



Plant Archives

Journal homepage: <http://www.plantarchives.org>

DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2026.v26.no.2.137>

STANDARDIZATION OF POTTING MEDIA COMPOSITION FOR GROWTH, FLOWERING AND POT PRESENTABILITY OF ZINNIA (*Zinnia elegans* JACQ.)

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(Date of Receiving- 21-7-2026; Date of Revision-22-08-2026; Date of Acceptance-03-09-2026)

ABSTRACT

The present investigation entitled “Standardization of potting media composition for growth, flowering and pot presentability of zinnia (*Zinnia elegans* Jacq.)” was carried out in the year 2025-2026 at Post Graduate Institute of Horticultural Sciences, SKLTGHU, Mulugu, Telangana, India. The treatments consists of different combinations of soil, cocopeat, spent mushroom compost, burnt rice husk, vermicompost and farmyard manure (FYM), namely: T₁ - Soil + Vermicompost (2:1 v/v), T₂ - Cocopeat + Vermicompost (2:1 v/v), T₃ - Spent mushroom compost + Vermicompost (2:1 v/v), T₄ - Burnt rice husk + Vermicompost (2:1 v/v), T₅ - Soil + Cocopeat + Vermicompost (1:1:1 v/v), T₆ - Soil + Spent mushroom compost + Vermicompost (1:1:1 v/v), T₇ - Soil + Burnt rice husk + Vermicompost (1:1:1 v/v), T₈ - Soil + Cocopeat + Spent mushroom compost + Burnt rice husk + Vermicompost (1:0.5:0.5:0.5:0.5 v/v) and T₉ - Control (Soil + FYM, 2:1 v/v). Observations were recorded on growth, flowering, of the potting media. The results revealed significant variation among the potting media combinations. Among the growth parameters, T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) at 30, 60 and 90 days after transplanting (DAT), recorded the maximum plant height (15.99, 26.07 and 29.57 cm) and stem diameter (0.52, 0.78 and 0.93 cm), respectively. In contrast, T₂ (Cocopeat + vermicompost, 2:1 v/v) at 30, 60 and 90 DAT recorded the maximum number of branches (8.47, 14.39 and 16.70), plant spread in E-W (15.27, 29.40 and 36.22 cm) and N-S (14.07, 27.80 and 34.42 cm), leaf area (3.62, 6.37 and 8.51 cm²) and chlorophyll content in leaves (23.27, 31.37 and 36.08 SPAD), respectively. Among the flowering parameters, T₂ recorded the earliest flower bud initiation (24.20 days), 50 per cent flowering (41.83 days) and full bloom (50.53 days), along with maximum flowering duration (59.12 days), maximum number of flowers per plant (51.36) and highest pot presentability score (91.98). This study concludes that T₂ (Cocopeat + vermicompost, 2:1 v/v) found to be the most effective potting medium, promoting superior vegetative growth, early and profuse flowering and better pot presentability in *Zinnia elegans*.

Key words : Potting media, Zinnia, Cocopeat, Vermicompost, Spent mushroom compost, Burnt rice husk, Pot presentability.

Introduction

Zinnia elegans (syn. *Zinnia elegans* Jacq) is one of the most widely cultivated flower crop species, with a chromosome number of 2n = 24 belongs to the family Asteraceae. It is highly valued for its bright, attractive flowers, sturdy stems, extended vase life and relative resistance to diseases, making it popular among growers

and gardeners (Dole, 1999). Due to its profuse flowering and ornamental value, zinnia is widely used in landscape gardening, bedding, and pot culture. (Thaledi *et al.*, 2023). Apart from its ornamental use, zinnia is also utilized as a cut flower, potted plant and in dried flower arrangements. Studies have also reported various bioactive properties such as antifungal, antibacterial and antioxidant activities

(Nashar and Aboelsaadat, 2020).

