

# Effect of Different Growing Media on The Growth and Development of Zinnia Flower Under Agro Climatic Condition of Uthal, Lasbela

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**Submission:** September 28, 2023; **Published:** October 11, 2023

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## Abstract

A pot experiment, to investigate the effect of different growing media on the growth and development of zinnia flower, conducted at Department of Horticulture, faculty of agriculture, LUAWMS Uthal. During summer 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 was recorded for different parameters including emergence percentage, survival 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. The overall performance of Zinnia was better on Emergence percentage (94%), survival percentage (91%), Number of leaves plant-1 (40), number of branches plant-1 (10), plant height (54.10 cm), days to 1st flower (71), flower size (8.06 cm), Number of flowers plant-1 (9.00), persistence life (days) (7.30), the performance of other growing media remained in variable for different parameters investigate in this study. Thus, treatment (T7) Soil + leaf manure + Coco Coir, be recommended for as the best growing media for the better growth and development of Zinnia under the agro climatic condition of Uthal Lasbela.

**Keywords:** Coco Coir; Survival Percentage; Flowers; Seedling; Growing Media.

## Introduction

Zinnia is a wonderful summer annual flower which is gaining rapid popularity for its variety of colorful blooms. It belongs to family Compositae. It is native to Mexico and Central America. The most cultivated zinnia varieties "Blue Point" and "Oklahoma" are considered best because of their good performance and various color blooms (Dole, 1999). Zinnia is genus of 20 species of annual and perennial plants and its flowers exhibit bright, uniform colors, Plants that are disease resistant and have a long vase life. Zinnia elegans, also known as Zinnia violacea, is the most familiar species and a plant of warm, hot climate. Traditionally, taller varieties of Zinnia are used in borders, beds and for cut flowers but the dwarf varieties in containers and window planters (Jana and Pal, 1991) [1-8].

All zinnia flowers prefer a rich. Well drained soil, with proper drainage and the sunny location. Seed are sown in September-October in the plains and august to October (biennials) or in March and April (early flowering types) in hills. Grown easily from seed sown directly into the garden. Make the first sowing about a month before spring. To extend the bloom season, make another season sowing in late spring or easily summer. Scatter seed on the soil surface. And then rake lightly to just cover the seed. Keep the seedbed moist until seedling appear. Thin seedling to stand 15 to 20 cm apart. Mulch plant to keep the roots cool and moist. Water during the dry spells. Zinnia is subject to potassium deficiency, which is seen as burning on the older leaf margins. Zinnia will not flower if it receives more than 6 hours per day 18c.

For maximum flower quality the best might temperature is 2 to 4c. Buds should be present 9 weeks before the expend cutting date. Seed germination in two weeks from 18c to 21c and may respond to light [9-15].

Zinnia is an excellent cut flower. Spikes are cut when one-half to two- thirds of the floret have opened. Flower are stored 4C for up to 3 days, and the flowers will last 3 to 4 days when moved to room temperature. The life of the cut flower can be prolonged by burning the cut ends. Good flower production usually depends upon various factors including the type of growing media use. Nutrients availability plays a pivotal role in good flower production and thus provision of proper growing media is the pre-requisite for better grown and production of floriculture crops. Growing media is defined as the means where the roots of cultivated plants grow (Kampf 2000). Their primordial function is to give support for plant growing (Fermino 1996, Kampf 2000 and Rober 2000). Use of suitable growing media or substrates is essential for production of quality horticultural crops. It directly affects the development and later maintenance of the extensive function rooting system [16-23].

A good growing would provide sufficient anchorage or support to the plant, serves as reservoir for nutrients and water, allow oxygen diffusion to the roots and permit gaseous exchange between the roots and atmosphere outside the root's substrate (Richard 1986, Bunt 1988, Fonteno 1996, Agro 1998 and Abad et al., 2002). This important factor is usually underestimated while working on commercial flower production. Only a few studies deal with growing media and their effect in various flower ornamentals like Liliium (Kapoor et al., 2000), gladiolus (Salim et al.,2002), and phlox (Naz et al., 2006) has been reported. However, no such study has been conducted on zinnia in general and in Uthal region in particular. The current study is being proposed to study the effect different growing media on the growth and development so zinnia plant [24-27].

