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Effect of different media on growth of China aster seedlings after pricking

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ABSTRACT

A study was conducted to evaluate the effect of different growing media on the growth of China aster (*Callistephus chinensis*) seedlings after pricking. Thirteen growing media combinations comprising cocopeat, vermicompost, perlite, vermiculite and peat moss were evaluated for their influence on important vegetative growth attributes. Observations on number of leaves per plant, leaf length, leaf width and leaf area were recorded at 15 and 30 days after pricking. The results revealed significant differences among the growing media treatments for number of leaves, leaf length and leaf area at both stages of observation, while leaf width showed a non-significant response at 15 days and a significant response at 30 days after pricking. treatment consisting of cocopeat + vermiculite + vermicompost + peat moss in a 1:1:1:1 ratio consistently recorded superior growth. At 15 and 30 days after pricking, it recorded the maximum number of leaves (7.83 and 14.57 plant⁻¹), leaf length (4.18 and 8.28 cm), leaf width (1.58 and 3.27 cm) and leaf area (3.67 and 9.92, respectively). The superior performance of it may be attributed to the complementary properties of the constituent materials, providing a favourable balance of moisture retention, aeration, physical support and nutrient availability for root and shoot development. In contrast, treatment consist of (cocopeat + perlite, 1:1) generally recorded the lowest values for the growth parameters studied. The findings indicate that cocopeat + vermiculite + vermicompost + peat moss (1:1:1:1) provides a favourable growing medium for improving the early vegetative growth of China aster seedlings after pricking.

Keywords: China aster, *Callistephus chinensis*, Growing media, Pricking, Seedling growth, Cocopeat, Vermicompost, Vermiculite, Peat moss, Leaf development, Vegetative growth

Introduction

China aster (*Callistephus chinensis*) is an important annual flowering plant belonging to the family Asteraceae. It can be successfully grown under different agro-climatic conditions. The growth and development of China aster seedlings are greatly influenced by the conditions under which they are raised, particularly the availability of moisture, nutrients, aeration and adequate root-zone space.

Pricking is an important nursery operation involving the transfer of young seedlings from the seed bed to another tray, pan or container when they are sufficiently large to handle. The seedlings are carefully transplanted into a suitable medium to provide adequate space for root development and better access to water, nutrients and air. Proper pricking helps in establishing healthy seedlings and promotes vigorous vegetative growth. The operation should be performed carefully to minimize damage to the delicate stem and root system, as injury during pricking may adversely affect subsequent seedling growth (Randhawa *et al.*, 1986) [1]. The growing medium is one of the most important factors affecting seedling growth and development after pricking. An ideal growing medium should possess suitable porosity, uniform texture, adequate moisture retention, good drainage and sufficient aeration. It should provide physical support to the developing seedlings and create a favourable environment for root growth. Different materials such as cocopeat, perlite, vermiculite and peat moss are commonly used as growing media for raising seedlings and container-grown plants (Raviv *et al.*, 2019) [2].

The physical and chemical properties of growing media directly influence root growth, nutrient availability, water uptake and overall vegetative growth of seedlings. A suitable growing medium acts as a reservoir for water and nutrients while maintaining adequate gaseous exchange between the root zone and atmosphere (Mazahreh *et al.*, 2015) [3]. Organic and inorganic components can be combined in different proportions to improve water-holding capacity, aeration, drainage and nutrient availability, thereby creating favourable conditions for better seedling establishment and growth.

Cocopeat is obtained from the mesocarp of coconut fruits and is widely used as a component of soilless growing media because of its high water-holding capacity and ability to maintain favourable physical conditions around the roots. It also helps to reduce compaction and provides a suitable environment for seed germination and root development. Perlite, a stable volcanic material, improves aeration and drainage while

also contributing to water retention. However, it has little buffering capacity and contains negligible mineral nutrients (Raviv *et al.*, 2019) [2]. Vermiculite has good moisture- and nutrient-holding properties, whereas peat moss provides high water-holding capacity and favourable conditions for root development. Vermicompost, being an organic component, can additionally contribute nutrients and organic matter to the growing medium.

