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Zinnia Flower Growth and Development Concerning Various Growing Media under Agroclimatic Conditions of Uthal, Lasbela

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Introduction

Zinnias are a great summer annual flower that is increasingly gaining popularity because of their vibrant flowers. It is a member of the Compositae family. It is only found in Mexico and Central America. Due to their superior performance and wide range of colorful blooms, the most popular zinnia types, "Blue Point" and "Oklahoma," are recognized as the best (Dole, 1999). A grouping of 20 species of annual and perennial plants known as zinnia are distinguished by their bright, uniform, disease-resistant, and long-lasting flowers. The most well-known species of Zinnia, which is native to warm, humid areas, is Zinnia elegans, also called Zinnia violacea. Although smaller forms can be found in pots and window planters, traditional uses for zinnias include borders, beds, and cut flowers (Jana and Pal, 1991).

Zinnia flowers prefer rich soil. The soil is well-drained, and the location is sunny. In the plains, seeds are sown between September and October, and in the hills, either between August

Abstract

A pot experiment to see the way various growing media affect the growth and development of zinnia flowers was conducted at the Department of Horticulture, Faculty of Agriculture, LUAWMS Uthal. During the summer of February 2019. With seven treatments, the research was set up in a Completely Randomized Design (CRD). Seven different growing media including Soil (Control), Leaf Manure, Coco Coir, Soil + Leaf Manure, Soil + Coco Coir,

Leaf + Coco Coir, Soil + leaf manure + Coco Coir, were used to check the growth of Zinnia plants in pots. Data were obtained for numerous factors including emergence percentage, survival terms of percentage, Number of leaves plant⁻¹, Number of branches plant⁻¹, Plant height (cm), Flower size (cm), Number of flower plant⁻¹, and flower persistence life (days), Days to 1st flower during this course of study. Zinnia's entire performance was exceptional emergence percentage (94%), survival percentage (91%), Number of leaves plant⁻¹ (40), number of branches plant⁻¹ (10), plant height (54.10cm), days to 1st flower (71), flower size (8.06cm), Number of flowers plant⁻¹ (9.00), persistence life (days) (7.30), the performance of other growing media remained in the variable for different parameters investigated in this study. Thus, treatment (T7) Soil + leaf manure + Coco Coir, is suggested as the ideal growing medium for the improved growth and development of Zinnia in the Uthal Lasbela agroclimatic conditions.

Keywords: Zinnia flower, Growing media; Lasbela; Soil + leaf manure; Agroclimatic conditions; Soil

and October for biennials or between March and April for early flowering varieties. Directly sowed seeds in the garden are simple to grow. About a month early than spring, begin sowing. To lengthen the flowering season, start another season of planting in late spring or early summer. On the topsoil, scatter seeds. The seed will then be softly covered by a light rake. Maintain a moist seedbed until seedlings appear. Seedlings should be spaced 15 to 20 cm apart. To keep the roots of the plant cool and moist, mulch should be applied. Water Zinnia experiences potassium deficiency during dry periods, which shows up as burning on the mature leaf margins. If given more than six hours of daily exposure to 18°C, zinnias will not blossom. The best temperature for maximum flower quality is 2 to 4 degrees Celsius. Nine weeks before the expiration date, buds should start to develop. At 18 to 21 degrees Celsius, seeds will react to light and begin to grow in two weeks.

Zinnia is a wonderful cut flower. When one-half to two-thirds of the floret has opened, the spike is cut. Flowers can be stored at 4 degrees Celsius for up to three days, and they can be stored at room temperature for three to four days. The cut flower's life can be extended by burning the cut ends. The type of growing media used, among other things, influences flower production. Because nutrient availability is critical to good flower production, providing proper growing media is a prerequisite for better growth and production of floriculture crops. Growing media is defined as the medium in which cultivated plants' roots grow (Kampf 2000). Their primary function is to provide support for plant growth (Fermino 1996, Kampf 2000 and Rober 2000). For the growth of horticulture crops of the highest caliber, it is essential to employ the right growing media or substrates. It directly affects the creation and ongoing upkeep of the complex function rooting network. In addition to providing enough anchoring or support, a healthy plant also acts as a reservoir for nutrients and water, allows oxygen to diffuse to the roots, and permits gaseous exchange between the roots and the atmosphere outside the substrate where the roots are located (Richard 1986, Bunt 1988, Fonteno 1996, Agro 1998 and Abad *et al.*, 2002).