### Material and Method

The research was conducted in the experimental field of Lasbela University of agriculture water and marine sciences (LUAWMS), Uthal, Lasbela Balochistan in February 2019 with complete randomized design (CRD). Seeds were sown in seedling trays. Healthy seedlings were transplanted into pots after one month at the height of 3 inches. Pots were irrigated soon after transplantation.

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

T1 = Soil (Control)	100%
T2 = Leaf Manure	100%
T3 = Coco Coir	100%
T4 = Soil+ Leaf Manure	1:1
T5 = Soil + Coco Coir	1:1

T6 = Leaf + Coco Coir 1:1

T7 = Soil + leaf manure + Coco Coir 1:1:1

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

### Parameters

#### Emergence percentage

Days taken to 1st flowering were counted from the date the transfer of seedling into the pots to the date of first flower opening (corolla fully opened). And then the average was calculated.

#### Survival percentage

It was recorded by counting the total number of survival plants in each treatment divided by total number of plants transplanted multiplied by 100, as follow,

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

#### Number of Leaves per plant<sup>1</sup>.

Number of leaves per plant (below the inflorescence) was counted and at the time of harvest of each replicate plant and mean was calculated.

#### Number of branches per plant-1.

Number of branches of each plant was counted, when flower emerged, from each plant and average was counted.

#### Plant Height (cm)

The height of all plants was measured from the point where the plant emerged from the growing media to the top of the stem in centimeters and average was calculated.

#### Number of flower per plant-1.

The total number of flowers from each cluster of the plant was counted and the average was calculated.

#### Flower persistence life (days)

For flower persistence, number of days was counted during which the flower opened and then dropped down on the plant were counted. Three flowers per replication were selected to observe this trait.

#### Statically Analysis

All collected data were analyzed using statistical software Statistix 8.1 Statistix, 2006. LSD test was performed. The data analysis of modification technique and means were matched via least significant at ( $P \leq 0.05$ ). Probability level to compare treatment superiority [28-35].

### Result and Discussion

The result for the experiment "Effect of different growing media on the growth and development of Zinnia" have been described in the following paragraphs. The data regarding

Emergence percentage of Zinnia plant as affected by different growing media is given in (Table 1), while its analysis of variance is given in (Appendix-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%) recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (56.66%) Emergence percentage was observed in control. The LSD test suggested that differences in emergence under growing media of leaf manure + coco coir + soil (T7) were statistically significant ( $P < 0.05$ ). Difference in emergence might be due to different level of nutrients in different growing media and climatic condition. The result are similar with Anastasia et al (2019), who reported deference in emergence in zinnia flowering plant using different organic fertilizer (Table 1).

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

Treatments	Mean
T1 = Soil (Control) 100%	56.66 G
T2 = Leaf Manure 100%	62.06 F
T3 = Coco Coir 100%	66.10 E
T4 =Soil+ Leaf Manure 1:1	77.13 D
T5= Soil + Coco Coir 1:1	77.00 C
T6 = Leaf + Coco Coir 1:1	87.06 B
T7 = Soil + leaf manure + Coco Coir 1:1:1	94.00 A
S.E.±	0.8087
LSD 0.05	1.7345

The survival percentage of Zinnia plant as affected by different composition of growing media is given in (Table-2), while its analysis of variance is given in (Appendix-2). The maximum Survival percentage of Zinnia (91.00%) was measured in pots filled with leaf manure + coco coir (T6), followed by (85.00%) and (81.00%) was noted in pots filled with soil + leaf manure + coco coir (T7), and soil + coco coir (T5). While (76.00 %) and (69.00%) recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (50.00 %) Survival % was noted in control. The LSD test suggested that differences in survival percentage under growing media of leaf manure + coco coir + soil (T6) were statistically significant ( $P < 0.05$ ).

Favorable environment and good growing media are the main factor for the survival of any flowering plants, mixture of growing media (soil+ Leaf mature + Coco coir) gave good result in survival of plant which is good source of organic matter. Our finding are in agreement with Rao et al (2004) and Bashir et al (2007) worked

on jojoba cutting and tomato hybrids were found less mortality percentage in plants using mixture of different growing media for their growth and survival (Table 2).