Therefore, the selection and combination of suitable growing media are important for obtaining healthy, vigorous and well-established China aster seedlings after pricking. Differences in the physical and nutrient-related properties of individual media and their combinations may consequently influence important growth attributes such as plant height, number of leaves, leaf size, plant spread, root growth and seedling biomass. Hence, evaluation of different growing media is essential for identifying a suitable medium combination for improved growth and establishment of China aster seedlings after pricking.

Material and methods

The experiment entitled “Effect of different media on growth of China aster seedlings after pricking” was carried out at the Ornamental Plant Nursery at Department of Floriculture and Landscaping, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during the year 2025 - 2026. The experiment was laid out in a Randomized Block Design (RBD) with Thirteen treatments and three replications. China aster seed sown in October 2025. Which were pricked after fifteen days and transplanted in portrays filled with in different mediya as per treatment. The treatments consisted of:

Sr. No.	Treatments
T ₁	Cocopeat + Vermicompost (1:1)
T ₂	Cocopeat + Perlite (1:1)
T ₃	Cocopeat + Vermiculite (1:1)
T ₄	Cocopeat + Peat moss (1:1)
T ₅	Vermicompost + Perlite (1:1)
T ₆	Vermicompost + Vermiculite (1:1)
T ₇	Vermicompost + Peat moss (1:1)
T ₈	Cocopeat + Vermicompost + Vermiculite (1:1:2)
T ₉	Cocopeat + Vermicompost + Peat moss (1:1:2)
T ₁₀	Cocopeat + Vermicompost + Perlite (1:1:2)
T ₁₁	Cocopeat + Vermiculite + Vermicompost + Perlite (1:1:1:1)
T ₁₂	Cocopeat + Vermiculite + Vermicompost + Peat moss (1:1:1:1)
T ₁₃	Cocopeat + Perlite + Vermicompost + Peat moss (1:1:1:1)

For recording observations, randomly five seedlings were selected from each portray and labelled for the purpose of recording different observations. The mean value of the five selected plants from each treatment was taken for statistical analysis.

Techniques adopted

Raising of seeds

Propagation was done by using the seeds. The seeds were soaked in 5 ppm GA₃ solution for 15-20 minutes for the break seed dormancy and earlier germination. The seeds were treated with 0.1 per cent carbendazim for 30 minutes and broadcasted in the pots filled with 2.5 cm layer of cocopeat + vermicompost (1:1) proportion. Pots Were Covered with polythin sheets up to 3-4 days. These pots were kept under shade. The seeds were kept moist by spreading water after removing polythin, (2-3 times every day to maintain 75-80 per cent relative humidity). Regular watering and plant protection measures were carried out as and when required. After 15 days, all the rooted seedlings of uniform size were pricked and transplant in portray (100

cells) filled with different media combination and the relevant data was recorded.

Pricking

Fifteen days old, well rooted, uniform sized seedlings of China Aster were selected as per treatment. Then all the rooted seedlings were treated with humic acid solution for 10 minutes for better establishment of seedlings in portray. The treated seedlings were transplanted in cells of portray at a depth up to roots were covered. Light irrigation was applied immediately after planting.

After care

After pricking, the China aster seedlings were maintained under suitable growing conditions. Regular irrigation was provided to maintain adequate moisture in the growing media. Weeding, removal of dead seedlings, and plant protection measures were carried out as and when required. The seedlings were monitored regularly to ensure healthy growth and development throughout the experimental period.

Results and discussion

Growth parameters

1 Effect of different growing media on number of leaves per plant

The data related to number of leaves per plant of prick seedlings influenced by different growing media is presented in Table 1. The number of leaves per plant was recorded at 15 and 30 days after pricking. Significant differences were recorded among the treatments at both the stages of observation.