When working on the manufacture of commercial flowers, this important component is frequently disregarded. A few research investigations on growing media and their effects on different flower ornamentals, like Liliun, have been undertaken [12], gladiolus (Salim *et al.*, 2002), and phlox [18] has been reported. Nevertheless, no research efforts on zinnia in general, or the Uthal region in particular, have been conducted. The current study will examine how the zinnia plant's vegetative process and growth are impacted by various growing media.

Material and Method

The study was carried out in February 2019 using a Complete Randomized Design (CRD) in the experimental area of the Lasbela University of Agriculture, Water, and Marine Sciences (LU-AWMS), Uthal, Lasbela Balochistan. Seeds were sown in seedling trays. Healthy seedlings were transplanted into pots after one month at a height of 3 inches. Pots were irrigated soon after transplantation.

The media were used alone and in combination, as listed below.

T ₁ =	Soil (Control)	100%
T ₂ =	Leaf Manure	100%
T ₃ =	Coco Coir	100%
T ₄ =	Soil+ Leaf Manure	1:1
T ₅ =	Soil + Coco Coir	1:1
T ₆ =	Leaf+ Coco Coir	1:1
T ₇ =	Soil + leaf manure + Coco Coir	1:1:1

Other growth and yield-related parameters were checked and are listed below.

Parameters

Emergency Percentage

The number of days between the transfer of seedlings into pots and the first flower opening (corolla fully opened) was calculated. The average was then computed.

Survival Percentage

It was calculated by multiplying the total number of trans-

planted plants by 100 and dividing the total number of plants that survived each treatment:

$$\text{Survival percentage} = \frac{\text{No. of plants survived}}{\text{Total Number of plant}} \times 100$$

No of Leaves Plant¹

At the time of harvest for each replication plant, the number of leaves per plant (below the inflorescence) was counted, and the mean number of leaves was calculated.

No of Branches Plant¹

When the bloom first appeared, the number of branches on each plant was recorded, and the average was calculated.

Plant Height (cm)

From the point at which each plant emerged from the growing medium to the top of the stem, the height of each plant was measured in centimeters, and an average was determined.

No of Flower Plant¹

From each plant cluster, the total number of flowers was counted, and the average was computed.

Flower Persistence Life (days)

For flower persistence, the number of days that the flower opened before dropping to the ground on the plant was recorded. To observe this characteristic, three blooms per replication were chosen.

Statically Analysis

Statistical software Statistix 8.1 Statistix, 2006 was used to evaluate all of the data gathered. There was an LSD test. The least significant at (P 0.05) was used to match the data analysis of the modification technique and means. Comparing therapeutic superiority based on probability.

Result and Discussion

The results of the study "Effect of different growing media on the growth and development of Zinnia" have been discussed in the sentences that follow.

Emergency Percentage

The data regarding the Emergence % of Zinnia plant as impacted by various growing media is mentioned in (Table 1) The maximum Emergence percentage of Zinnia (94.00%) was noted in pots filled with leaf manure + coco coir + soil (T₇), followed by (87.06%) and (77.00%) was noted in pots filled with leaf manure + coco coir (T₆), and soil + leaf manure (T₅). Respectively (77.13%) and (66.10%) were recorded in treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the minimum (56.66%) Emergence percentage was observed in the control. The LSD test suggested that differences in emergence under growing media of leaf manure + coco coir + soil (T₇) were statistically significant (P<0.05).

Differences in emergence might be due to different levels of nutrients in different growing media and climatic conditions. The result is similar to Anastasia *et al* (2019), who reported difference in emergence in zinnia flowering plants using different organic fertilizers.

Survival Percentage

The survival percentage of the Zinnia plant as affected by

Table 1: Emergence percentage of zinnia flower under different growing media.