Potting media plays an important role in enhancing the quality and production of ornamental plants. The media should be porous, uniform in texture, hold sufficient moisture and should be well drained. Now-a-days, various types of organic potting medias are used in floriculture industry. Apart from soil, vermicompost, farmyard manure (FYM), coconut compost (cocopeat), agricultural wastes spent mushroom compost and burnt rice husk were used to evaluate their efficacy on the growth, flowering of zinnia to find out the appropriate potting media combination. Vermicompost, an organic manure produced by earthworms, enhances soil properties such as pH balance, fertility, aeration, and water use efficiency. It also improves micronutrient availability and contains plant growth regulators that promote better growth and flowering (Gohil *et al.*, 2018). Cocopeat, derived from coconut husk, is a widely used growing medium due to its high water-holding capacity (8–9 times its weight) and good aeration. It is clean, lightweight, and supports healthy plant growth with reduced irrigation and fertigation needs, making it ideal for ornamental crops (Arunesh *et al.*, 2020). Spent mushroom compost (SMC), a by-product of the mushroom industry, it is rich in organic matter and contains comparatively higher levels of available nitrogen, phosphorus and potassium. However, it also possesses relatively high electrical conductivity due to the presence of soluble salts; therefore, it is commonly blended with other substrates to improve the nutrient status of the growing medium while maintaining favourable physical properties (Zied *et al.*, 2020). Burnt rice husk (BRH), is a lightweight, silica-rich material with low bulk density, high porosity. It also contains appreciable amounts of potassium and enhances root-zone aeration while reducing media compaction, making it a valuable component of container substrates (Susana and Alit, 2021). Farmyard manure refers to the decomposed mixture of dung and urine of farm animals along with their litter and left over material from roughages or fodder fed to the cattle. FYM is one of the components of INM as it is a cheap and easily available source of organic nutrient.

Materials and Methods

A pot experiment was conducted during the *Rabi* season of 2025-26 at Post Graduate Institute for Horticultural Sciences, Mulugu. The experimental site comes under a semi-arid tropical climate with an altitude of 543.3 m above mean sea level on 78.62 East longitude and 17.72 North latitude. The experiment was laid out in a Completely Randomized Design (CRD) with nine

treatments and three replications. The treatments consists of different combinations of soil, cocopeat, spent mushroom compost, burnt rice husk, vermicompost and farmyard manure (FYM), namely: T₁ - Soil + Vermicompost (2:1 v/v), T₂ - Cocopeat + Vermicompost (2:1 v/v), T₃ - Spent mushroom compost + Vermicompost (2:1 v/v), T₄ - Burnt rice husk + Vermicompost (2:1 v/v), T₅ - Soil + Cocopeat + Vermicompost (1:1:1 v/v), T₆ - Soil + Spent mushroom compost + Vermicompost (1:1:1 v/v), T₇ - Soil + Burnt rice husk + Vermicompost (1:1:1 v/v), T₈ - Soil + Cocopeat + Spent mushroom compost + Burnt rice husk + Vermicompost (1:0.5:0.5:0.5 v/v) and T₉ - Control (Soil + FYM, 2:1 v/v). Zinnia variety 'Profusion Double Mix' Sakata Seeds Private Limited was used in this experiment. This variety is known for its resistance to diseases, drought and heat, along with good tolerance to high humidity. It is easy to maintain, requires no de heading and shows a uniform and compact growth habit. The plants produce attractive double flowers in shades of yellow, deep orange, white and pink and flower continuously from spring to frost. The blooms are long-lasting and suitable for garden beds and landscape use. Plants attain a height of about 14 inches and spread up to 24 inches, with flower diameter ranging from 2.5 to 3.0 inches. Various potting media under study viz.; Red Soil, Cocopeat, Vermicompost, Spent mushroom compost, burnt rice husk and FYM were used for experiment. Uniform size of plastic pots (10 inch) was selected and filled with potting media according to different treatments. Uniform, well developed and healthy plants of zinnia were selected and seedlings were transplanted 21 days after sowing in portrays.

Statistical analysis

Statistical analysis of data of various characters was carried out as per Completely Randomized Design (CRD). Analysis of variance was worked out using standard statistical procedures as described by Panse and Sukatmi (1985). Standard Error of Mean (S.E.m ±), Critical Difference (CD) at 5% probability and Co-efficient of Variance (CV%) was worked out for the interpretation of the results.

Results and Discussion

Plant height (cm)

Significant differences among treatments were observed for plant height. At 30 DAT, the maximum plant height was recorded in T₅- (Soil + cocopeat + vermicompost, 1:1:1 v/v) (15.99 cm), followed by T₂- (Cocopeat + vermicompost, 2:1 v/v) (14.81 cm), whereas the minimum plant height was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (10.39 cm). At 60 DAT, T₅ (26.07

Table 1 : Effect of different potting media on plant height (cm) and stem diameter (cm) at 30, 60 and 90 DAT of zinnia (*Zinnia elegans* Jacq.).