At 15 days after pricking, maximum number of leaves i.e. 7.83 was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). Which was statistically found at par with T₁₃ and T₁₁ which recorded 7.13 and 7.07 leaves per plant, respectively. Treatment T₈ recorded 6.70 leaves per plant, followed by T₁₀, T₆ and T₇ which recorded 6.03, 5.93 and 5.90 leaves per plant, respectively. Treatment T₅ recorded 5.67 leaves per plant, whereas T₁, T₃ and T₄ recorded 5.50, 4.60 and 4.47 leaves per plant, respectively. Minimum number of leaves per plant i.e. 4.30 was recorded in treatment T₂ (Cocopeat + Perlite, 1:1).

At 30 days after pricking, maximum number of leaves i.e. 14.57 was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). Which was statistically found at par with T₁₃ and T₁₁ which recorded 13.73 and 13.57 leaves per plant, respectively. Treatment T₈ recorded 12.67 leaves per plant, followed by T₉ and T₁₀ which recorded 12.27 and 11.83 leaves per plant, respectively. Treatment T₇ recorded 10.97 leaves per plant, followed by T₅ and T₆ which recorded 10.90 and 10.27 leaves per plant, respectively. The minimum number of leaves per plant i.e. 8.00 was recorded in treatment T₂ (Cocopeat + Perlite, 1:1), followed by T₃, T₄ and T₁ which recorded 8.17, 8.80 and 8.83 leaves per plant, respectively. The results showed that the number of leaves per plant increased considerably from 15 to 30 days

after pricking in all the treatments. The maximum number of leaves at both stages was recorded in T₁₂, indicating that the combined growing medium consisting of cocopeat, vermiculite, vermicompost and peat moss provided favourable conditions for early vegetative growth of prick seedlings. Similar improvement in seedling growth and number of leaves with suitable combinations of growing media containing organic and inorganic components was reported by Sahu *et al.* (2022) [4] in papaya seedlings, where growing media combinations of cocopeat, peat moss, vermicompost, vermiculite and perlite significantly influenced seedling growth and leaf production.

The higher number of leaves recorded under T₁₂ might be due to the combined beneficial effect of the components of the growing medium. Vermicompost may have supplied essential nutrients required for vegetative growth, while cocopeat and peat moss may have helped in maintaining adequate moisture in the root zone. Vermiculite

may have improved moisture retention and aeration, thereby providing favourable conditions for root

Table: 1 Effect of Different growing media on number of leaves per plant of pricked seedlings.

Treatments	Number of leaves plant ⁻¹	
	15 days	30 days
T₁ - Cocopeat + Vermicompost (1:1)	5.50	8.83
T₂ - Cocopeat + Perlite (1:1)	4.30	8.00
T₃ - Cocopeat + Vermiculite (1:1)	4.60	8.17
T₄ - Cocopeat + Peat moss (1:1)	4.47	8.80
T₅ - Vermicompost + Perlite (1:1)	5.67	10.90
T₆ - Vermicompost + Vermiculite (1:1)	5.93	10.27
T₇ - Vermicompost + Peat moss (1:1)	5.90	10.97
T₈ - Cocopeat + Vermicompost + Vermiculite (1:1:2)	6.70	12.67
T₉ - Cocopeat + Vermicompost + Peat moss (1:1:2)	6.67	12.27
T₁₀ - Cocopeat + Vermicompost + Perlite (1:1:2)	6.03	11.83
T₁₁ - Cocopeat + Vermiculite + Vermicompost + Perlite (1:1:1:1)	7.07	13.57
T₁₂ - Cocopeat + Vermiculite + Vermicompost + Peat moss (1:1:1:1)	7.83	14.57
T₁₃ - Cocopeat + Perlite + Vermicompost + Peat moss (1:1:1:1)	7.13	13.73
'F' Test	Sig.	Sig.
SE (m) ±	0.23	0.47
CD at 5%	0.68	1.36

development and subsequent production of leaves. Similar beneficial effects of combined growing media containing cocopeat, vermicompost and vermiculite on vegetative growth and leaf production have been reported in ornamental crops such as snapdragon. Kumar *et al.* (2024) [5] reported that cocopeat + vermicompost + vermiculite was among the effective growing media combinations for improving growth parameters and number of leaves in snapdragon.

