Available online at www.pelagiaresearchlibrary.com

Pelagia Research Library

European Journal of Experimental Biology, 2014, 4(2):361-365

ISSN: 2248 –9215
CODEN (USA): EJEBAU

Effect of different media on growth indexes of ornamental plants under system mist

Ali Salehi Sardoei[1*] and Parviz Rahbarian[2]

[1]*Young Researchers Club, Jiroft Islamic Azad University, Jiroft Branch, Iran*
[2]*Department of Horticultural Sciences, Islamic Azad University, Jiroft, Iran*

ABSTRACT

An important factor in the growth medium of plants and chemical plants. native substrates can be used to improve plant performance. To evaluate the effect of growth medium on Ficus benjamina, Padanus sanderi, Rosmarinus officinalis experimental design was completely randomized with eight treatments and four replications were carried out in the research greenhouse of Islamic Azad University of Jiroft. Ficus benjamina, Padanus sanderi, Rosmarinus officinalis plants from vegetative characteristics were significantly different. Results showed that the mean media 50% peat moss + 25% sand + 25% perlite and 50% peat moss + 25% sand + 25% perlite has the highest average stem length 94.50, 40 and 62.50 cm was obtained from a statistically significant difference have showed. The highest number of branches in the bed 50% peat moss + 25% sand + 25% perlite, with a mean 29.25, and the lowest bed of 50% peat palm + 25% sand + 25% perlite with an average of 14, respectively, which showed a statistically significant difference. The highest number of Sucker/plant in the bed 100% peat palm, with a mean 8, the lowest bed of 100% peat moss with an average of 2, respectively, which showed a statistically significant difference. According to the results obtained in this study, due to economic problems and to use recovery agricultural waste, can palm waste as a suitable alternative to peat moss in the media popular culture Ficus benjamina, Padanus sanderi, Rosmarinus officinalis recommended, The study also determined that mixing the waste with peat palm healing characteristics such as increased porosity and water keep capacity is improve the nutritional condition of the product.

Keywords: Substrates, *Ficus benjamina*, *Padanus sanderi*, *Rosmarinus officinalis*, Leaf Area, Number of Branches.

INTRODACTION

The commercial production of the ornamental plants is a world business. Their economical value has significantly increased in the past two decades and there is much potential for continuous flower culture in future either in local markets or in international ones. The Netherlands excels in exports of ornamental plants including potted plants such as Begonia, Ficus, Cyclamen, Philodendron, Saintpaulia, Spathiphyllum and Rhododendron [21]. Iran has just commenced serious investment to produce ornamental plants. The main investment was done by private sector and the government just participates indirectly in producing lawns, flowers, shrubs and the ornamentals. It may be said that only 5 percents of the production is performed by the public section and the rest (95 percents) by the private sector [12]. One of the objectives of the developing countries is to achieve the stable economical growth.

Flowers and the ornamentals are of the products attainable in many parts of Iran and enjoy high capability on foreign currency earning and can be placed as one of the main non-oil goods in country exports. During the recent decades, the development world trade of ornamental plants caused to propel the advanced countries to perform specialized researches in the field of these products [4]. The selection of the cultivation bed is an important and effective factor on the quality of seedling [10]. The first criterion for a commercial cultivation bed is optimal growth of the plants and the continuous accessibility in an economic manner. Commercial cultivation bed should reserve water with suitable drainage and preparing appropriate placement of roots, should be devoid of toxic materials, pests and diseases [7]. The producers need cultivated bed which is permanent and stable, accessible, easily usable and reasonable in cost. The optimal physical and chemical features of the cultivation beds and their compounds are among the features that are of main concern. The main physical features are the total percent of porosities, the capacity of water reservation, the percentage of air porosities, volume density, distribution and the particle size. The main chemical features include pH, concentration of soluble salt and the cation exchange capacity [6].

