Int.J.Curr.Microbiol.App.Sci (2021) *10*(03): 1402-1408

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 03 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1003.171

Effect of FYM, Vermicompost and Cocopeat on Growth and Yield of African Marigold (*Tagetes erecta* L.) cv. Sirakole

Rudra Madhab Dash*, Sailendri Kumari Patra, Subhendu Jena and Swagat Ranjan Mund

Department of Horticulture, Institute of Agricultural Sciences, Siksha 'O' Anusandhan Deemed to be University, Bhubaneswar, Odisha, India

**Corresponding author*

Keywords

Pinching, FYM, Vermicompost, Cocpeat

Article Info

Accepted:
12 February 2021
Available Online:
10 March 2021

A B S T R A C T

The present investigation entitled "Effect of FYM, Vermicompost and Cocopeat on Growth and Yield of African Marigold (*Tagetes erecta* L.) CV. Sirakole" was carried out in form of a field trial at the Agricultural Research Station, Binjhagiri, Chhatabar, Institute of Agricultural Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar during 2019-20. The experiment was laid out in R.B.D. with three replications and nine treatments separately. Studies showed significant effect on height of plants before pinching (22.17cm), height of plants after pinching (37.23cm), on number of flowers (66), fresh weight of flower (6g), flower yield per plant (396g), flower yield per plot (1.98kg), flower yield per hectare (33 t/ha), was recorded optimum in treatment with T4 (Soil+ FYM 20 t/ha) under Bhubaneswar agro climatic conditions. Flower diameter was recorded maximum in treatment T8 (Soil+ VC 3 t/ha), i.e., 10.16cm. Optimum results for days until initiation of 1st flower bud, was obtained in treatment T5 (Soil+ FYM 10 t/ha+ CP 16 t/ha) and T9 (Soil+ VC 2t/ha+ CP 16 t/ha). Treatment T9 (Soil+ VC 2t/ha+ CP 16 t/ha) was found to give optimum results for maximum secondary branches (17.66).

Introduction

India is conferred with contrasting agro-climatic and ecological conditions which are convenient to grow all types of commercially dominant flowers grown in different parts of the world. The estimated area under flower cultivation in India during the year 2017-18 was 324 thousand ha. The leading flower growing states in India are J&K (49.58 thousand ha.), TN (34.2 thousand ha.), Karnataka (31.36 thousand ha.), WB (26.8 thousand ha.), AP (25.74 thousand ha.), and Gujarat (20.43 thousand ha.). Odisha also plays a small role towards the total contribution of India with an area of 6.61 thousand ha with a loose flower production of 24.9 thousand MT.

Marigold (*Tagetes sps*.) is one of the most important flower grown commercially for loose flowers. It belongs to family Asteraceae. It is suitable for beds, borders, pot culture and used in various religious and

social functions. In Odisha marigold occupies around 2681 ha area with a production of 239810 q (2013-14 statistics). Major districts of Odisha under marigold cultivation are Sambalpur, Cuttack, Khordha, Koraput, Mayurbhanj, Puri, Sundargarh and Ganjam. Successful production of marigold flowers depends on several factors, among which nutrition plays an important role in growth, quality and yield of flowers provided, pinching is the compulsory cultural practice carried out at 35 days after planting which also plays a vital role in yield attributes. Since, very little work has been done in Odisha on the use of organic manures to make the cultivation of marigold more profitable, hence present study was undertaken to find out the effect of FYM, vermicompost and cocopeat on growth and yield of marigold.

Materials and Methods

The present investigation "effect of farm yard manure, vermicompost and cocopeat on the growth and yield of African marigold (*Tagetes erecta* L.) Sirakole" was carried out in form of a field trial at the Agricultural Research Station, Binjhagiri, Chhatabar, Institute of Agricultural Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar during 2019-20.

The experiment was conducted following Randomized Block Design, where soil was taken as the control treatment i.e T1, Farm yard manure was applied to the soil @ 10 t/ha, 15 t/ha and 20 t/ha in three treatments which are T2,T3 and T4 respectively. Vermicompost was applied @ 2 t/ha, 2.5 t/ha and 3 t/ha in three treatments i.e T6,T7 and T8 respectively.

Cocopeat was applied @ 16 t/ha each in two treatments, i.e. with FYM @ 10 t/ha (T5) and vermicompost @ 2 t/ha(T9). So total nine no. of treatments were taken and replicated thrice.