The comparatively lower number of leaves recorded in T₂ (Cocopeat + Perlite, 1:1) might be due to the comparatively lower nutrient contribution of this combination, as perlite primarily contributes to physical properties such as aeration and drainage rather than serving as a major nutrient source. The better performance of media containing vermicompost may be attributed to the nutrient contribution of the organic component, which supported vegetative growth and leaf development. Similar results were reported by Attri *et al.* (2024) [6], who observed maximum seedling growth and number of leaves in *Ailanthus excelsa* seedlings with a growing medium containing vermicompost.

2 Effect of different growing media on length of leaves

The data related to length of leaves of prick seedlings influenced by different growing media is presented in Table 2. The length of leaves was recorded at 15 and 30 days after pricking. Significant differences were recorded among the treatments at both the stages of observation, as indicated by the significant *F*-test.

At 15 days after pricking, maximum leaf length i.e. 4.18 cm was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₁₁, T₁₃ and T₁₀ which recorded 3.87, 3.78 and 3.71 cm leaf length, respectively. Treatment T₈ recorded 3.49 cm, followed by T₉ which recorded 3.42 cm. Treatment T₇ recorded 3.19 cm, whereas T₆ and T₅ recorded 3.16 and 2.99 cm, respectively. Treatment T₁ recorded 2.82 cm leaf length, followed by T₃ and T₄ which recorded 2.76 and 2.67 cm, re-

spectively. Minimum leaf length i.e. 2.57 cm was recorded in T₂ (Cocopeat + Perlite, 1:1).

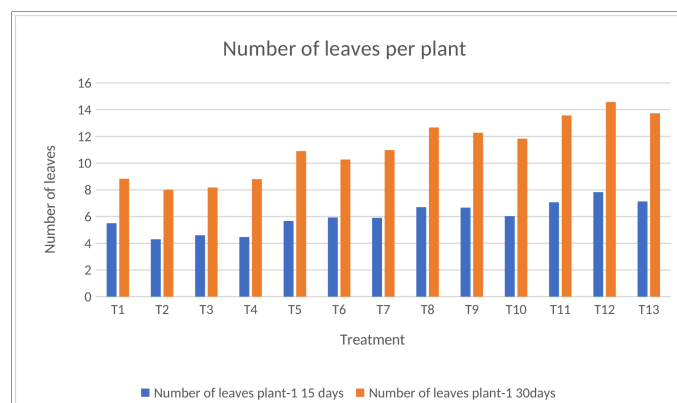


Fig: 1 Effect of Different growing media on number of leaves per plant of prick seedlings.

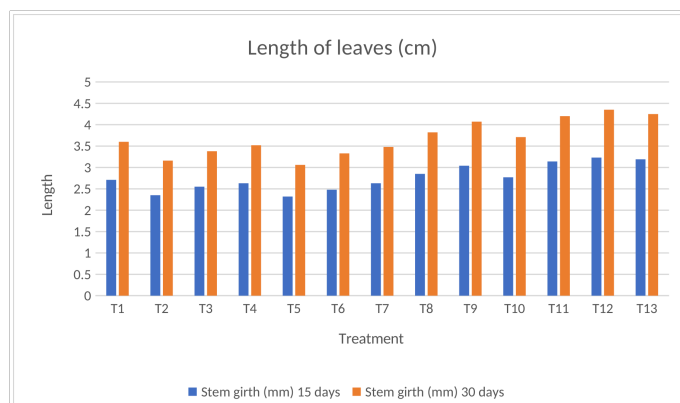
Fig: 2 Effect of Different growing media on Length of leaves of prick seedlings.