Numbiar and Fife [18] and Oliet et al [20] reported that by optimizing the physical conditions of soil, the bed of seed will cause an increase in the seed germination, the growth of the root and seedling growth. Faraz et al [5] and Brito et al [2] found that adding organic materials of soil makes improvement of properties on germination percent, daily mean germination and germination rate. Griffin [6] reported that perlitee does not have any effect on the chemical features of the bed. Despite many organic compounds, perlitee will not decompose. Based on Khalighi et al [13] research, Azolla compost caused toproduce the most number of leaves in Beaucarnea and the Coco-peat beds had the least ones. The most amount of the leaf length was reported in Azolla compost 50% + Perlitee 50%, while the least amount was reported in the beds of Coco- Peat 50% + Perlitee 50%. Results showed that the longest length of leaf was obtained under soil + tea wastes compound and the shortest length of leaf was obtained under soil + perlite medium [1].

The aim of this research was comparison of different growth beds on the vegetative indexes of *Ficus benjamina*, Padanus sanderi, *Rosmarinus officinalis* plant in kerman province.

MATERIALS AND METHODS

The three experimental design was completely randomized with four replications of eight treatments. treatments to planting beds with sand + perlite that the combination was as follows:

1-100% peat moss
2-100% peat palm
3-100% cocopeat
4-100% cococheps
5-50% peat moss + 25% sand + 25% perlite
6-50% peat palm + 25% sand + 25% perlite
7-50% cocopeat + 25% sand + 25% perlite
8-50% cococheps + 25% sand + 25% perlite

Prepare Media and Planting Plants

Cocopeat commercial with the aim of reducing the cost of transportation, the compressed unit (block) supplied. Before applying this material the amount of water to opening up and voluminous, was added to it to have a completely uniform. The substrates peat moss, peat, palm cococheps nothing did not and the materials were used as primary. In treatments containing sand + perlite, these four types of seed bed volume ratio of 1:1 and mixed with sand + perlite were used. First of all pasteurized potting culture media with 2% sodium hypochlorite for disinfection were. First, of wooden cuttings in a bed of sand *Ficus benjamina*, Padanus sanderi (used sucker), *Rosmarinus officinalis* rooted in the greenhouse environment, then the rooted cuttings were transferred to pots with a diameter of 17 cm. the pots were filled with the material examined. After planting in pots in a greenhouse with temperature (winter 20-25 °C) and in summer (30-35 °C) were kept on planting plans. Growth of the indicator stem diameter, Plant Height and lateral shoot number, leaf area, specific leaf area and chlorophyll index was measured.

Analysis was performed on data using SPSS ver 16. Comparisons were made using one-way analysis of variance (ANOVA) and Duncan's multiple range tests. Differences were considered to be significant at $P < 0.05$.

RESULTS AND DISCUSSION

Test Ficus

Ficus benjamina plants from vegetative characteristics were significantly different from one another. (Tab 1). Results showed that the mean bed 50% peat moss + 25% sand + 25% perlite and peat moss has the highest average stem length 94.50, 94.25 cm was obtained from a statistically significant difference have showed. The lowest average stem length 58.50 cm was observed in cocopeat substrate. The highest lateral shoot in palm peat substrate, respectively, with a mean 80/43 cm, respectively. The lowest bed of 50% cococheps + 25% sand + 25% perlite and cococheps with mean 25.22, 27.02, respectively. The highest number of branches in the bed 50% peat moss + 25% sand + 25% perlite, with a mean 29.25, and the lowest bed of 50% peat palm + 25% sand + 25% perlite with an average of 14, respectively, which showed a statistically significant difference. Most of the leaf area bed 50% cocopeat + 25% sand + 25% perlite with a mean 75.77 cm and lowest in cocopeat substrate with a mean 46.40 cm, respectively.

Highest chlorophyll index of the substrate cococheps mean (40.23 mg/lit) and the lowest bed of 50% peat palm + 25% sand + 25% perlite mean (52.27), respectively. mean highest diameter of the palm peat substrate (1.19 cm) and the lowest mean (0.84 cm) in the context 50% cococheps + 25% sand + 25% perlite obtained a statistically significant difference said. Add 25% sand + 25% perlite substrates on growth indices such as lateral stem length and stem diameter minimum were obtained, The highest value obtained in other indexes which show pure increase in beds with sand + perlite to grow their substrates.

