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Response of potting media composition for pot Mum production on chrysanthemum (*Dendranthema grandiflora* L.) variety Savita

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Abstract

The present investigation entitled “Response of potting media composition for pot mum production on chrysanthemum (*Dendranthema grandiflora* L.) variety Savita” was conducted at Tissue Culture Lab premises at College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during 2023 – 24. The experiment was laid out in completely randomized design using 8 treatments viz. T₀ Garden soil (control), T₁ Garden soil + Sand + FYM (2:1:1), T₂ Garden soil + Sand + Poultry manure (1:2:0.5), T₃ Garden soil + Sand + FYM + Vermicompost (1:1:0.5:0.5), T₄ Garden soil + FYM + Neem cake (1:1:0.5), T₅ Garden soil + Cocopeat + Sand (2:1:1), Garden soil + Sand + Vermicompost (1:1:0.5), T₆ Garden soil + Sand + Vermicompost (1:1:0.5), T₇ Cocopeat + Vermicompost + FYM (1:1:1) and replicated thrice. The experimental result revealed that minimum number of days taken for first bud appearance (58.56 days), minimum days for 50% flowering (69.34 days), maximum duration of flowering days (41.13 days), maximum flower diameter (5.39 cm), maximum number of flowers per plant (66.13), highest average weight of flower (2.96g). The maximum flower yield per plant (118.16 g) and highest vase life (10.16 days) was recorded in treatment containing T₃ Garden soil + Sand + FYM + Vermicompost (1:1:0.5:0.5) followed by T₆ Garden soil + Sand + Vermicompost (1:1:0.5).

Keywords: FYM, Chrysanthemum (*Dendranthema grandiflora* L.), potting media, vermicompost, sand

Introduction

The world's most well-known and significant flower crop is the chrysanthemum, which is mostly cultivated in China, Japan, the United States, France, the United Kingdom, and India. Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, and West Bengal are among the Indian States where chrysanthemums are grown for sale. In Northern India, people prefer buying large-flowered chrysanthemums, whereas in Southern India, they prefer buying small-flowered varieties. Along with local demand, floriculture has enormous export potential. Commercial chrysanthemum gardening is now most profitable when pot mums are produced. This developing method is particularly promising because to its efficiency in terms of time, area, and material. They are the most well-liked because they have a great variety of colour, shape, long-lasting flowers, and handling simplicity. The leaves beauty, compact stature, and capacity to withstand gloomy conditions make pot plants highly prized. One class of plants that may bring freshness to confined places is pot plants. Plants like chrysanthemums, lantanas, helianthus, nerium, etc. may be planted alongside potted mum.

Materials and Methods

The experiment was conducted at Tissue Culture Lab premises at College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) during 2023 -24. The experiment was laid out in completely randomized design replicated 3 times having 8 treatments viz. T₀ Garden soil (control), T₁ Garden soil + Sand + FYM (2:1:1), T₂ Garden soil + Sand + Poultry manure (1:2:0.5), T₃ Garden soil + Sand + FYM + Vermicompost (1:1:0.5:0.5), T₄ Garden soil + FYM + Neem cake (1:1 :0.5), T₅ Garden soil + Cocopeat + Sand (2:1:1), Garden soil + Sand + Vermicompost (1:1:0.5), T₆ Garden soil + Sand + Vermicompost (1:1:0.5), T₇ Cocopeat + Vermicompost +FYM (1:1:1).

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The terminal cuttings of 5-7 cm length were prepared from one year old chrysanthemum plant with the help of secateurs. After 45 days seedlings are transplanted in polybags were filled with different potting media and use some cultural practices like irrigations, weeding and plant protection among all treatments.

Results and Discussion

Days taken for first bud appearance

The data in Table 1 showed that different combinations of potting media had a significant influence on the number of days required for first bud appearance. The treatment T₃ Garden soil + sand + FYM + vermicompost took lesser days to first bud appearance (58.56 days) followed by T₆ Garden soil + sand + vermicompost with (61.46 days). These findings are consistent with studies reported by Monika *et al.* (2021) [12] in chrysanthemum, who found that first bud initiation took fewer days in media containing cocopeat + FYM + garden soil (2:1:1). Similarly, Chauhan *et al.* (2014) [6] found adequate number of leaves per plant which resulted in healthy buds and flowers at an early stage in gerbera with similar kind of organic combination of media which contains soil, rice husk, cocopeat, castor cake and vermicompost (1:1:1:1:1). Deogade *et al.* (2020) [7] have similar result in calendula with treatment combination of Garden soil + FYM + Vermicompost + Cocopeat took minimum days for first flower bud initiation.