At 30 days after pricking, maximum leaf length i.e. 8.28 cm was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₁₃ and T₁₁ which recorded 7.88 and 7.87 cm, respectively. Treatment T₁₀ recorded 7.28 cm, followed by T₈ and T₉ which recorded 7.03 and 6.87 cm, respectively. Treatment T₆ and T₇ recorded 6.52 and 6.40 cm, respectively, whereas T₅ recorded 6.40 cm. Treatment T₁ recorded 5.88 cm, followed by T₄ and T₃ which recorded 5.58 and 5.42 cm, respectively. Minimum leaf length i.e. 5.21 cm was recorded in T₂ (Cocopeat + Perlite, 1:1).

Table: 2 Effect of Different growing media on Length of leaves of pricked seedlings.

Treatments	Length of leaves (cm)	
	15 days	30 days
T₁ - Cocopeat + Vermicompost (1:1)	2.82	5.88
T₂ - Cocopeat + Perlite (1:1)	2.57	5.21
T₃ - Cocopeat + Vermiculite (1:1)	2.76	5.42
T₄ - Cocopeat + Peat moss (1:1)	2.67	5.58
T₅ - Vermicompost + Perlite (1:1)	2.99	6.40
T₆ - Vermicompost + Vermiculite (1:1)	3.16	6.52
T₇ - Vermicompost + Peat moss (1:1)	3.19	6.40
T₈ - Cocopeat + Vermicompost + Vermiculite (1:1:2)	3.49	7.03
T₉ - Cocopeat + Vermicompost + Peat moss (1:1:2)	3.42	6.87
T₁₀ - Cocopeat + Vermicompost + Perlite (1:1:2)	3.71	7.28
T₁₁ - Cocopeat + Vermiculite + Vermicompost + Perlite (1:1:1:1)	3.87	7.87
T₁₂ - Cocopeat + Vermiculite + Vermicompost + Peat moss (1:1:1:1)	4.18	8.28
T₁₃ - Cocopeat + Perlite + Vermicompost + Peat moss (1:1:1:1)	3.78	7.88
'F' Test	Sig.	Sig.
SE (m) ±	0.06	0.09
CD at 5%	0.16	0.28

Similar effects of growing media on seedling growth attributes have been reported in nursery crops, where combinations of cocopeat, vermicompost, vermiculite and perlite significantly influenced seedling growth and leaf development (Lohani *et al.*, 2023) [7].



The higher leaf length recorded under T₁₂ might be due to the combined effect of cocopeat, vermiculite, vermicompost and peat moss, which may have provided favourable physical, nutritional and moisture conditions for vigorous seedling growth. Vermicompost may have supplied essential nutrients required for cell division and leaf expansion, while cocopeat and peat moss may have helped in maintaining adequate moisture in the root zone. Vermiculite may have improved moisture retention and aeration, thereby encouraging better root development and nutrient uptake. The favourable root environment might consequently have resulted in enhanced leaf expansion and increased leaf length. Similar improvement in seedling growth was reported by Patel *et al.* (2023) [8], who observed better seedling growth attributes with growing media containing cocopeat, vermicompost, perlite and vermiculite.

The comparatively lower leaf length recorded in T₂ (Cocopeat + Perlite, 1:1) might be due to the lower nutrient contribution of this growing medium. Perlite mainly improves aeration and drainage, while cocopeat primarily provides moisture retention and physical support. Therefore, the absence of a nutrient-rich organic component such as vermicompost may have resulted in comparatively lower vegetative growth and leaf elongation. The better performance of treatments containing vermicompost in combination with cocopeat and other porous materials indicates the importance of balanced physical and nutritional properties of the growing medium. Similar observations were reported by Patel *et al.* (2025) [9], who found that cocopeat + vermicompost based growing media improved several quality planting material parameters, including leaf area and shoot growth, in broccoli seedlings.