Table 1 - Effect of Different Potting Mixes on Growth *Ficus benjamina*

Media	Chlorophyll Index (mg/L)	Specific leaf area (cm^2)	leaf area (cm^2)	No. branches	Side stem length (cm)	Length of main stem (cm)	Stem diameter (cm)
100% peat moss	46.64 abc	73.06 a	59.49 ab	26.25 a	32 bc	94.25 a	1.16 ab
100% peat palm	49.86 ab	65.46 a	57.71 ab	25.25 a	43.80 a	93.50 a	1.19 a
100% cocopeat	46.48 abc	72.99 a	46.40 b	18.50 b	35.57 abc	58.50 b	1.06 abc
100% cococheps	40.23 c	72.97 a	51.37 b	18.75 b	27.02 c	72.50 ab	0.93 abc
50% peat moss + 25% sand + 25% perlite	47.47 abc	74.14 a	57.39 b	29.25 a	40.25 ab	94.50 a	1.12 ab
50% peat palm + 25% sand + 25% perlite	52.27 a	71.98 a	60.69 ab	14 b	31.58 bc	74.25 ab	0.92 bc
50% cocopeat + 25% sand + 25% perlite	47.59 abc	72.76 a	75.77 a	15 b	30.45 bc	70 b	1 abc
50% cococheps + 25% sand + 25% perlite	42.43 bc	68.59 a	50.41 b	16.25 b	25.22 c	61 b	0.84 c
Cv%	10.86	11.13	19.46	18.32	20.04	18.27	13.35

Means followed by same letter are not significantly different at P< 0.05 probability using Duncan's test.

Test Padanus

Padanus sanderi plants from vegetative characteristics were significantly different from one another. (Tab 1). Results showed that the mean media cocochepsand 50% peat palm + 25% sand + 25% perlite has the highest leaf area with mean413.97, 378.69 cm^2 was obtained from a or non significant difference have showed. The lowest average Specific leaf area with a mean251.86 cm^2 was observed in cocopeat substrate. Today, many substances that are used as planting beds, each with unique characteristics are, in general, these materials have the capacity to storage water, adequate ventilation, proper drainage and high cation exchange capacity, and they also should not have any adverse impact to the plant [11].

The highest number of Sucker/plant in the bed 100% peat palm, with a mean 8, the lowest bed of 100% peat moss with an average of 2, respectively, which showed a statistically significant difference. Highest Spad of the media cococheps mean with 17.03, the lowest bed of % cococheps + 25% sand + 25% perlite mean with 9.47, respectively. Plant Height of the 50% peat palm + 25% sand + 25% perlite media mean with 40 cm and the lowest mean with 17.50 cm in the 100% peat moss obtained a statistically significant difference said. Add 25% sand + 25% perlite substrates on growth indices such as No. of leaves/plant maximum were obtained. Palm peat substrates for most plant growth did not different significantly with peat Moss and this issue implies that the substrate has the ability replace peat moss the results of Shabani researchers Hussami et al [9], Hematian dehkordi, et al [8], Samiee et al [22, 23], is consistent.

Table 2 - Effect of Different Potting Mixes on Growth *Padanus sanderi*

Media	Chlorophyll Index (Spad)	Specific leaf area (cm^2)	leaf area (cm^2)	No. of leaves/plant	No. of Sucker/plant	Plant Height (cm)
100% peat moss	14.41 ab	91.45 c	189.80 b	16 b	2 c	17.50 d
100% peat palm	14.58 ab	169.3 cd	326.22 ab	18.5 ab	8 a	31.50 abc
100% cocopeat	7.20 c	256.81 a	296.86 ab	16 b	5 b	28 bc
100% cococheps	17.03 a	100.36 c	413.97 a	18.5 ab	4.5 bc	32 abc
50% peat moss + 25% sand + 25% perlite	16.47 a	122.58 c	200.14 b	20 a	5 b	23.50 cd
50% peat palm + 25% sand + 25% perlite	13.90 ab	120.48 c	378.69 a	18.5 ab	3 bc	40 a
50% cocopeat + 25% sand + 25% perlite	13 abc	91.96 c	306.60 ab	19.5 ab	3.5 bc	36 ab
50% cococheps + 25% sand + 25% perlite	9.47 bc	91.55 c	181.28 b	19.5 ab	3 bc	28.50 bc
Cv %	18.90	9.99	20.33	7.93	24.95	13.60

Means followed by same letter are not significantly different at P<0.05 probability using Duncan's test.