Treatments	Mean emergency percentage
T ₁ = Soil (Control) (100%)	56.66 g
T ₂ = Leaf Manure (100%)	62.06 f
T ₃ = Coco Coir (100%)	66.10 e
T ₄ = Soil + Leaf Manure (1:1)	77.13 d
T ₅ = Soil + Coco Coir (1:1)	77.00 c
T ₆ = Leaf + Coco Coir (1:1)	87.06 b
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	94.00 b
S.E.±	0.8087
LSD (0.05)	1.7345

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

various growing media compositions is shown in (Table-2). the maximum Survival percentage of Zinnia (91.0%) was measured in pots filled with leaf manure + coco coir (T₆), followed by (85.00%) and (81.0%) was noted in pots filled with soil + leaf manure + coco coir (T₇), and soil + coco coir (T₅). While (76.0 %) and (69.0%) were recorded in treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the minimum (50.0 %) Survival % was noted in the control. The LSD test suggested that differences in survival percentage under growing media of leaf manure + coco coir + soil (T₆) were statistically significant (P<0.05).

A favorable environment and good growing media are the main factor for the survival of any flowering plants, a mixture of growing media (soil+ Leaf mature + Coco coir) gave good results in the survival of the plant which is a good source of organic matter. Our findings are in agreement with Rao *et al* (2004) and Bashir *et al* (2007) worked on joboba cutting and tomato hybrids were found less mortality percentage in plants using a mixture of different growing media for their growth and survival.

No of Leaves Plant¹

The information is provided regarding how different growing media affect the number of leaves per plant of zinnia plants (Table 3). The zinnia flower's maximum number of plant¹ leaves (40.0) was counted in pots of leaf manure + coco coir + soil (T7), followed by (38.0) and (35.0) noted in pots filled with leaf manure + coco coir (T6), and soil + leaf manure (T4). While (31.0)

Table 2: Survival Percentage of zinnia flower under different growing media.

Treatments	Mean survival percentage
T ₁ = Soil (Control) (100%)	50.00 g
T ₂ = Leaf Manure (100%)	60.00 f
T ₃ = Coco Coir (100%)	69.00 e
T ₄ = Soil+ Leaf Manure (1:1)	76.00 d
T ₅ = Soil + Coco Coir (1:1)	81.00 c
T ₆ = Leaf + Coco Coir (1:1)	91.00 a
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	85.00 b
S.E.±	0.815
LSD 0.05	1.7512

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

Table 3: Number of zinnia flower plants with one leaf under various growing media.

Treatments	The mean number of leaf plant ¹
T ₁ = Soil (Control) (100%)	21.00 g
T ₂ = Leaf Manure (100%)	28.42 f
T ₃ = Coco Coir (100%)	28.22 e
T ₄ = Soil+ Leaf Manure (1:1)	34.00 d
T ₅ = Soil + Coco Coir (1:1)	31.00 c
T ₆ = Leaf + Coco Coir (1:1)	38.00 b
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	40.00 a
S.E.±	0.8249
LSD (0.05)	1.7693

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

and (28.42) were recorded in treatment Soil + Coco Coir (T5) and Leaf Manure (100%) (T2). Whereas the minimum (21.0) Number of leaves plant¹ was observed in control. The LSD test suggested that differences in the number of leaves plant¹ under growing media of leaf manure + coco coir + soil (T7) were statistically significant (P<0.05).

The above result conforms with the research of Waseem *et al* (2000) who reported that the mixture of different growing media gave the maximum number of leaves in stock plants and minimum leaves was observed in control. Additionally, our results are consistent with earlier studies by Wuryaningsih *et al.* (1999), who found that utilizing growing media other than soil led to a notable increase in the number of anthurium leaves. Similar results were obtained by Pasini and Aquila (1989) and Riaz *et al.* (2008) when they used leaf manure as a growth medium for several flowering plants.