The present findings are also supported by the results of studies conducted on ornamental plants. In snapdragon, cocopeat + vermicompost + vermiculite was found to be an effective growing medium for improving vegetative growth, number of leaves and root development. This may be attributed to the complementary properties of cocopeat, vermicompost and vermiculite in providing moisture, nutrients and suitable physical conditions for root and shoot development (Kumar *et al.*, 2024) [5].

3 Effect of different growing media on width of leaves

The data related to width of leaves of prick seedlings as influenced by different growing media is presented in Table 3. The width of leaves was recorded at 15 and 30 days after pricking. At 15 days after pricking, the effect of different growing media on leaf width was found to be non-significant, whereas at 30 days after pricking, significant differences were recorded among the treatments.

At 15 days after pricking, the maximum leaf width i.e. 1.58 cm was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₁₃, T₁₁ and T₉ which recorded 1.517, 1.48 and 1.44 cm leaf width, respectively. Treatment T₈ recorded 1.35 cm, followed by T₁₀ which recorded 1.32 cm. Treatment T₇ recorded 1.28 cm, whereas T₆, T₄ and T₁ recorded 1.17, 1.12 and 1.11 cm, respectively. Treatment T₃ recorded 0.98 cm leaf width, followed by T₅ which recorded 0.97 cm. The minimum leaf width i.e. 0.93 cm was recorded in T₂ (Cocopeat + Perlite,

1:1). However, since the *F*-test was non-significant, the differences among treatments at 15 days after pricking were statistically non-significant.

At 30 days after pricking, maximum leaf width i.e. 3.27 cm was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₁₃ and T₁₁ which recorded 3.14 and 3.09 cm, respectively. Treatment T₉ recorded 2.95 cm leaf width, followed by T₁₀ and T₈ which recorded 2.77 and 2.76 cm, respectively. Treatment T₇ recorded 2.57 cm, whereas T₆ recorded 2.45 cm. Treatment T₄ recorded 2.32 cm, followed by T₁ which recorded 2.18 cm. Treatment T₃ recorded 2.03 cm, whereas T₅ recorded 2.02 cm. The minimum leaf width i.e. 1.89 cm was recorded in T₂ (Cocopeat + Perlite, 1:1).

Table: 3 Effect of Different growing media on width of leaves of prick seedlings.

The present findings are in agreement with the general observations reported in studies on nursery growing media, where combinations of cocopeat, vermicompost, vermiculite, peat moss and perlite were found to influence vegetative growth and leaf development of seedlings. The favourable effect of such combinations may be attributed to improved water-holding capacity, aeration, nutrient availability and root development. Similar results were reported by Sahu *et al.* (2022) [4] in papaya seedlings, where different