Test Rosamary

Rosmarinus officinalis plants from vegetative characteristics were significantly different from one another. (Table 1). Results showed that the mean bed 50% peat palm + 25% sand + 25% perlite and 50% peat moss + 25% sand + 25% perlite has the Plant Height 62.50, 57.25 cm was obtained from a statistically or non significant difference have showed. The lowest average Plant Height, 34.50 cm was observed in 50% cococheps + 25% sand + 25% perlite and 50% cocopeat + 25% sand + 25% perlite substrate. The highest Side stem length in 50% peat palm + 25% sand + 25% perlite and 50% peat moss substrate, respectively, with a mean 51/29 and 49/53 cm, respectively. The lowest bed of cococheps and 50% cococheps + 25% sand + 25% perlite with mean 32.33, 32.75, respectively. The highest number of branches in the bed 100% peat palm and 50% peat moss + 25% sand + 25% perlite, with a mean 6 and 4.75, the lowest bed of 100% cocopeat with an average of 2, respectively, which showed a statistically significant difference. Verdonc and Gabriels [24] resulting from the composting of tobacco waste (nitrogen source) and the tree bark and leaves broad leaf fig and ficus to growth two plants were used, 10% and 90% of the composting of tobacco waste tree bark on plant height and number of leaves they have a very good combination for plants introduced as a combination. Khalighi and Padasht [14] with replacement of medium with peat moss, bark, tea wastes, bark rice and azolla as substrates for potted plants have foster in bed with marigold dwarf and concluded that bark compost in pure form or in combination with other materials, can be a viable alternative to peat moss.

Highest chlorophyll index of the substrate 50% cococheps + 25% sand + 25% perlite mean (1.38 mg/lit) and the lowest bed of 50% peat moss + 25% sand + 25% perlite mean (0.71), respectively. mean highest stem diameter of the peat palm and 50% peat moss + 25% sand + 25% perlite substrate 0.62 and 0.53 cm and the lowest mean 0.31 cm in the context 100% cocopeat obtained a statistically significant difference said. Add 25% sand + 25% perlite substrates on growth indices such as Chlorophyll Index, No. branches and Stem diameter minimum were obtained, The highest value obtained in other indexes which show pure increase in beds with sand + perlite to grow their substrates. Palm peat substrates with regard to economic issues, in order to increase moisture storage, after the initial preparation of this article can be a good medium for the production's presented country level. Peat is acidic and has a high cation exchange capacity and on top of the substrates used. peat beds, flowering delay and high performance in this beds. keeping humidity capacity is higher in the medium [17]. However, about ten times the dry weight is water retention capacity [15]. differences due to differences in plant growth in different culture media on the cation exchange capacity (CEC), water holding capacity, etc. are attributed to the amount of porosity [24].

Table 3 - Effect of Different Potting Mixes on Growth *Rosmarinus officinalis*

Media	Chlorophyll Index (Spad)	No. branches	Stem diameter (cm)	Plant Height (cm)	Side Stem length (cm)
100% peat moss	0.98 bc	2.5 de	0.36 bc	54.25 a	49.53 ab
100% peat palm	1.54 a	6 a	0.62 a	45.50 ab	38.37 bc
100% cocopeat	1.03 bc	2 e	0.31 c	50.50 ab	43.70 abc
100% cococheps	0.74 c	3.75 bcd	0.48 abc	55.50 ab	32.33 c
50% peat moss + 25% sand + 25% perlite	0.71 c	4.75 ab	0.53 ab	57.25 a	41.14 abc
50% peat palm + 25% sand + 25% perlite	1.07 abc	2.75 cde	0.39 bc	62.50 a	51.29 a
50% cocopeat + 25% sand + 25% perlite	0.97 bc	2.50 de	0.39 bc	34.50 b	32.75 c
50% cococheps + 25% sand + 25% perlite	1.38 ab	4.25 bc	0.48 abc	54.50 b	47.05 ab
Cv%	23.82	22.19	22.46	17.51	15.28

CONCLUSION

According to the results obtained in this study, due to economic problems and to use recovery agricultural waste, can palm waste as a suitable alternative to peat moss in the media popular culture *Ficus benjamina*, *Padanus sanderi*, *Rosmarinus officinalis* recommended, The study also determined that mixing the waste with peat palm healing characteristics such as increased porosity and water keep capacity is improve the nutritional condition of the product.