Results and Discussion

Plant height (before pinching)

The observations on plant height before pinching were recorded and the data are given in Table-1. It is observed that the plant height was maximum i.e., 22.17cm in treatment T4 (Soil+ FYM 20t/ha) followed by 18.9cm in T5 (Soil+ FYM 10t/ha+ Cocopeat 16 t/ha) and 18.2cm in T3 (Soil+ FYM 15t/ha).The minimum plant height I.e., 15.43cm was observed in T1 (Soil). The result is in confirmation with the results reported by Naveen Chandra (2018). Similar results were also observed by Razzaq (2014) in marigold. Plant height in T5 (Soil+ FYM 10t/ha+ Cocopeat 16 t/ha) is more than T3 (Soil+ FYM 15t/ha) maybe due to the presence of Cocopeat. Faster plant development is due to the good root system and better heat properties of Cocopeat (Jadwiga Treder, 2008).

Plant height (after pinching)

The data for plant height after pinching is presented in Table-1 indicate that there is a continuous increase in plant height in all the treatments and it is maximum i.e., 37.23cm in T4 (Soil+ FYM 20t/ha) followed by T5 (Soil+ FYM 10t/ha+ *Cocopeat* 16 t/ha) i.e., 35.6cm and T3 (Soil+ FYM 15t/ha) i.e., 34.66cm which is similar to the results obtained by Naveen Chandra (2018). The height is more in case of T5 (Soil+ FYM 10t/ha+ *Cocopeat* 16 t/ha) than T3 (Soil+ FYM 15t/ha) might be due to cocopeat which provide better aeration and drainage and also good root system (Jadwiga Treder, 2008).

Number of secondary branches

It is observed from the data presented in Table-1, that the number of secondary branches after pinching is maximum i.e.,

17.66 in T9 (Soil+ vermicompost 2t/ha+ cocopeat 16 t/ha) followed by 16 in T6 (Soil+ FYM 15t/ha). Minimum number of branches were observed in T1 (Soil), i.e., 8.66.The result might be due to the presence of vermicompost as only vermicompost contains plant growth regulator like auxin, which is important for branching (Preeti Gohil, 2018). Number of branches are more in T6 (Soil+ vermicompost 2t/ha), i.e., 16 than T8 (Soil+ vermicompost 3t/ha), i.e., 13.33 which is similar with the results obtained by Ali Saheli Sardoei (2014) who suggested that high levels of vermicompost have negative effect on plant growth.

Days taken for initiation of 1st bud

The data of days taken for initiation of 1st flower bud from the date of planting was recorded and presented in Table-1. The data revealed that the least number of days taken for 1st flower bud initiation is 49.33 days, which is observed in both T5 (Soil+ FYM 10kg/ha+ Cocopeat 16 t/ha) and T9 (Soil+ Vermicompost 2 t/ha+ Cocopeat 16 t/ha), followed by T7 (Soil+ Vermicompost 2 t/ha), i.e., 50 days and T8 (Soil+ Vermicompost 3 t/ha), i.e., 50.66 days. Treatment T2 (Soil+ FYM 10 t/ha) and T4 (Soil+ FYM 20 t/ha) are at par with each other. The result is in confirmation with Jadwiga Treder, 2008, which might be due to the presence of cocopeat that results in faster development due to good root system.

Similar result was also observed in pelargonium grown in cocopeat (Treder and Nowak, 2002). Number of days was maximum in treatment T1 (Soil). Application of vermicompost caused the earlier bud initiation by enhancing soil fertility and moisture retention capacity of soil. Similar result also result was also reported by in china aster, Hildago and Harkess (2002) in chrysanthemum.

Days taken for colour break stage of the bud

The days taken for colour development in buds from the bud initiation was recorded and presented in Table-1. The data revealed that the least number of days taken for colour development of flower bud was 2 days, which is observed in T4 (Soil+ FYM 20t/ha), T5 (Soil+ FYM 10kg/ha+ Cocopeat 16 t/ha), T6 (Soil+ Vermicompost 2t/ha) and T9 (Soil+ Vermicompost 2 t/ha+ Cocopeat 16 t/ha) followed by T7 (Soil+ Vermicompost 2.5 t/ha) and T8 (Soil+ Vermicompost 3 t/ha), i.e., 2.33 days. In treatment T1 (Soil), maximum number of days were taken, i.e., 3.66 days. The result is in confirmation with Jadwiga Treder, 2008, which might be due to the presence of cocopeat that results in faster development due to good root system. Similar result was also observed in pelargonium grown in cocopeat (Treder and Nowak, 2002). Number of days was maximum in treatment T1 (Soil). Application of *vermicompost* caused the earlier bud initiation by enhancing soil fertility and moisture retention capacity of soil. Similar result also result was also reported by Hildago and Harkess (2002) in chrysanthemum.