No of Branches Plant¹

Data on how various growing media affect the number of branches per plant is provided (Table 4). The most branches possible plant¹ of zinnia flower (10.0) was measured in pots filled with leaf manure + coco coir + soil (T₇), followed by (9.0) and (7.0) was noted in pots filled with leaf manure + coco coir (T₆), and soil + leaf manure (T₅). While (8.0) and (5.0) number of branches plant¹ recorded in treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the minimum (3.0) number of branches plant¹ was noted in Leaf Manure (T₂) and Soil (T₁). The LSD test revealed that plant¹ under leaf manure growing media had different numbers of branches + coco coir + soil (T₇) were statistically significant (P<0.05). The mixture of growing media (soil, leaf manure, coco coir) has more appropriate physical characteristics may be because of having a high level of nutrients.

Our findings were supported by earlier research by Riaz *et al.* (2008), who discovered considerably more branches in zinnia flowers grown in a variety of mediums. Also, Waseem *et al* (2013) found more branches in stock flowers while using a mixture of growing media.

Plant Height (cm)

Data on how various growing media affect Zinnia plant height (cm) are provided in (Table 5). The maximum plant height of the zinnia flower (54.10 cm) was measured in pots filled with leaf manure + coco coir + soil (T₇), followed by (49.0 cm) and (46 cm) was noted in pots filled with leaf manure + coco coir (T₆), and soil + leaf manure (T₄) respectively. While (43 cm) and (39 cm) were recorded in treatment Soil + Coco Coir (T₅) and Coco Coir (100%) (T₃). Whereas the minimum (34.10 cm) plant height was noted in control. According to the LSD test, variations in plant height under growing media of leaf manure + coco coir+ soil¹ were statistically significant (P<0.05).

Results indicated that the mixture of growing media containing soil, leaf manure, and coco coir has a good impact on plant height rather than using a single source of growing media. The result was an agreement with Shahina Yaseen *et al* (2012) and Freed *et al* (1997). Where they found the maximum plant height of Dianthus Caryophyllus and chrysanthemum when grown in different mixtures of growing media.

Days to 1st Flower

The information on how various growing conditions affect the number of days it takes a Zinnia plant to bloom is provided

Table 4: No of branches plant⁻¹ of zinnia flower under different growing media.

Treatments	Mean no of branches plant ⁻¹
T ₁ = Soil (Control) (100%)	3.0 f
T ₂ = Leaf Manure (100%)	3.0 d
T ₃ = Coco Coir (100%)	5.0 e
T ₄ =Soil+ Leaf Manure (1:1)	8.0 bc
T ₅ = Soil + Coco Coir (1:1)	7.0 c
T ₆ = Leaf + Coco Coir (1:1)	9.0 ab
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	10.0 a
S.E.±	0.8165
LSD (0.05)	1.7512

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

Table 5: Plant height (cm) of zinnia flower under different growing media.

Treatments	Mean plant height (cm)
T ₁ = Soil (Control) (100%)	34.10 f
T ₂ = Leaf Manure (100%)	35.20 f
T ₃ = Coco Coir (100%)	39.00 e
T ₄ =Soil+ Leaf Manure (1:1)	46.00 c
T ₅ = Soil + Coco Coir (1:1)	43.00 d
T ₆ = Leaf + Coco Coir (1:1)	49.00 b
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	54.10 a
S.E.±	0.8246
LSD 0.05	1.7686

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

in (Table-6). The minimum days to flowering of the zinnia flower (51 days) was observed in pots filled with leaf manure + coco coir + soil (T₇), followed by the average total number of Days to 1st Flower (54 days) recorded in the pots filled with leaf manures + coco coir (T₆) respectively. A significant decrease in the days to 1st flower such as (61 days) was observed in flowers fertilized with soil + leaf manure Soil + Coco Coir (T₅) respectively. While (61days) and (68 days) were recorded in treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the maximum (71 days) observed in Soil (T₁) and Leaf Manure (T₂) was noted. The LSD test indicated that there were statistically significant differences between the days to the first blossom under the soil (100%) and leaf manure (100%) growing media (P 0.05).

The result is in agreement with Awang and Ismail (1997) who found that Zinnia elegance and marigold give easily flower emergence in different media also Atif Riaz (2008), found differences in the days of the first flower opening s of Zinnia in different growing media.