Days for 50% flowering

The data in Table 1 showed that different combinations of potting media had a significant influence on the number of days required for 50% flowering. The treatment T₃ Garden soil + sand + FYM + vermicompost took minimum days for 50% flowering having value of (69.34 days), which was statistically at par with treatment T₆ Garden soil + sand + vermicompost (70.43 days). The application of adequate vermicompost which is rich in humic acid and aids in the production of auxins and growth substances at an early stage of growth may be responsible for the number of days to 50% flowering, similarly early bud initiation is dependent on plants quick response to nutrient absorption and simultaneously transfer growth-promoting agents like cytokine to the auxiliary buds which break the apical dominance of the plant, ultimately, these processes provide a better site for the mobilization of photosynthesis and the transition of vegetative plant parts into the reproductive phase. Patel *et al.* (2017) + found similar result in marigold. Deogade *et al.* (2020) [7] have similar result in calendula with treatment combination of garden soil + FYM + vermicompost + cocopeat took minimum days for 50% flowering.

Duration of flowering days

It is evident from the Table 1 different combinations of potting media had a significant influence on duration of flowering. The maximum flowering duration was observed in the treatment T₃ Garden soil + sand + FYM + vermicompost (41.13 days), which was statistically at par with treatment T₆ Garden soil + sand + vermicompost (39.36 days). These findings are consistent with findings reported in chrysanthemum by Nair and Bharathi (2015) [16] they found the longest flowering duration in treatment combination of cocopeat + sand + FYM + vermicompost. Similar result by Bala and Singh (2013) in chrysanthemum

with treatment combination of soil + sand + FYM + vermicompost observed longest flowering duration. Dubey *et al.* (2013) [8] noted that when calendula plant was grown in cocopeat + vermicompost observed maximum flowering duration. Padhiyar *et al.* (2017) [13] found that cocopeat + vermicompost + bio compost media containing observed highest flowering duration on chrysanthemum.

Flower diameter (cm)

The flower diameter was significantly influenced by different potting media combination Table 1 the treatment T₃ Garden soil + sand + FYM + vermicompost had the highest flower diameter of (5.39 cm), which was at par with T₆ Garden soil + sand + vermicompost of (5.24cm) and T₁ Garden soil + sand + FYM of (5.17cm). Phosphorous helps in flower initiation and development (Uchida, 2000), adequate nutrient supply and ambient temperature conditions may be the reason for good flower head size. The similar results were observed in chrysanthemum by Kameswari *et al.* (2014) [11] with media containing cocopeat + sand + FYM + vermicompost, have significantly maximum flower diameter. Singh *et al.* (2022) [15] concluded compositions of cocopeat, vermicompost and leaf moulds improve the water retention and aeration of media, the result revealed flowering parameters with maximum flower diameter in case of media composition of cocopeat + vermicompost + leaf mould among all the growing media compositions on chrysanthemum. Padhiyar *et al.* (2017) [13] have similar result in chrysanthemum with treatment combination of cocopeat + vermicompost + bio compost.

Number of flower per plant

Different combinations of potting media had a significant influence on the number of flowers per plant Table 2 T₃ Garden soil + sand + FYM + vermicompost produced the maximum flowers (66.13) followed by T₁ Garden soil + sand + FYM of (59.21) flowers. The maximum flower is due to vigorous vegetative growth that resulted in increased carbohydrate reserve material as well as proper absorption of all available nutrients resulting in a highest number of flowers per plant in gerbera (Chauhan *et al.*, 2014) [6]. The similar result reported by Kameswari *et al.* (2014) [11] and Singh *et al.* (2022) [15] in chrysanthemum, Nair and Bharathi (2015) [16] in pot mum, Lokhande *et al.* (2019) [17] in marigold and Kumar *et al.* (2022) [14] in calendula. According to Patanwar *et al.* (2014) [18] the vermicompost used in the media is a good source of macro and micronutrients such as Fe and Zn, enzymes etc which have beneficial effects on microorganisms and growth hormones and play secondary role to increase in flower yield chrysanthemum.

Average weight of flower (g)

The potting media combinations had a significant influence on average flower weight Table 2 T₃ Garden soil + sand + FYM + vermicompost had the highest average flower weight of (2.96g), followed by T₆ Garden soil + sand + vermicompost with (2.56g), which performed the best. The lowest average weight was observed in T₀ Garden soil control (1.93g).

The potting media provide nutrient and air space *i.e.* anchorage for the plant roots for proper growth and air space to allow respiration and sufficient available water to enable plant growth which may also increase the absorption of

available elements through the roots resulting in an increase in the average weight of the flower. Similarly Kameswari *et al.* (2014) ^[11] found that cocopeat + sand + FYM + vermicompost medium significantly increased the average flower weight of chrysanthemum and Chauhan *et al.* (2014) ^[6] observed highest weight of gerbera flower in potting media containing Soil: Cocopeat: Castor cake: Rice Husk: vermicompost (1:1:1:1:1v/v).