Days taken for bud to attain full development stage

The days taken for full development of a flower from bud initiation was recorded Nand presented in Table-1. The data revealed that the least number of days taken for bud to develop into its full bloom stage is 5 days, which is observed in T9 (Soil+ Vermicompost 3 t/ha+ Cocopeat 16 t/ha), followed by T4 (Soil+ FYM 20 t/ha) and T5 (Soil+ FYM 10 t/ha+ Cocopeat 16 t/ha), i.e. 5.33 days. Treatments T8 (Soil+ Vermicompost 3 t/ha), and T3 (Soil+ FYM 15 t/ha) are at par with each other, i.e., 6 days.

Table.1 Effect of various growth parameters

Treatments	Plant height before Pinching (cm)	Plant height after Pinching (cm)	Number of secondary branches	Days taken for the initiation of 1st flower bud	Days taken until colour break stage of the bud	Days taken for bud to attain full development stage	Flower diameter (cm)	Individual weight of flower (g)
T1-Soil	15.43	27.4	8.66	58	3.66	7.33	6.66	4
T2-Soil + FYM(10t/ha)	17.2	29.1	12	51.33	3.0	6.33	8.73	4.8
T3-Soil + FYM(15t/ha)	22.16	37.23	14.33	52.0	2.0	6.0	10.3	5.6
T4-Soil + FYM(20t/ha)	18.2	34.66	11.33	51.33	3.0	7.0	9.16	6.0
T5-Soil + FYM(10t/ha) + CP(16 t/ha)	18.9	35.6	15.0	50.0	2.0	5.33	10.6	5.1
T6-Soil + VC(2t/ha)	16.03	27.9	13.33	51.0	2.0	5.33	7.8	4.1
T7-Soil + VC(2.5t/ha)	16.46	28.03	14.0	49.33	2.33	6.33	8.3	4.5
T8-Soil + VC(3t/ha)	16.83	28.73	16.0	50.66	2.33	6.0	8.76	4.3
T9-Soil+ VC(2t/ha)+ CP(16 t/ha)	17.83	30.46	17.66	49.33	2.0	5.0	8.9	6.0
SE(m) ±	0.916	1.442	1.09	0.683	0.251	0.211	0.431	0.198
CD @ 5%	2.74	4.32	3.26	2.05	0.75	0.63	1.29	0.596

Table.2 Yield parameters

Treatments	Number of flowers per plant	Flower yield per plant (g)	Flower yield per plot(kg)	Flower yield per hectare(t)
T1-Soil	30.66	122.64	0.91	10.2
T2-Soil + FYM(10t/ha)	50.33	275.18	1.71	22.9
T3-Soil + FYM(15t/ha)	58.0	334.09	1.78	27.8
T4-Soil + FYM(20t/ha)	52.66	396.0	1.98	33.0
T5-Soil + FYM(10t/ha) + CP(16 t/ha)	66.0	295.8	1.74	24.6
T6-Soil + VC(2t/ha)	53.0	206.35	1.50	17.1
T7-Soil + VC(2.5t/ha)	54.0	243.0	1.62	20.2
T8-Soil + VC(3t/ha)	57.33	227.9	1.59	18.9
T9-Soil+ VC(2t/ha)+ CP(16 t/ha)	59.66	315.96	1.57	26.3
SE(m) ±	2.541	3.251	4.992	0.916
CD @ 5%	7.62	9.747	14.966	2.747

The result is in confirmation with Jadwiga Treder, 2008, which might be due to the presence of Cocopeat that results in faster development due to good root system. Similar result was also observed in pelargonium grown in Cocopeat (Treder and Nowak, 2002). Number of days was maximum in treatment T1 (Soil). Application of Vermicompost caused the earlier bud initiation by enhancing soil fertility and moisture retention capacity of soil. Similar result also result was also reported by Hildago and Harkess (2002) in chrysanthemum.