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

Treatments	Mean
T1 = Soil (Control) 100%	50.00 G
T2 = Leaf Manure 100%	60.00 F
T3 = Coco Coir 100%	69.00 E
T4 =Soil+ Leaf Manure 1:1	76.00 D
T5= Soil + Coco Coir 1:1	81.00 C
T6 = Leaf + Coco Coir 1:1	91.00 A
T7 = Soil + leaf manure + Coco Coir 1:1:1	85.00 B
S.E.±	0.8165
LSD 0.05	1.7512

### Number of leaves plant-1

**Table 3:** Number of leaves plant<sup>-1</sup> of zinnia flower under different growing media.

Treatments	Mean
T1 = Soil (Control) 100%	21.00 G
T2 = Leaf Manure 100%	28.42 F
T3 = Coco Coir 100%	28.22 E
T4 =Soil+ Leaf Manure 1:1	34.00 D
T5= Soil + Coco Coir 1:1	31.00 C
T6 = Leaf + Coco Coir 1:1	38.00 B
T7 = Soil + leaf manure + Coco Coir 1:1:1	40.00 A
S.E.±	0.8249
LSD 0.05	1.7693

The data regarding number of leaves per plant of Zinnia plant as affected by different growing. media is given (Table-3), while its analysis of variance given in (Appendix-3) The maximum number of leaves plant-1 of zinnia flower (40.00%) was counted in pots leaf manure + coco coir + soil (T7), followed by (38.00%) and (35.00%) was noted in pots filled with leaf manure + coco coir (T6), and soil + leaf manure (T4). While (31.00%) and (28.42%) recorded in treatment Soil + Coco Coir (T5) and Leaf Manure (100%) (T2). Whereas the minimum (21.00%) Number of leaves plant-1 was observed in control. The LSD test suggested that differences in number of leaves plant-1 under growing media of leaf manure + coco coir + soil (T7) were statistically significant ( $P < 0.05$ ). Above result are in conformity with the finding of waseem et al (2000) who reported that the mixture of different

growing media gave maximum number of leaves in stock plants and minimum leaves were observed in control. Also our findings are similar to previous research done by wuryaningsih (1999) et al. who obtained significant increase in number of leaves anthurium using growing media other than soil. Likewise, Pasini and Aquila (1989) and riaz et al (2008) obtained maximum number of leaves per plant using leaf manure as growing media for different flowering plants (Table 3).

### Number of branches plant-1

The data regarding the number of branches per plant as affected by different growing media is given (Table-4), while its analysis of variance is given in (Appendix-4). The maximum number of branches plant-1 of zinnia flower (10.00%) was measured in pots filled with leaf manure + coco coir + soil (T7), followed by (9.00%) and (7.00%) was noted in pots filled with leaf manure + coco coir (T6), and soil + leaf manure (T5). While (8.00%) and (5.00%) number of branches plant-1 recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (3.00%) number of branches plant-1 was noted in Leaf Manure (100%) (T2) and Soil (Control) (100%) (T1). The LSD test suggested that differences in number of branches plant-1 under growing media of leaf manure + coco coir + soil (T7) were statistically significant (P<0.05). Apparently, the mixture of growing media (soil, leaf manure, coco coir) has more appropriate physical characteristics maybe because of having high level of nutrients. Our result got support from the previous finding of Riaz et al (2008) who also significantly found a greater number of branches in zinnia flower using mixture of growing media. Also, waseem et al (2013) found that a greater number of branches in stock flower while using mixture of growing media (Table 4).

**Table 4:** Number of branches plant<sup>-1</sup> of zinnia flower under different growing media.

Treatments	Mean
T1 = Soil (Control) 100%	3.00 F
T2 = Leaf Manure 100%	3.00 D
T3 = Coco Coir 100%	5.00 E
T4 =Soil+ Leaf Manure 1:1	8.00 BC
T5= Soil + Coco Coir 1:1	7.00 C
T6 = Leaf + Coco Coir 1:1	9.00 AB
T7 = Soil + leaf manure + Coco Coir 1:1:1	10.00 A
S.E.±	0.8165
LSD 0.05	1.7512

4

### Plant Height (Cm)

The data regarding plant height (cm) of Zinnia as affected by different growing media is given in (Table-5), while its analysis of variance is given in (Appendix-5). The maximum plant height of zinnia flower (54.10%) cm was measured in pots filled with leaf manure + coco coir + soil (T7), followed by (49.00%) cm and (46%) cm was noted in pots filled with leaf manure + coco coir (T6), and soil + leaf manure ( T4 ). While (43.00%) cm and (39.00%) cm recorded in treatment Soil + Coco Coir (T5) and Coco Coir (100%) (T3). Whereas the minimum (34.10%) cm plant height was noted in control. The LSD test suggested that differences in plant height under growing media of leaf manure + coco coir+ soil were statistically significant (P<0.05). Result indicated that the mixture of growing media containing soil, leaf manure and coco coir has good impact on plant height rather than using single source of growing media. The result was an agreement with the shahina yaseen et al (2012) and Freed at al. (1997). Where they found maximum plant height of Dianthus Caryophyllus and chrysanthemum when grown in different mixture of growing media (Table 5).