Flower yield per plant (g)

The flower yield per plant was significantly affected by different combinations of potting media Table 2 T₃ Garden soil + sand + FYM + vermicompost produced the highest flower yield per plant of (118.16g), which was at par with T₆ Garden soil + sand + vermicompost (116.06g). Increased in flower yield per plant may be due to increased number of branches, size and weight of a blossom in media containing T₃ Garden soil + sand + FYM + vermicompost these media enhanced metabolic activity of the plant resulted in better production of photosynthates at the source and an accumulation of food materials in the sink, i.e. increasing the yield of flowers per plant. The result got supported by Singh *et al.* (2022) ^[15] with cocopeat, vermicompost and leaf mould (2:1:1) media in potted chrysanthemum, Chauhan *et al.* (2014) ^[6] with soil + rice husk + cocopeat + castor cake + vermicompost media in gerbera, where as Barreto and Jagtap (2002) observed that highest flower yield was

produced by coco-peat combined with either compost or vermicompost (1:1) in gerbera.

Vase life (days)

The data in Table 2 showed that different combinations of potting media had a significant influence on the vase life of flower. The highest vase life (10.16 days) was observed in T₃ Garden soil + sand + FYM + vermicompost which was at par with treatment T₆ Garden soil + sand + vermicompost of (9.33 days) and T₀ Garden soil (control) of (9.13 days). The lowest vase life of (5.63 days) and (5.43 days) were found in T₇ Cocopeat + vermicompost + FYM and T₅ Garden soil + cocopeat + sand respectively.

The maximum vase life caused by potting media might be due to the higher water retention and lower desiccation in the cells of flowers and internal storage of carbohydrate content of the flowers was responsible for the longevity and vase life of cut flowers due to organic source of potting media. Greater length and thickness of the flower stalk also affected the longevity of flowers. These result is commensurate with the finding of Chauhan *et al.* (2014) ^[6] who found soil + rice husk + cocopeat + castor cake + vermicompost media have highest vase life on gerbera, Singh *et al.* (2022) ^[15] found highest vase life in chrysanthemum with cocopeat + vermicompost + leaf mould (2:1:1).

Table 1: Effect of different combinations of potting media on number of days taken to first bud initiation, days for 50% flowering, duration of flowering days and flower diameter (cm)

Tr. No.	Treatment details	Days taken for first bud appearance	Days for 50% flowering	Duration of flowering (days)	Flower diameter (cm)
T ₀	Garden soil (control)	64.86	76.06	31.87	4.15
T ₁	Garden soil + Sand + FYM (2:1:1)	62.16	71.46	36.06	5.17
T ₂	Garden soil + Sand + Poultry manure (1:2:0.5)	62.83	71.63	35.23	4.17
T ₃	Garden soil + Sand + FYM + Vermicompost (1:1:0.5:0.5)	58.56	69.34	41.13	5.39
T ₄	Garden soil + FYM+ Neem cake (1:1 :0.5)	66.03	74.56	34.96	4.45
T ₅	Garden soil +Cocopeat + Sand (2:1:1)	64.16	73.03	35.36	4.74
T ₆	Garden soil + Sand + Vermicompost (1:1:0.5)	61.46	70.43	39.36	5.24
T ₇	Cocopeat + Vermicompost +FYM (1:1:1)	68.13	77.18	37.83	3.80
	SEM±	0.49	0.39	0.47	0.25
	C.D. at 5%	1.49	1.18	1.42	0.77

Table 2: Effect of different combinations of potting media on number of flower per plant, average weight of flower (g), flower yield per plant (g) and vase life (days)

Tr. No.	Treatment details	Number of flower per plant	Average weight of flower (g)	Flower yield per plant(g)	Vase life (days)
T ₀	Garden soil (control)	46.93	1.93	97.63	9.13
T ₁	Garden soil + Sand + FYM (2:1:1)	59.21	2.53	112.46	9.06
T ₂	Garden soil + Sand + Poultry manure (1:2:0.5)	53.01	2.43	105.23	6.13
T ₃	Garden soil + Sand + FYM + Vermicompost (1:1:0.5:0.5)	66.13	2.96	118.16	10.16
T ₄	Garden soil + FYM+ Neem cake (1:1 :0.5)	54.86	2.23	105.76	6.03
T ₅	Garden soil +Cocopeat + Sand (2:1:1)	52.76	2.36	107.93	5.43
T ₆	Garden soil + Sand + Vermicompost (1:1:0.5)	58.54	2.56	116.06	9.33
T ₇	Cocopeat + Vermicompost +FYM (1:1:1)	57.26	2.13	113.26	5.63
	SEM±	0.67	0.09	1.07	7.61
	C.D. at 5%	2.02	0.27	3.21	0.35

Conclusion

The result indicating the effect of different potting media combination on flower parameter of chrysanthemum, treatment T₃ Garden soil + sand + FYM + vermicompost and T₆ Garden soil + Sand + Vermicompost best with regards to days taken to first bud appearance, days for 50% flowering, duration of flowering (days). Flower diameter

(cm), number of flower per plant, average weight of flower (g), flower yield per plant (g) and vase life (days). Therefore, it can be concluded that potting media containing Garden soil + Sand + FYM + Vermicompost and Garden soil + Sand + Vermicompost were found best for flowering parameters of chrysanthemum plants.

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