Treatments	Plant height (cm)			Stem diameter (cm)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
T ₁ - Soil + vermicompost (2:1 v/v)	11.97 ^d	19.26 ^{cd}	22.67 ^{de}	0.40 ^c	0.64 ^{bc}	0.77 ^{ef}
T ₂ - Cocopeat + vermicompost (2:1 v/v)	14.81 ^b	24.66 ^a	28.32 ^{ab}	0.50 ^a	0.75 ^a	0.90 ^{ab}
T ₃ - Spent mushroom compost + vermicompost (2:1 v/v)	11.60 ^d	17.90 ^{de}	20.11 ^{fg}	0.37 ^{cd}	0.60 ^d	0.75 ^{fg}
T ₄ - Burnt rice husk + vermicompost (2:1 v/v)	13.51 ^c	22.61 ^b	26.11 ^c	0.45 ^b	0.67 ^{bc}	0.83 ^{cd}
T ₅ - Soil + cocopeat + vermicompost (1:1:1 v/v)	15.99 ^a	26.07 ^a	29.57 ^a	0.52 ^a	0.78 ^a	0.93 ^a
T ₆ - Soil + spent mushroom compost + vermicompost (1:1:1 v/v)	14.74 ^b	24.53 ^{ab}	27.23 ^{bc}	0.46 ^b	0.69 ^b	0.85 ^{bc}
T ₇ - Soil + burnt rice husk + vermicompost (1:1:1 v/v)	12.37 ^d	20.69 ^c	24.04 ^d	0.43 ^b	0.65 ^{bc}	0.80 ^{de}
T ₈ - Soil + cocopeat + spent mushroom compost + burnt rice husk + vermicompost (1:0.5:0.5:0.5:0.5 v/v)	11.83 ^d	18.47 ^{de}	21.57 ^{ef}	0.39 ^c	0.63 ^{cd}	0.76 ^{ef}
T ₉ - Control (Soil + FYM) (2:1 v/v)	10.39 ^e	16.84 ^e	18.91 ^g	0.35 ^d	0.54 ^e	0.70 ^g
S.E.(m)±	0.38	0.62	0.54	0.01	0.02	0.02
C.D at 5%	1.14	1.87	1.62	0.03	0.05	0.05
C.V	5.06	5.11	3.87	4.28	4.50	3.39

cm) recorded the maximum plant height, which was statistically on par with T₂ (24.66 cm) and T₆- (24.53 cm), while T₉ (16.84 cm) recorded the minimum plant height. Similarly, at 90 DAT, the maximum plant height was recorded in T₅ (29.57 cm), followed by T₂ (28.32 cm), whereas the minimum plant height was recorded in T₉ (18.91 cm). The enhanced plant height may be attributed to improved root development, nutrient uptake and moisture availability under the combined use of soil, cocopeat and vermicompost. The favourable root-zone conditions may have promoted greater meristematic activity, cell division and elongation, resulting in greater shoot growth. Similar findings were reported by Gohil *et al.* (2018) and Motanayak *et al.* (2025) in chrysanthemum.

Stem diameter (cm)

Significant differences among the treatments were observed for stem diameter at 30, 60 and 90 DAT. At 30 DAT, the maximum stem diameter was recorded in T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (0.52 cm), which was statistically on par with T₂ (Cocopeat + vermicompost, 2:1 v/v) (0.50 cm), whereas the minimum stem diameter was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (0.35 cm). At 60 DAT, T₅ (0.78 cm) recorded the maximum stem diameter, which was statistically on par with T₂ (0.75 cm), while T₉ (0.54 cm) recorded the minimum stem diameter. Similarly, at 90 DAT, the maximum stem diameter was recorded in T₅ (0.93 cm), which was statistically on par with T₂ (0.90 cm), whereas

the minimum stem diameter was recorded in T₉ (0.70 cm). The increased stem diameter could be due to better nutrient uptake and assimilate accumulation under the favourable growing medium, which enhanced cambial activity and structural tissue development. Similar findings were reported by Bhandari *et al.* (2017) in lilium and Arunesh *et al.* (2020) in gerbera.

