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Evaluation of vermicompost on the Pigments content of *Pelargonium hortorum*

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ABSTRACT

This study was conducted to Evaluation of vermicompost on the Pigments content of Pelargonium hortorum. This experiment was conducted in the Islamic Azad University, Garmsar branch. Treatments of vermicompost rates included: 0, 25, 50, 75 and 100%. Also combine of control pot included: 25% cocopeat, 20% pulp tea, 10% rice straw and 45% garden soil. According to analysis of variance, treatments had significant effect on Chlorophyll a and b, Total chlorophyll, Anthocyanin and Carotenoids at 1% statistical probability.With regard to the comparison of treatments and control, 75% vermicompost treatment was the most effective treatments and this level suggest for pelargonium culture.

Introduction

The compost prepared through the application of earthworms is called vermicompost and the technology of using local species of earthworms for culture or composting has been called Vermitech(Ismail, 2005).The role of vermicompost as organic manure in improving soil fertility and productivity is well documented. In addition to its richness in essential plant nutrients, it also supplies plant growth promoting substances, humus forming microbes and N-fixers in the soil (Lenin et al., 2010). Organic manures act not only as a source of nutrients and organic matter, but also increase size, biodiversity and activity of the microbial population in soil, influence structure, nutrients get turnover and many other change related to physical, chemical and biological parameters of the soil (Albiach et al., 2000).The nutrient content of vermicompost greatly depends on the input material. It usually contains higher levels of most of the mineral elements, which are in available forms than the parent material. Vermicompost improves the physical, chemical and biological properties of soil (Kale, 1998). Various greenhouse and field studies have examined the effects of a varity of vermicomposts on a wide range of crops including cereals and legumes (Chan and Griffiths, 1988), vegetable (Edwards and Burrows, 1988; Wilson and Carlile, 1989; Sulber et al., 1998; Atiyeh et al., 2000b) ornamental and flowering plants (Edwards and Burrows, 1988), and field crops (Arancon et al., 2004).In order to reduce the use of chemical fertilizers, biofertilizers play a crucial role by increasing the availability of soil nutrients and to sustain (Lenin et al., 2012).Anthocyanins are coloured flavonoids occurring mainly in flowers and fruits,They may also be present in leaves. The accumulation of anthocyanins is observed under conditions of nitrogen deficiency, since carbohydrates not used in nitrogen metabolism can be used in the synthesis of these pigments (Taiz and Zeiger 1998).Pelargonium is a large genus within the Geraniaceae family, which has a worldwide distribution in temperate to subtropical zones with some 800 mostly herbaceous species. They are commonly seen in bedding schemes in parks and gardens, but can also be grown indoors as houseplants if given enough light (Roschenbleck et al., 2014). In herbal medicine, Pelargonium has been used for intestinal problems, wounds and respiratory ailments, but Pelargonium species have also been used for fevers, kidney complaints and other conditions. Geranium (Pelargonium) oil is considered a relaxant in aromatherapy, and in recent years, respiratory/cold remedies made from *P. sidoides* and *P. reniforme* have been sold in Europe and the United States (Herb Society of America, 2012). The aims of this study evaluation of vermicompost on the Pigments content of *Pelargonium hortorum.*

Material and methods

This experiment was conducted in the Islamic Azad University, Garmsar branch. Treatments of vermicompost rates included: 0, 25, 50, 75 and 100%. Also combine of control pot included: 25% cocopeat, 20% pulp tea, 10% rice straw and 45% garden soil. Table1 and 2 show characteristics of the pot at the beginning of the test and experiment combine, respectively.

Chlorophyll:0.5 mg of fresh leaf material was ground with a mortar and pestle with 10 ml of 80 percent acetone. The homogenate was centrifuged at 800 rpm for 15 minutes. The supernatant was saved and the residue was re extracted with 10 ml of 80 percent acetone. The supernatant was saved and the absorbance values were read at 645 and 663 nm in a UV-Spectrophotometer (Arnon, 1949).

Carotenoid: The same plant extract used for chlorophyll estimation was also used for carotenoid estimation. The acetone extract was read at 480 nm in a UV Spectrophotometer (Kirk et al., 1965).

Result and discussion

Chlorophyll a

According to analysis of variance, treatments had significant effect on Chlorophyll a at 1% statistical probability. Between treatment, V75 and V50 showed highest Chlorophyll a by 280 and 300µgr/ 1gr fresh weight respectively also, there was no significant difference between the two treatments. By V50 treatment application, Chlorophyll aincreased 2fold compared to the control.

Chlorophyll b

Analysis of variance showed that the effects of vermicompost on Chlorophyll b were significant at the 1% level. The results of Chlorophyll b showed that both treatments V75 and V50 with 170and 200µgr/ 1gr fresh weight had highest content, respectively; however, there was no significant difference between the two treatments. By V50 treatment

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application, Chlorophyll b increased 81 percent compared to the control.

Total Chlorophyll

According to analysis of variance, treatments had significant effect on Total Chlorophyll at 1% statistical probability. Between treatments, V75 and V50 showed highest Total Chlorophyll by 350 and 300µgr/ 1gr fresh weight, respectively. There was significant difference between the two treatments. By V75 treatment application, Total Chlorophyll increased 1.75 fold compared to the control.