Number of flowers per plant

It is evident from the data presented in Table-2 that, the maximum number of flowers were recorded in T4 (Soil+ FYM 20 t/ha), i.e., 66 followed by T3 (Soil+ FYM 15t/ha), i.e., 59.66 and T5 (Soil+ FYM 10t/ha+ Cocopeat 16 t/ha). Minimum number of flowers were recorded in T1 (Soil), i.e., 30.66. Treatments T7 (Soil+ Vermicompost 2.5 t/ha), T8 (Soil+ Vermicompost 3 t/ha) and T9 (Soil+ Vermicompost 2 t/ha+ Cocopeat 16 t/ha) are similar to each other, i.e., 54, 53 and 52.66 respectively. These are in confirmation with the results obtained by Naveen Chandra *et al.*, 2018, and Idan *et al.*, 2014. It might be due to the cause that FYM played an important role in improving physio-chemical properties of soil because of its higher analytical values (Jeyabasakaran *et al.*, 2001).

Flower diameter

The data on average flower diameter was recorded in Table-1. The maximum flower diameter (10.16 cm) was recorded under T8 (Soil+ Vermicompost 3t/ha) followed by 10.3 cm in T7 (Soil+ Vermicompost 2.5t/ha) and 9.6 cm in T9 (Soil+ vermicompost 2t/ha+ Cocopeat 16 t/ha). It might be due to the presence of vermi-compost which tend to increase in flower size (Shadanpour, 2011). Minimum flower diameter is observed in T1 (Soil), i.e., 6.66 cm. From the results obtained, we found that T3 (Soil+ FYM 15 t/ha) and T5 (Soil+ FYM 10 t/ha+ Cocopeat 16 t/ha) have given similar results, i.e., 8.73 cm and 8.76 cm.

Individual weight of flower

The data presented in Table-1 shows that the maximum weight of flower were recorded in T5 (Soil+ FYM 10t/ha+ Cocopeat 16 t/ha), i.e., 6 grams and it is at par with T9 (Soil+ Vermicompost 2t/ha+ Cocopeat 16 t/ha), followed by T3 (Soil+ FYM 15 t/ha) and T5 (Soil+ FYM 10 t/ha+ Cocopeat 16 t/ha), i.e., 5.6 grams and 5.1 grams respectively. The least flower weight was recorded in T1 (Soil), i.e., 4 grams. The results of treatments T6 (Soil+ Vermicompost 2 t/ha), T7 (Soil+ Vermicompost 2.5 t/ha) and T8 (Soil+ Vermicompost 3 t/ha) are similar to each other, i.e., 4.1, 4.5 and 4.3. The result is in confirmation with Jadwiga Treder, (2008) which might be due to the presence of cocopeat that results in faster development due to good root system. This might be due to cocopeat which provide better aeration and drainage (Khayyat *et al.*, 2007). Plants grown on cocopeat accumulated more fresh weight in the buds than plants grown in control medium.

Flower yield per plant as per weight basis

The data recorded in Table-2 represents that yield of a single plant in treatment T4 (Soil+ FYM 20 t/ha) was highest, i.e., 396 grams, followed by T3 (Soil+ FYM 15t/ha) and T9 (Soil+ Vermicompost 2t/ha+ Cocopeat 16 t/ha), i.e., 334.09 grams and 315.96 grams respectively. Yield was lowest in T1 (Soil), i.e., 122.64 grams. Similar results were reported by Shadanpour *et al.*, (2011) and Ajit Kumar (2002), in marigold. It might be due to the cause that FYM played an important role

in improving physio-chemical properties of soil because of its higher analytical values (Jeyabasakaran *et al.*, 2001).