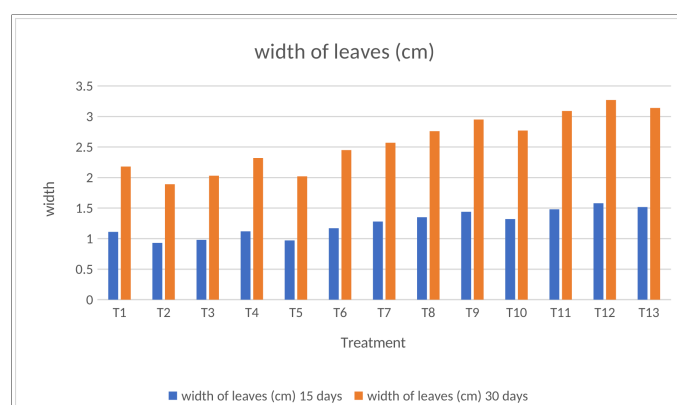


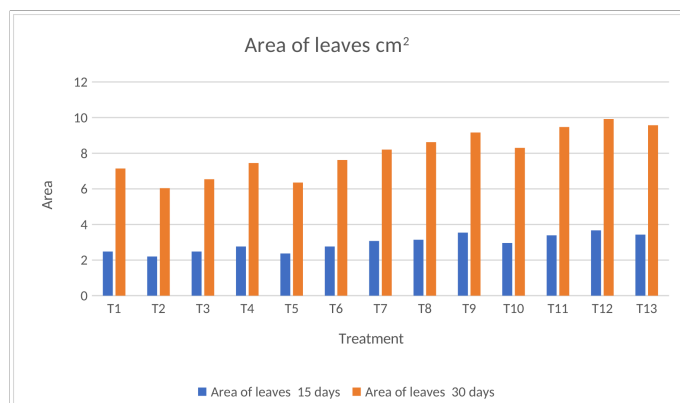
Fig: 3 Effect of Different growing media on width of leaves of pricked seedlings.

Treatments	width of leaves (cm)	
	15 days	30 days
T₁ - Cocopeat + Vermicompost (1:1)	1.11	2.18
T₂ - Cocopeat + Perlite (1:1)	0.93	1.89
T₃ - Cocopeat + Vermiculite (1:1)	0.98	2.03
T₄ - Cocopeat + Peat moss (1:1)	1.12	2.32
T₅ - Vermicompost + Perlite (1:1)	0.97	2.02
T₆ - Vermicompost + Vermiculite (1:1)	1.17	2.45
T₇ - Vermicompost + Peat moss (1:1)	1.28	2.57
T₈ - Cocopeat + Vermicompost + Vermiculite (1:1:2)	1.35	2.76
T₉ - Cocopeat + Vermicompost + Peat moss (1:1:2)	1.44	2.95
T₁₀ - Cocopeat + Vermicompost + Perlite (1:1:2)	1.32	2.77
T₁₁ - Cocopeat + Vermiculite + Vermicompost + Perlite (1:1:1:1)	1.48	3.09
T₁₂ - Cocopeat + Vermiculite + Vermicompost + Peat moss (1:1:1:1)	1.58	3.27

(continued on next page)

T₁₃ - Cocopeat + Perlite + Vermicompost + Peat moss (1:1:1:1)	1.52	3.14
‘F’ Test	NS.	Sig.
SE (m) ±	0.017	0.024
CD 5%	0.05	0.07

fig: 4 Effect of Different growing media on leaf Area of pricked seedlings.



combinations of growing media significantly influenced seedling growth parameters. Similar observations were also reported by Kumar *et al.* (2024) [5] in snapdragon, where growing media containing cocopeat, vermicompost and vermiculite improved vegetative growth and leaf development.

4 Effect of different growing media on leaf area

The data related to leaf area of prick seedlings as influenced by different growing media is presented in Table 4. The leaf area was recorded at 15 and 30 days after pricking. Significant differences were recorded among the treatments at both the stages of observation, as indicated by the significant *F*-test.

At 15 days after pricking, maximum leaf area i.e. 3.67 cm² was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₉, T₁₁ and T₁₃ which recorded 3.54, 3.39 and 3.43 cm² leaf area, respectively. Treatment T₈ recorded 3.14 cm², followed by T₇ and T₁₀ which recorded 3.07 and 2.96 cm², respectively. Treatment T₄ and T₆ recorded 2.76 cm² leaf area, whereas T₁ and T₃ recorded 2.48 cm². Treatment T₅ recorded 2.37, while the minimum leaf area i.e. 2.20 cm² was recorded in T₂ (Cocopeat + Perlite, 1:1).

At 30 days after pricking, maximum leaf area i.e. 9.92 cm² was recorded in treatment T₁₂ (Cocopeat + Vermiculite + Vermicompost + Peat moss, 1:1:1:1). This treatment was followed by T₁₃ and T₁₁ which recorded 9.57 and 9.47 cm², respectively. Treatment T₉ recorded 9.16 cm² leaf area, followed by T₈ and T₁₀ which recorded 8.62 and 8.30 cm², respectively. Treatment T₇ recorded 8.20, whereas T₆ recorded 7.62 cm². Treatment T₄ recorded 7.45 cm², followed by T₁ which recorded 7.14 cm². Treatment T₃ recorded 6.54 cm² and T₅ recorded 6.35 cm² leaf area. The minimum leaf area i.e. 6.04 cm² was recorded in T₂ (Cocopeat + Perlite, 1:1).