Anthocyanin

Analysis of variance showed that the effects of vermicompost on Anthocyanin were significant at the 1% level. The results of Anthocyanin showed that both treatments V75 and V50 with 0.9 and 1.0 µgr/ 1gr fresh weight had highest content, respectively; however, there was no significant difference between the two treatments. Lowest Anthocyanin was observed by control. By V50 treatment application, Anthocyanin increased 2.5 fold compared to the control.

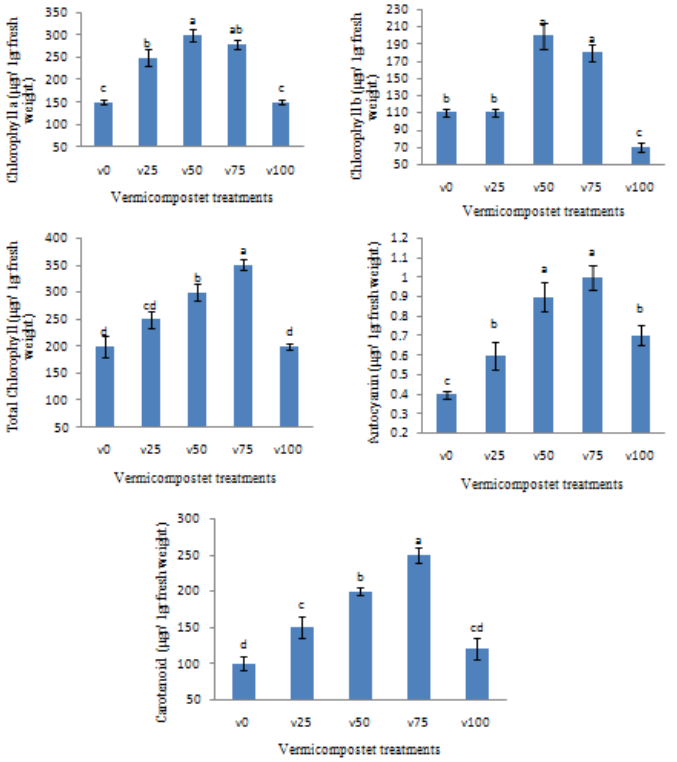

Fig 1: Effect of vermicompost treatments on some trait of *Pelargonium hortorum (Duncan test at 5% and error bar)*

Carotenoids

This parameter was affected by the experimental treatments at the 1% level. Between treatments, V75 showed highest Carotenoids by 250µgr/ 1gr fresh weight respectively, also,By V75 treatment application, Carotenoid contents increased2.5 fold compared to the control.At this order, leninet al., (2012) reported that vermicompost increased biochemical content of groundnut. Organic amendments like vermicompost promotehumification, increased microbial activity and enzyme production, which, in turn, bring about the aggregate stability of soil particles, resulting in better aeration (Perucci, 1990). Organic matter has a property of binding mineral particles like calcium, magnesium and potassium in the form of colloids of humus and clay, facilitating stable aggregates of soil particles for desired porosity to sustain plant growth. Soil microbial biomass and enzyme activity are important indicators of soil improvement as a result of addition of organic matter (Ansari, 2008). Moreover, in comparison with mineral fertilizers, compost produces significantly greater increases in soil organic carbon and some plant nutrients (Nardi, 2004). In general at this experiment, this fact observed that vermicompost increased pigment content. According to other research, this increasing obtained by improvement of physical and chemical characteristics of planting bed. With regard to the comparison of treatments and control, 75% vermicompost treatment was the most effective treatments and this level suggest for pelargonium culture.

Resources

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Table 1. Characteristics of the pot at the beginning of the test								
K2O%	**K(aya)%**	**P2o5%**	**P(aya)%**	**totalIN%**	**pH**	**CEC m.e/100gr**	**Ec Ds/m**	**treatments**
0.652	0.554	0.4	0.144	0.54	5.46	102	1.38	V 0
0.307	0.235	0.49	0.215	1.18	6.5	93.6	1.53	V 25
0.575	0.481	0.52	0.218	0.91	7.0	81.6	1.69	V 50
0.790	0.667	0.61	0.242	0.91	7.21	79.3	1.71	V 75
0.549	0.467	0.76	0.36	1.46	7.63	79.3	1.83	V 100

Table 2: Composition of experiment treatments		
treatments	**Vermicompost (vulome)**	**Control (volume)**
V0	0	100
V25	25	75
V50	50	50
V75	75	25
V100	100	0

Table 2: Analysis of variation for traits						
Source of variation	Degree of freedom	Chlorophyll a	Chlorophyll b	Total Chlorophyll	Anthocyanin	Carotenoids
treatments	4	90.96**	78.8**	184.8**	6.05**	98.26**
error	25	2.08	0.12	3.2	0.294	2.96
Coefficient of variation		8.3	8.8	6.8	8.5	8.3
**indicate of significant statistical different at 1%						

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