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

Treatments	Mean
T1 = Soil (Control) 100%	34.10 F
T2 = Leaf Manure 100%	35.20 F
T3 = Coco Coir 100%	39.00 E
T4 =Soil+ Leaf Manure 1:1	46.00 C
T5= Soil + Coco Coir 1:1	43.00 D
T6 = Leaf + Coco Coir 1:1	49.00 B
T7 = Soil + leaf manure + Coco Coir 1:1:1	54.10 A
S.E.±	0.8246
LSD 0.05	1.7686

### Days to 1st Flower

The data regarding days to 1st flower in Zinnia plant as affected by different growing media is given in (Table 6), while its analysis of variance is given in (Appnedix-6). The minimum days to flowering of zinnia flower (51.00%) was observed in pots filled with leaf manure + coco coir + soil (T7), followed by average total number of Days to 1st Flower of (54.00%) recorded in the pots filled with leaf manures + coco coir (T6) respectively. A significant decrease in the days to 1st flower such as (6.00 %) observed in flower fertilized with soil + leaf manure Soil + Coco Coir (T5) respectively. While (61.00%) and (68.00 %) recorded

in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the maximum (71.00 %) days observed in Soil (Control) (100%) (T1) and Leaf Manure (100%) (T2) as noted. The LSD test suggested that differences in days to 1st flower under growing media of Soil (Control) 100% and Leaf Manure (100%) were statistically significant (P<0.05). The result are in agreement Awang and Ismail (1997) who found that Zinnia elegance and marigold give easily flower emergence in different media also Atif riaz (2008), found difference in days of first flower opening s of Zinnia in different growing media (Table 6).

**Table 6:** Days to 1<sup>st</sup> flower of zinnia flower under different growing media.

Treatments	Mean
T1 = Soil (Control) 100%	71.00 A
T2 = Leaf Manure 100%	71.00 A
T3 = Coco Coir 100%	68.00 B
T4 =Soil+ Leaf Manure 1:1	61.00 C
T5= Soil + Coco Coir 1:1	61.00 C
T6 = Leaf + Coco Coir 1:1	54.00 D
T7 = Soil + leaf manure + Coco Coir 1:1:1	51.00 E
S.E.±	0.891
LSD 0.05	1.9111

### Flower Size (Cm)

**Table 7:** Flower size of zinnia flower under different growing media.

Treatments	Mean
T1 = Soil (Control) 100%	3.10 E
T2 = Leaf Manure 100%	4.00 E
T3 = Coco Coir 100%	4.50 DE
T4 =Soil+ Leaf Manure 1:1	6.46 BC
T5= Soil + Coco Coir 1:1	6.50 CD
T6 = Leaf + Coco Coir 1:1	7.46 AB
T7 = Soil + leaf manure + Coco Coir 1:1:1	8.06 A
S.E.±	0.6909
LSD 0.05	1.4819

The data regarding flower size (cm) as affected by different growing media is given in (Table-7), while its analysis of variance is given in (Appendix-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) recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (3.10 cm) flower size was noted in 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 with Riaz et al (2008) who found maximum flower size in coconut compost while control produced smallest flower size.

(Table 7).