Number of branches

Significant variation in the number of branches was observed among the treatments at 30, 60 and 90 DAT. At 30 DAT, the maximum number of branches was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (8.47), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (7.93), whereas the minimum number of branches was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (3.80). At 60 DAT, T₂ (14.39) recorded the maximum number of branches, followed by T₅ (13.31), while T₉ (6.14) recorded the minimum. Similarly, at 90 DAT, the maximum number of branches was recorded in T₂ (16.70), which was statistically on par with T₅ (15.67), whereas the minimum number of branches was recorded in T₉ (9.25). The increased branching may be due to the lower bulk density, higher porosity and greater water-holding capacity of the medium, favouring root growth and nutrient uptake. Vermicompost also provides essential nutrients, humic substances and growth-promoting compounds that enhance axillary bud development and lateral shoot growth. Similar findings were reported by Chauhan *et al.* (2014) in gerbera and

Table 2 : Effect of different potting media on number of branches and leaf area (cm²) at 30, 60 and 90 DAT of zinnia (*Zinnia elegans* Jacq.).

Treatments	Number of branches			Leaf area (cm ²)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
T ₁ - Soil + vermicompost (2:1 v/v)	5.53 ^d	8.98 ^e	12.05 ^d	2.74 ^d	4.57 ^e	7.25 ^e
T ₂ - Cocopeat + vermicompost (2:1 v/v)	8.47 ^a	14.39 ^a	16.70 ^a	3.62 ^a	6.37 ^a	8.51 ^a
T ₃ - Spent mushroom compost + vermicompost (2:1 v/v)	4.47 ^e	7.36 ^f	10.55 ^e	2.67 ^{de}	4.30 ^{fg}	6.55 ^f
T ₄ - Burnt rice husk + vermicompost (2:1 v/v)	6.80 ^c	11.70 ^c	14.65 ^{bc}	3.00 ^c	5.18 ^d	7.73 ^{cd}
T ₅ - Soil + cocopeat + vermicompost (1:1:1 v/v)	7.93 ^{ab}	13.31 ^b	15.67 ^{ab}	3.45 ^{ab}	6.06 ^b	8.24 ^b
T ₆ - Soil + spent mushroom compost + vermicompost (1:1:1 v/v)	7.50 ^b	12.82 ^b	15.46 ^b	3.28 ^b	5.60 ^c	7.98 ^c
T ₇ - Soil + burnt rice husk + vermicompost (1:1:1 v/v)	6.35 ^c	10.56 ^d	13.76 ^c	2.84 ^{cd}	4.94 ^d	7.51 ^{de}
T ₈ - Soil + cocopeat + spent mushroom compost + burnt rice husk + vermicompost (1:0.5:0.5:0.5:0.5 v/v)	4.70 ^e	7.84 ^f	11.28 ^{de}	2.71 ^{de}	4.48 ^{ef}	6.72 ^f
T ₉ - Control (Soil + FYM) (2:1 v/v)	3.80 ^f	6.14 ^g	9.25 ^f	2.55 ^e	4.05 ^g	6.24 ^g
S.E.(m)±	0.19	0.36	0.38	0.06	0.09	0.09
C.D at 5%	0.57	1.06	1.15	0.18	0.26	0.26
C.V	5.33	5.94	4.99	3.47	3.01	2.05

Singh *et al.* (2022) in chrysanthemum.

Leaf area (cm²)

Significant differences among the treatments were observed for leaf area at 30, 60 and 90 DAT. At 30 DAT, the maximum leaf area was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (3.62 cm²), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (3.45 cm²), whereas the minimum leaf area was recorded in T₉ - Control (Soil + FYM, 2:1 v/v) (2.55 cm²). At 60 DAT, T₂ (6.37 cm²) recorded the maximum leaf area, followed by T₅ (6.06 cm²), while T₉ (4.05 cm²) recorded the minimum. Similarly, at 90 DAT, the maximum leaf area was recorded in T₂ (8.51 cm²), followed by T₅ (8.24 cm²), whereas the minimum leaf area was recorded in T₉ (6.24 cm²). The higher leaf area could be due to improved moisture availability and nutrient supply under the cocopeat and vermicompost medium, promoting root growth, cell division and leaf expansion. Similar findings were reported by Katoch *et al.* (2024) in ornamental plants and Paruchuru *et al.* (2021) in miniature rose.

