten with a volume of 20 ml acetone and 80% were volume. Absorbance at wavelengths of 663, 645 and 470 nanometer was measured with a spectrophotometer. Then, use the formula provided Ashtiani Parvizian Farhi [8] concentrations of chlorophyll a, b, and carotenoids were measured in mg/gm of leaf.

$$\text{Chl.a} = [(12.7(A_{663}) - 2.69(A_{645})) / V] / W \times 1000 \text{ mg/g Fw}$$

$$\text{Chl.b} = [(22.9(A_{645}) - 4.67(A_{663})) / V] / W \times 1000 \text{ mg/g Fw}$$

Methods of Data Analysis

After concluding the and given that the test randomized complete block design run was to assess the effects of treatments on the yield and quality of the product obtained using software MSTAT-C attempts to analyze the data and comparison Duncan's multiple range test was used. EXCEL program was used for the diagrams.

Table 1. Vermicompost features.

P H	E C	OM%	OC%	C / N	N mg/k	P mg/k	K mg/k	C a mg/k	M g mg/k	F e mg/k	M n mg/k	C u mg/k	Z n mg/k	P b mg/k	C d mg/k
7.64	1.12	56.8	32.9	21.25	1.55	0.4	0.4	2.73	0.65	5000	275	20	115	19	1

RESULT AND DISCUSSION

Analysis of variance table showed that effect of substrate, cultivar and interaction between the substrate and cultivars for all traits such as: Chlorophyll a was significant mean at 1% level, and chlorophyll b and Carotenoids was significant at 5% level (Table 1). Also the results of the comparison mean, the highest average of chlorophyll a vermicompost: cocopeat: perlite (25:25:50) and least average vermicompost: cocopeat: perlite (50:25:25 respectively). Important element in making vermicompost because chlorophyll

is magnesium nutrients including magnesium can increase the amount of chlorophyll is magnesium vermicompost contained (275 mg/k), respectively.

Table2. The results of analysis of variance of studied factors

S . O . V	d f	Mean of Squares		
		Chlorophyll a	Chlorophyll b	Carotenoids
B l o c k	2	0 / 0 5 8 n s	0 / 0 0 4 n s	0 / 0 3 n s
Cultivar(A)	5	0 / 2 8 7 **	0 / 0 1 2 n s	0 / 0 2 4 n s
Substrate(B)	2	1 8 / 2 7 1 **	0 / 8 2 8 **	1 / 1 5 2 **
A × B	1	0 0 / 3 2 6 **	0 / 0 2 1 *	0 / 0 6 5 *
E r r o r	3	4 0 / 0 3	0 / 0 1	0 / 0 2 6
C . V %	-	2 6 / 8 1 %	2 9 / 7 5 %	2 6 / 1 5 %

ns: non significant; *: significant in 5%, **: significant in 1%.

And the results were compatible with Azarmy on tomatoes in 2009. The results of the comparison mean the highest average of chlorophyll b vermicompost: cocopeat: perlite (25:25:50) and least average cocopeat: perlite (25:25:50) respectively. Chlorophyll Magnesium is an important element in making vermicompost because nutrients such as magnesium can increase the amount of chlorophyll is magnesium vermicompost contained (275 mg / k). Azarmy [2] observed the tomato was compatible. The results of the comparison mean, the highest average of carotenoids cocopeat: vermicompost: perlite (25:25:50) in Roxy cultivar and least average was in Baiela. carotenoid nutrients available to plants is dependent on the uptake and use of nutrients from the vermicompost facility poses significant effect on the concentration of the substance is generated [3].

Table3. Comparison of means of substrates and cultivars of pepper on studied factors.

Comparison of means							
Parameter	cultivar	1	2	3	4	5	6
Chlorophyll a	Alonso	1 / 6 4 3 b	1/953 b	2 / 7 0 7 a	1 / 0 2 c	1/947 b	1/58 b
	R o x y	0/1003 d	0/03651 d	0/01893 d	0/05967 d	0/082 d	0/01373 d
	Baiela	0/1267 d	0/03333 d	0/02733 d	0/065 d	0/1345 d	0/06267 d
Chlorophyll b	Alonso	0/3867 ab	0/54 a	0/5667 a	0/43 a	0/3567 ab	0/3433 abc
	R o x y	0/142 bcd	0/02667 d	0 / 0 2 d	0/02733 d	0/017 d	0/1827 bcd
	Baiela	0/1003 cd	0/02867 d	0 / 0 2 4 d	0/03533 d	0/01667 d	0/1683 bcd
Carotenoids	Alonso	0/3333 f	0/3767 ef	0/5267 cdef	0/4033 ef	0/3667 ef	0/5067 cdef
	R o x y	0/8267 abcd	1/047 ab	0/7733 bcde	0/8733 bc	1 / 1 8 a	0/7 bcdef
	Baiela	0/4233 def	0/6133 cdef	0/4833 cdef	0/6233 cdef	0/3767 ef	0/6233 cdef

CONCLUSION

According to experiment results positive effect of vermicompost on photosynthesis pigments of sweet pepper is recommended the study of vermicompost effects on seed germination and pH of vermicompost , as compared with chemical fertilizers and manure in the case of sweet pepper examined. effects of vermicompost in farm is being studied.

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