Flower yield per plot

It is observed from the data presented in Table-2, that the flower yield from a single plot of treatment T4 (Soil+ FYM 20 t/ha) was highest, i.e., 1.98 kg, followed by T3 (Soil+ FYM 15t/ha) and T5 (Soil+ FYM 10 t/ha+ Cocopeat 16 t/ha), i.e., 1.789 kg and 1.74 kg respectively. Least yield was found in T1 (Soil), i.e., 0.919 kg. Treatments T2 (Soil+ FYM 15 t/ha) and T3 (Soil+ FYM 20 t/ha) are at par with each other, i.e., 1.719 and 1.789. Treatments with vermicompost incorporated in treatments T6 (Soil+ Vermicompost 2 t/ha) and T9 (Soil+ Vermicompost 3 t/ha) are at par with each other, i.e., 1.509 and 1.59 The results are in confirmation with Jadwiga Treder, (2008), which might be due to the presence of cocopeat that results in faster development due to good root system. Similar result was also observed in pelargonium grown in cocopeat (Treder and Nowak, 2002).

Flower yield per hectare

As per the data recorded in Table-2, we found that T4 (Soil+ FYM 20 t/ha) gave the highest yield, i.e., 33 ton, followed by T3 (Soil+ FYM 15 t/ha) and T9 (Soil+ FYM 3 t/ha+ Cocopeat 16 t/ha), i.e., 27.8 ton and 26.3 ton respectively. Whereas T1 (Soil) produced minimum yield, i.e., 10.2 ton. Similar results were reported by Shadanpour *et al.*, (2011) and Ajit Kumar (2002) in marigold. FYM played an important role in improving physio-chemical properties of soil because of its higher analytical values (Jeyabasakaran *et al.*, 2001).

From the present investigation, it may be concluded that, among FYM, vermicompost and cocopeat, the performance of FYM was found best, followed by vermicompost and cocopeat. The application of FYM @ 20t/ha gave highest plant growth and flower yield, while mixture of vermicompost @ 2t/ha and cocopeat @16t/ha showed best results in flowering.

References

Naveen Chandra, Badoni A, Chamoli V, Khaan J, Joshi N and Muruglatha N. 2018. Effect of different doses of FYM on flower yield of marigold (*Tagetes Erecta* L.) CV. Hawaii, *Journal of Pharmacognosy and Phytochemistry*; SP5: 154-156.

Razzaq O.I., Prasad V.M and Saravanan S. 2014, Effect of organic manures on flower yield of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda. *International Journal of Agricultural Science and Research (IJASR)*, 4 (1): 39-50

Jadwiga Treder. 2008, The Effects Of Cocopeat And Fertilization On The Growth And Flowering Of Oriental Lily 'Star Gazer', *Journal of Fruit and Ornamental Plant Research*, Vol. 16: 361-370.

Ali Saheli Sardoei and Roien A. 2014, Effect of Vermicompost on the Growth and Flowering of African Marigold (Tagetes erecta). *American-Eurasian J. Agric. and Environ. Sci*., 14 (7): 631-635.

Hidalgo, P.R. and Harkess, R.L. 2002. Earthworm castings as a substrate for poinsettia production, *HortScience* 37: 304-308

Treder J., Nowak J. 2002. Zastosowanie podłoży kokosowych w uprawie roślin rabatowych.. *ZESZ. PROBL. POST. NAUK ROL.* 485: 335-358 (in Polish with English abstract).

Jeyabaskaran KJ, Pandey SD, Mustaffa MM, Sathyamoorthy S. 2001. Effect of different organic manures with graded

level of inorganic fertilizers on ratios of Poovan banana. *South Indian Horticulture*, 49: 105- 106.

Shadanpour F, Torkashv and M, Majd H. 2011. The effect of cow manure vermicompost as the planting medium on the growth of Marigold, *Annals of Biological Research*, 2(6): 109-115.

Ajit Kumar, 2002, Effect of organic and inorganic fertilizers on growth, yield and post-harvest life of marigold. M.Sc. (Agri) Thesis, *University of Agricultural Sciences*, Bangalore, 2002. 6 (4): 130-158

Preeti Gohil, Gohil M., Rajatiya J., Halepotara F., Solanki M., Malam V.R. and Barad R. 2018. Role of Growing Media for Ornamental Pot Plants. *Int. J. Pure App. Biosci*. 6 (1): 1219-1224.

How to cite this article:

Rudra Madhab Dash, Sailendri Kumari Patra, Subhendu Jena and Swagat Ranjan Mund. 2021. Effect of FYM, Vermicompost and Cocopeat on Growth and Yield of African Marigold (*Tagetes erecta* L.) cv. Sirakole. *Int.J.Curr.Microbiol.App.Sci.* 10(03): 1402-1408.
doi: https://doi.org/10.20546/ijcmas.2021.1003.171