The increase in leaf area with advancement of seedling age may be attributed to continuous leaf initiation and expansion as the seedlings developed. A larger leaf area indicates greater development of the photosynthetic surface, which can contribute to enhanced light interception and photosynthetic activity and consequently support further vegetative growth. Similar beneficial effects of combined growing media containing organic and porous components on seedling growth and leaf development have been reported in nursery crops. Sahu *et al.* (2022) [4] reported significant variation in seedling growth under different growing media combinations containing cocopeat, vermicompost, vermiculite and other components. Similar

Table: 4 Effect of Different growing media on leaf Area of pricked seedlings.

Treatments	Area of leaves (cm ²)	
	15 days	30 days
T₁ - Cocopeat + Vermicompost (1:1)	2.48	7.14
T₂ - Cocopeat + Perlite (1:1)	2.20	6.04
T₃ - Cocopeat + Vermiculite (1:1)	2.48	6.54
T₄ - Cocopeat + Peat moss (1:1)	2.76	7.45
T₅ - Vermicompost + Perlite (1:1)	2.37	6.35
T₆ - Vermicompost + Vermiculite (1:1)	2.76	7.62
T₇ - Vermicompost + Peat moss (1:1)	3.07	8.20
T₈ - Cocopeat + Vermicompost + Vermiculite (1:1:2)	3.14	8.62
T₉ - Cocopeat + Vermicompost + Peat moss (1:1:2)	3.54	9.16
T₁₀ - Cocopeat + Vermicompost + Perlite (1:1:2)	2.96	8.30
T₁₁ - Cocopeat + Vermiculite + Vermicompost + Perlite (1:1:1:1)	3.39	9.47
T₁₂ - Cocopeat + Vermiculite + Vermicompost + Peat moss (1:1:1:1)	3.67	9.92
T₁₃ - Cocopeat + Perlite + Vermicompost + Peat moss (1:1:1:1)	3.43	9.57
‘F’ Test	Sig	Sig
SE (m) ±	0.06	0.07
CD 5%	0.16	0.19

observations were also reported by Kumar *et al.* (2024) [5] in snapdragon, where suitable growing media combinations improved vegetative growth and leaf development.

Conclusion

The present investigation demonstrated that different growing media combinations significantly influenced the early vegetative growth of China aster (*Callistephus chinensis*) seedlings after pricking. The magnitude of response varied with the composition of the growing medium and the stage of seedling growth. Among the thirteen treatments evaluated, (cocopeat + vermiculite + vermicompost + peat moss, 1:1:1:1) consistently produced superior growth and recorded the maximum number of leaves, leaf length, leaf width and leaf area at both 15 and 30 days after pricking. The treatment was followed by the other combinations containing multiple organic and inorganic components. The improved growth under it may be associated with the complementary characteristics of cocopeat, vermiculite, vermicompost and peat moss, which together provided favourable moisture retention, aeration, physical support and nutrient availability for active root and shoot development. In contrast, (cocopeat + perlite, 1:1) recorded the minimum values for the major growth parameters at both observation stages. The comparatively lower performance of this treatment may be related to its limited nutrient contribution, as perlite primarily improves the physical properties of the growing medium, particularly aeration and drainage. Overall, the results indicate that cocopeat + vermiculite + vermicompost + peat moss in a 1:1:1:1 ratio was the most favourable growing medium combination among those evaluated for promoting early vegetative growth of China aster seedlings after pricking. The use of a balanced combination of organic and inorganic components can therefore be considered useful for obtaining vigorous and well-developed planting material for subsequent establishment of China aster.

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