Plant spread (E-W) (cm)

Significant variation in plant spread in the E-W direction was observed among the treatments at 30, 60 and 90 DAT. At 30 DAT, the maximum plant spread was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (15.27 cm), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (14.25 cm), whereas the minimum plant spread was recorded in T₉-Control (Soil + FYM, 2:1 v/v) (7.18 cm). At 60 DAT, T₂ (29.40

cm) recorded the maximum plant spread, followed by T₅ (27.36 cm), while T₉ (13.48 cm) recorded the minimum. Similarly, at 90 DAT, the maximum plant spread was recorded in T₂ (36.22 cm), which was statistically on par with T₅ (34.53 cm), whereas the minimum plant spread was recorded in T₉ (18.74 cm).

Plant spread (N-S) (cm)

Significant differences in N-S plant spread were observed among the treatments at 30, 60 and 90 DAT. At 30 DAT, the maximum plant spread was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (14.07 cm), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (13.10 cm), whereas the minimum plant spread was recorded in T₉ - Control (Soil + FYM, 2:1 v/v) (5.98 cm). At 60 DAT, T₂ (27.80 cm) recorded the maximum plant spread, which was statistically on par with T₅ (26.06 cm), while T₉ (11.88 cm) recorded the minimum. Similarly, at 90 DAT, the maximum plant spread was recorded in T₂ (34.42 cm), which was statistically on par with T₅ (32.73 cm), whereas the minimum plant spread was recorded in T₉ (16.94 cm). Improved aeration, water-holding capacity and nutrient availability may have promoted photosynthate accumulation, cell division and elongation, resulting in greater plant spread. Similar findings were reported by Kameshwari *et al.* (2014), Nair and Bharati (2015) and Deogade *et al.* (2020) in chrysanthemum.

Chlorophyll content in leaves (SPAD units)

Significant differences among the treatments were

Table 3 : Effect of different potting media on Plant spread (cm) (E-W), (N-S) and chlorophyll content in leaves (SPAD units) at 30, 60 and 90 DAT of zinnia (*Zinnia elegans* Jacq.).

Treatments	Plant spread (E-W) (cm)			Plant spread (N-S) (cm)			Chlorophyll content in leaves (SPAD)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
T ₁ - Soil + vermicompost (2:1 v/v)	9.85 ^e	20.65 ^e	25.74 ^e	8.65 ^{de}	18.05 ^d	23.94 ^e	18.85 ^d	28.46 ^{de}	30.83 ^{de}
T ₂ - Cocopeat + vermicompost (2:1 v/v)	15.27 ^a	29.40 ^a	36.22 ^a	14.07 ^a	27.80 ^a	34.42 ^a	23.27 ^a	31.37 ^a	36.08 ^a
T ₃ - Spent mushroom compost + vermicompost (2:1 v/v)	8.33 ^f	15.64 ^g	22.10 ^f	7.13 ^f	14.04 ^f	19.90 ^f	16.86 ^f	26.83 ^f	28.93 ^g
T ₄ - Burnt rice husk + vermicompost (2:1 v/v)	12.40 ^c	24.89 ^c	30.72 ^c	11.20 ^c	23.32 ^c	28.92 ^c	20.62 ^c	29.67 ^{bc}	32.94 ^c
T ₅ - Soil + cocopeat + vermicompost (1:1:1 v/v)	14.25 ^{ab}	27.36 ^b	34.53 ^{ab}	13.10 ^{ab}	26.06 ^{ab}	32.73 ^{ab}	22.26 ^b	30.62 ^{ab}	35.09 ^{ab}
T ₆ - Soil + spent mushroom compost + vermicompost (1:1:1 v/v)	13.33 ^{bc}	26.93 ^b	33.11 ^b	12.53 ^b	25.33 ^b	31.31 ^b	21.63 ^b	30.27 ^{ab}	34.27 ^b
T ₇ - Soil + burnt rice husk + vermicompost (1:1:1 v/v)	11.10 ^d	22.85 ^d	28.71 ^d	9.65 ^d	19.65 ^d	26.91 ^d	19.82 ^c	29.24 ^{cd}	31.95 ^{cd}
T ₈ - Soil + cocopeat + spent mushroom compost + burnt rice husk + vermicompost (1:0.5:0.5:0.5:0.5 v/v)	9.07 ^{ef}	17.65 ^f	23.59 ^f	7.67 ^{ef}	16.20 ^e	22.29 ^e	17.93 ^e	27.67 ^{ef}	29.84 ^{ef}
T ₉ - Control (Soil + FYM) (2:1 v/v)	7.18 ^g	13.48 ^h	18.74 ^g	5.98 ^g	11.88 ^g	16.94 ^g	16.24 ^f	26.71 ^f	28.05 ^g
S.E.(m)±	0.37	0.63	0.62	0.35	0.61	0.60	0.30	0.41	0.39
C.D at 5%	1.10	1.88	1.84	1.04	1.83	1.78	0.89	1.24	1.17
C.V	5.68	4.93	3.78	6.00	5.22	3.91	2.62	2.47	2.12