Overall, according to results, since it is very expensive imported peat, Use it as substrates no economic justification in Iran. considering that there are many sources of waste in the south palm, the physical properties of the substrates used for high functionality can be and also the its good price than any other ground in kerman province can be recommended as a suitable medium.

REFERENCES

[1] Azarmi Movafagh O, Sedaghathoor S, Kaviani B, **2013,** *European Journal of Experimental Biology*, **2013,** 3(4):112-117.
[2] Brito JMC, Lopes R, Machando AMV, Guerrero CAC, Faleiro L, Beltrao J, *Biomedical and Life Sciences*, **2007,** 86:205-286.
[3] Dresboll DB, *Scientia Horticulture*, **2010,** 126:56-63.
[4] Edrisi B, *Payam Digar Press*, **2010,** pp 150.
[5] Faraz LCL, Café Filho AC, Nasser LCB, Azevedo J, *Plant Pathology*, **1999,** 48:77-82.
[6] Griffin WN, **2010,** *M.Sc. Thesis, Auburn University, Auburn, Alabama, USA.*
[7] Higaki T, Imamura JSI, **1985,** *College of Hawaii. Research Series*. No 40.
[8] Hematian Dehkordi M, Mohamadi Ghahsareh A, Kalbasi M, *Proceedings of the 5^{red} National Conference on New Ideas in Agricultural Branch, Isfahan, Iran*, **2010,** Pp: 215.
[9] Hesami A, Amini F, Sarikhani Q, Bir ghdar kashkol A, *Proceedings of the Second National Conference on Agriculture and Sustainable Development*, **2010,** pp 1-4.
[10] Jan KausKiene J, Brazaityte A, *Lithuanian Institute of Horticulture Kauno*, **2008,** 27(2):285-294.
[11] Javanpour Heravi R, Babalar M, Mir Abdolbaghi M, Askari M, *Journal of Agricultural Sciences Iranian*, **2005,** 36(4): 939-946.
[12] Kafi M, *Business Researches Journal*, **2000,** 162:44-49.
[13] Khalighi A, Padasht Dehkaei MN, Saneei M, Hekmati J, **2010,** *6th Iranian Horticultural Science Congress. Guilan University.*
[14] Khilighi A, Padasht Dehkaee MN, *Iranian J. Agric, Sci*, **2000,** 71(3):557–565.
[15] KhoshKhui M, Shybany B, Rouhani L, Tafazoli E, *Shiraz University Press. Iran*, **2006,** pp 594.
[16] Lichtenthaler HK, C Methods of Enzymology. **1987,** 148:350-380.
[17] Mashadi jahafarpour A, Henareh M, *1^{red} National Congress of hydroponic sand green house production. Isfahan*, **2009,** pp 254.
[18] Numbiar EKS, Fife DN, *American Journal*, **2007,** 60:147-156.
[19] Noguera P, Abad M, Noguera V, Puchades R, Maquieira A, *Acta Hort*, **2000,** 517:279-286.
[20] Oliet AJ, Planelles R, Artero F, Jacobs FD, *Forest Ecology and Management*, **2005,** 215:339-351.
[21] Rout GR, Mohapatra A, Mohan Jain S, *Biotechnology Advances*, **2006,** 24:531-560.
[22] Samiei L, Khalighi A, kafi M, Samavat S, *Iranian Journal of Horticultural Sience and Technology*, **2004a,** 6(2):88-79.
[23] Samiei L, Khalighi A, kafi M, Samavat S, Arghavani M, *Iranian, J. Agric. Sci*, **2004b,** 36(2):510–503.
[24] Verdonc O, Gabriels RI, *Acta Hort*, **1992,** 302:169–179.