Flower Size (cm)

The information on how various growing media affect bloom size (cm) is provided in (Table 7). The maximum flower size of zinnia of (8.06 cm) was determined in pots filled in leaf manure + coco coir + soil (T₇), followed by (7.46 and 6.50% cm) was noted in pots filled with leaf manure + coco coir (T₆), and soil + leaf manure (T₅). While (6.46 cm) and (4.50 cm) were recorded in

Table 6: Days to 1st flower of zinnia flower under different growing media.

Treatments	Mean days to 1 st flower
T ₁ = Soil (Control) 100%	71.0 e
T ₂ = Leaf Manure 100%	71.0 e
T ₃ = Coco Coir 100%	68.0 d
T ₄ =Soil+ Leaf Manure 1:1	61.0 c
T ₅ = Soil + Coco Coir 1:1	61.0 c
T ₆ = Leaf + Coco Coir 1:1	54.0 b
T ₇ = Soil + leaf manure + Coco Coir 1:1:1	51.0 a
S.E.±	0.8910
LSD 0.05	1.9111

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the minimum (3.10 cm) flower size was noted in the control. The LSD test suggested that differences in flower size under growing media of leaf manure + coco coir + Soil were statistically significant (P<0.05).

Our findings are similar to Riaz *et al* (2008) who found maximum flower size in coconut compost while the control produced the smallest flower size.

No of Flower Plant⁻¹

Data on the number of flower buds as influenced by various growing conditions are presented in Table 8 and their analysis of variance is presented in Appendix 8.

The maximum number of flowers plant⁻¹ of zinnia (9.0) was measured in pots filled with leaf manure + coco coir + soil (T₇),

Table 7: Flower size (cm) of zinnia flower under different growing media.

Treatments	Mean flower size (cm)
T ₁ = Soil (Control) (100%)	3.10 e
T ₂ = Leaf Manure (100%)	4.00 e
T ₃ = Coco Coir (100%)	4.50 de
T ₄ =Soil+ Leaf Manure (1:1)	6.46 bc
T ₅ = Soil + Coco Coir (1:1)	6.50 cd
T ₆ = Leaf + Coco Coir (1:1)	7.46 ab
T ₇ = Soil + leaf manure + Coco Coir (1:1:1)	8.06 a
S.E.±	0.6909
LSD 0.05	1.4819

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

Table 8: No of flower plant⁻¹ of zinnia flower under different growing media.

Treatments	Mean no of flower plant ⁻¹
T ₁ = Soil (Control) 100%	4.00 f
T ₂ = Leaf Manure 100%	4.06 ef
T ₃ = Coco Coir 100%	5.30 de
T ₄ =Soil+ Leaf Manure 1:1	6.30 cd
T ₅ = Soil + Coco Coir 1:1	7.26 bc
T ₆ = Leaf + Coco Coir 1:1	7.36 b
T ₇ = Soil + leaf manure + Coco Coir 1:1:1	9.00 a
S.E.±	0.6719
LSD 0.05	1.4410

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

Table 9: Flower Persistence life (days) of zinnia flower under different growing media.

Treatments	Mean flower persistence life (days)
T1 = Soil (Control) 100%	4.0 e
T2 = Leaf Manure 100%	4.41 d
T3 = Coco Coir 100%	5.30 c
T4 =Soil+ Leaf Manure 1:1	7.30 a
T5= Soil + Coco Coir 1:1	6.26 bc
T6 = Leaf + Coco Coir 1:1	7.10 ab
T7 = Soil + leaf manure + Coco Coir 1:1:1	6.36 b
S.E.±	0.8165
LSD 0.05	1.7512

Small same letters denote non-significant differences among treatments, while different letters show significant differences among treatments.

followed by (7.36) and (7.26) was noted in pots filled with leaf manure + coco coir (T₆), and soil + leaf manure (T₅). While (6.3) and (5.3) were recorded in treatment Soil+ Leaf Manure (T₄) and Coco Coir (T₃). Whereas the minimum (4.0) Number of flowers plant⁻¹ was noted in control. According to the LSD test, there were statistically significant variations in the number of flower plants-1 grown in soil mixed with leaf manure and coco coir (P 0.05).