### Number of flowers plant-1

**Table 8:** Number of flower plant<sup>-1</sup> of zinnia flower under different growing media.

Treatments	Mean
T1 = Soil (Control) 100%	4.00 F
T2 = Leaf Manure 100%	4.06 EF
T3 = Coco Coir 100%	5.30 DE
T4 =Soil+ Leaf Manure 1:1	6.30 CD
T5= Soil + Coco Coir 1:1	7.26 BC
T6 = Leaf + Coco Coir 1:1	7.36 B
T7 = Soil + leaf manure + Coco Coir 1:1:1	9.00 A
S.E.±	0.6719
LSD 0.05	1.441

The data regarding the number of flowers palnt-1 as affected by different growing media is given in (Table 8). while its analysis of variance is given in (Appendix-8). The maximum Number of flowers plant- 1 of Zinnia (9.00 %) was measured in pots filled with leaf manure + coco coir + soil (T7), followed by (7.36 %) and (7.26 %) was noted in pots filled with leaf manure + coco coir (T6), and soil + leaf manure (T5). While (6.30 %) and (5.30 %) recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (4.00%) Number of flowers plant-1 was noted in control. The LSD test suggested that differences in number of flower plant-1 under growing media of soil + leaf manure + coco coir were statistically significant (P<0.05). Above result are in agreement with previous work done by Riaz et al (2008) who found that Zinnia flower produced more flowering were grown in media containing silt, leaf manure and coconut compost. Similarly, Awang and Ismail (1997) who found that Zinnia elagans and marigold produce more flowers which were grown in different growing media while alone coconut coir failed to produce more flower (Table 8).

### Flower persistence life (Days)

The data regarding flower persistence life (days) as affected by different growing media is given in (Table-9), while its analysis of variance is given in (Appendix-9). The maximum flower persistence life (days) of Zinnia (7.10%) was measured in pots filled with leaf manure + coco coir + soil (T6), followed by (6.36%) and (6.26%) was noted in pots filled with leaf manure + coco coir (T7), and soil + leaf manure (T5). While (5.30%) and (5.00%) recorded in treatment Soil+ Leaf Manure (T4) and Coco Coir (100%) (T3). Whereas the minimum (4.00%) 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). May be due to more organic matter. Our result are in conformity with the finding of waseem et al (2013) who found more persistence life of stock flower using (soil + Leaf Mold + coco husk) [36-40] (Table 9).

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

Treatments	Mean
T1 = Soil (Control) 100%	4
T2 = Leaf Manure 100%	4.41
T3 = Coco Coir 100%	5.3
T4 =Soil+ Leaf Manure 1:1	7.3
T5= Soil + Coco Coir 1:1	6.26
T6 = Leaf + Coco Coir 1:1	7.10.00
T7 = Soil + leaf manure + Coco Coir 1:1:1	6.36
S.E.±	0.8165
LSD 0.05	1.7512

### Summary

A pot experiment was conducted at Department of horticulture, faculty of agriculture, LUAWMS during season 2018. To check the effect of different growing media on the growth and development of zinnia. The experiment was laid out in completely Randomized Design (CRD) with 7 treatment 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 cheek the growth of zinnia plants in pots. Data was recorded for different parameters including emergence percentage, survival percentage, Number of leaves plant<sup>-1</sup>, Number pf branches plant<sup>-1</sup>, Plant height (cm), Days to 1st flower, Flower size (cm), Number of flower plant<sup>-1</sup>, and flower persistence life (days), during this course of study. The result obtained is summarized below: The maximum emergence

percentage was recorded in the treatment (T7) while minimum percentage in treatment (T1). The maximum Survival percentage was recorded in the treatment (T6) while minimum percentage in treatment (T1). The maximum number of leaves plant<sup>-1</sup> was recorded in the treatment (T7) while minimum percentage in treatment (T1). The maximum number of branches plant<sup>-1</sup> was recorded in the treatment (T7) while minimum percentage in treatment (T1). The maximum plant height of zinnia flower was recorded in the treatment (T7) while minimum percentage in treatment (T1). The maximum days to flowering of zinnia flower was recorded in the treatment (T17) while minimum percentage in treatment (T1). The maximum Number of flowers plant<sup>-1</sup> was recorded in the treatment (T7) while minimum percentage in treatment (T1). The maximum flower size was recorded in the treatment (T1) while minimum percentage in treatment (T7). The maximum flower persistence life was recorded in the treatment (T6) while minimum percentage in treatment (T1) Significantly longer flower persistence life was monitored in treatment (T7) where minimum flower life (days) was found in treatment (T1).

### Conclusion

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

### Recommendation

In consideration of the treatment (T7) Soil + Leaf Manure + Coco Coir's comparative performance, it is suggested for flower grower for Uthal region may use (T7) Soil + leaf manure + Coco Coir as growing media for better production of zinnia elagans.

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DOI: [10.19080/AIBM.2023.17.555968](https://doi.org/10.19080/AIBM.2023.17.555968)

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