observed for chlorophyll content at 30, 60 and 90 DAT. At 30 DAT, the maximum chlorophyll content was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (23.27 SPAD), followed by T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (22.26 SPAD), whereas the minimum chlorophyll content was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (16.24 SPAD). At 60 DAT, T₂ (31.37 SPAD) recorded the maximum chlorophyll content, which was statistically on par with T₅ (30.62 SPAD), T₆ (30.27 SPAD), while T₉ (26.71 SPAD) recorded the minimum. Similarly, at 90 DAT, the maximum chlorophyll content was recorded in T₂ (36.08 SPAD), which was statistically on par with T₅ (35.09 SPAD), whereas the minimum chlorophyll content was recorded in T₉ (28.05 SPAD). The higher chlorophyll content could be due to improved nitrogen availability and utilization. The readily available nutrients and bioactive compounds in vermicompost may have enhanced nutrient uptake and chlorophyll biosynthesis. Similar findings were reported by Khandkar *et al.* (2019) in petunia and Saritha *et al.* (2025) in *Spathiphyllum*.

Flowering parameters

Number of days taken for flower bud initiation

Significant variation among the treatments was observed for number of days taken for flower bud initiation. The minimum days for flower bud initiation was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (24.20

days), followed by T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (25.84 days), whereas the maximum number of days was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (31.25 days). The combined effect of cocopeat and vermicompost, which improved water retention, aeration, drainage and nutrient availability, thereby promoting vigorous vegetative growth and earlier transition to the reproductive phase. The higher potassium availability may have further enhanced stomatal regulation, CO₂ uptake and photosynthesis, favouring assimilate accumulation and early bud initiation. Similar findings were reported by Swarupa *et al.* (2019) in gerbera and Sahu *et al.* (2023) in calendula.

Number of days taken for 50 percent flowering

Significant differences among the treatments were observed for days taken to 50 per cent flowering. The minimum number of days for 50 per cent flowering was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (41.83 days), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (42.41 days), T₆ (Soil + spent mushroom compost + vermicompost, 1:1:1 v/v) (43.26 days), T₄ (Burnt rice husk + vermicompost, 2:1 v/v) (43.30 days), whereas the maximum number of days was recorded in T₉- Control (Soil + FYM, 2:1 v/v) (48.10 days). Early bud initiation may be linked to rapid nutrient uptake and the enhanced translocation of growth-promoting substances such as cytokinins to axillary buds,

Table 4 : Effect of different potting media on flowering parameters and pot presentability of zinnia (*Zinnia elegans* Jacq.).

Treatments	Number of days taken for flower bud initiation	Number of days taken for 50 per cent flowering	Number of days taken for full bloom	Duration of flowering (Days)	Number of flowers per plant	Pot presentability
T ₁ - Soil + vermicompost (2:1 v/v)	27.08 ^{cd}	45.02 ^{cd}	55.22 ^{cd}	53.85 ^{cd}	34.38 ^e	73.04 ^e
T ₂ - Cocopeat + vermicompost (2:1 v/v)	24.20 ^e	41.83 ^f	50.53 ^g	59.12 ^a	51.36 ^a	91.98 ^a
T ₃ - Spent mushroom compost + vermicompost (2:1 v/v)	29.32 ^b	46.79 ^{ab}	58.01 ^{ab}	51.42 ^{ef}	29.36 ^g	66.96 ^f
T ₄ - Burnt rice husk + vermicompost (2:1 v/v)	26.56 ^d	43.30 ^{ef}	52.87 ^{ef}	55.68 ^{bc}	37.15 ^d	79.12 ^d
T ₅ - Soil + cocopeat + vermicompost (1:1:1 v/v)	25.84 ^d	42.41 ^f	51.65 ^{fg}	56.59 ^b	45.96 ^b	86.64 ^b
T ₆ - Soil + spent mushroom compost + vermicompost (1:1:1 v/v)	26.16 ^d	43.26 ^{ef}	52.03 ^{ef}	56.31 ^{bc}	40.70 ^c	82.08 ^c
T ₇ - Soil + burnt rice husk + vermicompost (1:1:1 v/v)	26.82 ^{cd}	44.16 ^{de}	54.04 ^{de}	54.73 ^{bc}	36.76 ^d	75.05 ^e
T ₈ - Soil + cocopeat + spent mushroom compost + burnt rice husk + vermicompost (1:0.5:0.5:0.5:0.5 v/v)	28.08 ^{bc}	45.92 ^{bc}	56.46 ^{bc}	52.61 ^{de}	31.87 ^f	69.77 ^f
T ₉ - Control (Soil + FYM) (2:1 v/v)	31.25 ^a	48.10 ^a	59.83 ^a	49.34 ^f	26.35 ^h	63.14 ^g
S.E.(m)±	0.49	0.53	0.74	0.80	0.63	0.99
C.D at 5%	1.48	1.58	2.20	2.41	1.87	2.95
C.V	3.14	2.06	2.34	2.56	2.92	2.23