The previously mentioned findings are consistent with ear-

lier research by Riaz et al. (2008), who discovered that Zinnia flowers produced more blossoming when cultivated on media containing silt, leaf dung, and coconut compost. Similar findings were made by Awang and Ismail (1997), who discovered that while coconut coir did not yield more blooms when planted alone, Zinnia elegant and marigold did.

Flower Persistence Life (Days)

The information on how various growing media affect floral persistence life (days) is provided in (Table9), While (Appendix-9) has its analysis of variance.

The maximum flower persistence life of Zinnia (7.10 days) was measured in pots filled with leaf manure + coco coir + soil (T_6), followed by (6.36 days) and (6.26 days) was noted in pots filled with leaf manure + coco coir (T_7), and soil + leaf manure (T_3). While (5.30 days) and (5.0 days) were recorded in treatment Soil+ Leaf Manure (T_4) and Coco Coir (T_3). Whereas the minimum (4.0 days) Flower persistence life (days) was noted in control. The LSD test suggested that differences in plant height under growing media of leaf manure + coco coir were statistically significant ($P < 0.05$).

Flower showed more persistence in T7 (soil + Leaf manure + coco coir). This may be due to more organic matter. Our result conforms with the finding of Waseem *et al* (2013) who found a more persistent life of stock flowers using (soil + Leaf Mold + coco husk).

Summary

During the 2018 growing season, a pot experiment was carried out at the Department of Horticulture, Faculty of Agriculture LUAWMS. The impact of various growing environments on the zinnia plant's growth and development. The experiment was set up using a Completely Randomized Design (CRD), with seven different growing media being used for each of the seven treatments. Soil (Control), Leaf Manure, Coco Coir, Soil + Leaf Manure, Soil + Coco Coir, Leaf + Coco Coir, and Soil + leaf manure + Coco Coir, were used to check the growth of zinnia plants in pots.

Data were recorded for different parameters including emergence percentage, survival percentage, Number of leaves plant⁻¹, Number of branches plant⁻¹, Plant height (cm), Days to 1st flower, Flower size (cm), Number of flower plant⁻¹, and flower persistence life (days), during this course of study. The outcome is outlined as follows:

The maximum emergence percentage was recorded in the treatment (T7) while the minimum percentage was in the treatment (T1).

The maximum Survival percentage was recorded in the treatment (T6) while the minimum percentage in treatment (T1)

The maximum number of leaves plant⁻¹ was recorded in the treatment (T7) while the minimum percentage in treatment (T1).

The maximum number of branches plant⁻¹ was recorded in the treatment (T7) while the minimum percentage in treatment (T1)

The maximum plant height of the zinnia flower was recorded in the treatment (T7) while the minimum percentage in treatment (T1)

The maximum number of days to flowering of zinnia flower was recorded in the treatment (T17) while the minimum percentage in treatment (T1)

The maximum number of flowers plant⁻¹ was recorded in the treatment (T7) while the minimum percentage in treatment (T1)

The maximum flower size was recorded in the treatment (T1) while the minimum percentage in the treatment (T7)

The maximum flower persistence life was recorded in the treatment (T6) while the minimum percentage in treatment (T1)

Significantly longer flower persistence life was monitored in treatment (T7) whereas minimum flower life (days) was found in treatment (T1).

Conclusion

The current study confirms that the selection of growing media for the Zinnia Elegant was very important for its growth and development to obtain aesthetic and marketing value. In a recent study treatment (T7) Soil + leaf manure + Coco Coir produced more Number of flowers plant⁻¹, the greater size of the flower, Treatment (T7) Soil + leaf manure + Coco Coir, while maximum plant height obtained in treatment (T7) Soil + leaf manure + Coco Coir. It is concluded as better growing media for zinnia flower under the agro-climatic condition of Uthal Lasbela.

Author Statements

Recommendation

Performance, it is suggested for flower growers for the Uthal region may use (T7) Soil + leaf manure + Coco Coir as growing media for better production of zinnia elagans.

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