promoting lateral bud development and reducing apical dominance. This may facilitate photosynthate mobilization and accelerate the transition from vegetative to reproductive growth. Similar findings were reported by Patel *et al.* (2020) in marigold and Deogade *et al.* (2020) in calendula.

Number of days taken for full bloom

Significant differences among the treatments were observed for days taken to full bloom. The minimum number of days taken for full bloom was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (50.53 days), which was statistically on par with T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (51.65 days), whereas the maximum number of days was recorded in T₉ - Control (Soil + FYM, 2:1 v/v) (59.83 days). Phosphorus and potassium, which support flower development, assimilate translocation and energy transfer. The favourable root-zone conditions and improved nutrient availability provided by cocopeat and vermicompost may have further enhanced photosynthate utilization and accelerated floral development and opening. Similar findings were reported

by Saikia *et al.* (2016) in gerbera and Saritha *et al.* (2025) in *Spathiphyllum*.

Duration of flowering

Significant differences among the treatments were observed for flowering duration. The maximum flowering duration was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (59.12 days), followed by T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (56.59 days), whereas the minimum flowering duration was recorded in T₉ - Control (Soil + FYM, 2:1 v/v) (49.34 days). The favourable root-zone environment and improved availability of nutrients provided by cocopeat and vermicompost and their better physical, chemical and biological properties may have supported sustained plant growth and flowering, resulting in a longer flowering period. Similar findings were reported by Bala and Singh (2013) and Nair and Bharti (2015) in chrysanthemum and Dilta *et al.* (2015) in *Hydrangea macrophylla*.

Number of flowers per plant

Significant differences among the treatments were observed for the number of flowers per plant. The

maximum number of flowers per plant was recorded in T₂ (Cocopeat + vermicompost, 2:1 v/v) (51.36), followed by T₅ (Soil + cocopeat + vermicompost, 1:1:1 v/v) (45.96), whereas the minimum number was recorded in T₉-Control (Soil + FYM, 2:1 v/v) (26.35). Maximum number of flowers might be due to production of a greater number of branches per plant those further have a greater number of buds. Another reason might be that this media composition contains cocopeat and as it adds organic matter and contains potassium as a source of nutrition might further resulted in development of greater number of flowers per plant. These results can be supported by the research findings of Yadav *et al.* (2024) in China aster and Sharma *et al.* (2023) in petunia.

Pot presentability

Pot presentability is directly dependent on scores given to various growth and flowering parameters. The maximum pot presentability score was recorded in T₂-Cocopeat + vermicompost (2:1 v/v) (91.98), followed by T₅- (Soil + cocopeat + vermicompost, 1:1:1 v/v) (86.64). Whereas, the minimum pot presentability score was recorded in T₉-Control (Soil + FYM, 2:1 v/v) (63.14) among all the treatments. These results are in close agreement with the findings of Wazir *et al.* (2009) in alstroemeria, Diltia *et al.* (2015) in *Hydrangea macrophylla* and Sharma *et al.* (2023) in petunia.

Conclusion

It can be concluded that among different potting media treatments T₂- (Cocopeat + vermicompost, 2:1 v/v) found to be most effective in terms of growth parameters such as number of branches, plant spread, leaf area, chlorophyll content in leaves; flowering parameters viz, number of days taken for flower bud initiation, number of days taken for 50 percent flowering, number of days taken for full bloom, duration of flowering, number of flowers per plant and pot presentability score.

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