



# International Journal of Research in Agronomy

E-ISSN: 2618-0618  
P-ISSN: 2618-060X  
© Agronomy  
NAAS Rating (2026): 5.20  
[www.agronomyjournals.com](http://www.agronomyjournals.com)  
2026; 9(8): 120-124  
Received: 24-05-2026  
Accepted: 28-06-2026

**Mudo Ram**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Dr. Ram Kumar Dewangan**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Dr. Jeevan Lal Nag**  
Department of Fruit Science, College  
of Agriculture pakhanjore IGKV  
Raipur Chhattisgarh, India

**Dr. Ganesh Prasad Nag**  
Department of Vegetable Science, K.  
D. College of Horticulture and  
Research Station Jagdalpur,  
MGUVV, Durg, Chhattisgarh, India

**Dr. Agniva Halder**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Nakul Kumar Nag**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Kamini Gawde**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Pankaj Kashyap**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

**Corresponding Author:**  
**Mudo Ram**  
Department of Fruit Science, K. D.  
College of Horticulture and Research  
Station Jagdalpur, MGUVV, Durg,  
Chhattisgarh, India

## Effect of growing media on seed germination and seedling growth of Jackfruit (*Artocarpus heterophyllus* Lam)

**Mudo Ram, Ram Kumar Dewangan, Jeevan Lal Nag, Ganesh Prasad Nag, Agniva Halder, Nakul Kumar Nag, Kamini Gawde and Pankaj Kashyap**

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i8b.6211>

### Abstract

The present research “Effect of growing media on seed germination and seedling growth of Jackfruit (*Artocarpus heterophyllus* Lam.)” was conducted during 2024–25 at the Department of Fruit Science, Krantikari Debridhur College of Horticulture and Research Station, Jagdalpur (MGUVV, DURG) (Chhattisgarh) to evaluate the seed germination and growth performance of Jackfruit under Bastar agro-climatic conditions, Jagdalpur. The experiment was laid out in a Completely Randomized Design comprising eight treatments with three replications to evaluate the influence of various growing media combinations on germination, and growth of jackfruit seedlings under protected conditions. The present investigation entitled “Effect of growing media on seed germination and seedling growth of Jackfruit (*Artocarpus heterophyllus* Lam.)” was conducted during 2024–25 at KDCHRS, Jagdalpur under a Completely Randomized Design with eight treatments and three replications to evaluate the effect of different growing media on germination and early seedling growth. The results revealed significant variation among treatments. Among all the treatments, T<sub>6</sub> (Soil + vermicompost + rice husk + cocopeat in 1:1:1:1 ratio) performed the best by recording minimum days to initiation of germination (11.72 days), highest germination percentage (91.41%) and germination index (33.42). Growth parameters were also significantly improved under this treatment, with maximum seedling height (58.04 cm), stem girth (9.45 mm) and number of leaves (14.88). Thus, the growing media combination used in T<sub>6</sub> was found to be the most effective for enhancing germination and early seedling growth of jackfruit under nursery conditions.

**Keywords:** Jackfruit, seed germination and seedling growth

### 1. Introduction

The Jackfruit plant (*Artocarpus heterophyllus* Lam.) belongs to the family Moraceae. Among fruit-bearing plants, it is native to India and produces the largest fruit. This yielder is fairly heavy. In India's eastern Southern and Western Ghats, the fruit is referred to as "poor man's food." Both the rich and the poor like the fruit. You can utilize immature fruit as a vegetable. The ripe fruit is rich in minerals, vitamins A and C, and other nutrients. In addition to being a high source of carbohydrates (23.4%), the edible pulp also includes minerals (0.9%), protein (0.6%), fat (0.6%), fiber (1.8%), and ash (0.5%). The seeds have 0.4% fat, 1.5% fiber, and 1.5% ash. The seeds have a high protein content of 11.05% and a high starch content of 38.4% (Purseglove, 1968) <sup>[16]</sup>.

The jack tree (*Artocarpus heterophyllus* Lam.) produces the dicotyledonous compound fruit known as jackfruit, which is found in many tropical South-East Asian nations but is especially common in Bangladesh and India. Fruit typically weighs 10 to 25 kg and is grown in the summer, when there are often shortages of primary foods like cereals. Locally referred to as kathal, jackfruit is a member of the Moraceae family, which also includes *Ficus species* (fig) and *Morus species* (mulberry), and it has chromosomal number 2n=56 (tetraploid) (Campbell, 1984) <sup>[3]</sup>. With over 1,000 species spread across 67 genera, this family primarily consists of tropical trees and shrubs, however there are also some vines and plants. (Press, B. R. I. T. 2018).

The world's largest edible fruit is jackfruit. It's an evergreen tropical tree. It was once called *Artocarpus integrifolia*. Widely grown in South Asia, East India, and other warm regions of both

hemispheres, it is an indigenous fruit crop that most likely originated in the Western Ghats. Jack trees are widely grown in Brazil, Malaysia, and Burma. Despite being widely spread throughout Assam, Bihar, South India, and the foothills of the Himalayas in North India, it is barely acknowledged as a commercial fruit crop in India. It is a staple of Keralam homesteads and is also planted as a shade crop alongside cardamom, areca, and coffee. Pepper plantations often grow it as a conventional crop. The crop has the unique distinction of being a staple food for the indigenous people of Kerala as well as in several African nations like Uganda.

In the southern states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh jackfruit is grown extensively. Other states like Assam, Bihar, Orissa, Maharashtra, and West Bengal also cultivate it. Approximately 186 thousand hectares of jackfruit are grown in India, with a production volume of 3292 thousand metric tonnes and a productivity of 17.69 MT (NHB., 2024) <sup>[11]</sup>. The total area planted to jack fruit in Chhattisgarh is 10.457 hectares, with a productivity of 19.40 metric tonnes and an annual production of 202.936 metric tonnes (Anon., 2024) <sup>[1]</sup>. Raigarh, Kondagaon, Bastar, Rajnandgaon, Kabirdham, Mahasamund, Bilaspur and Korea are the districts in Chhattisgarh where it is grown. Growers are willing to accept this fruit in exchange for enormous financial returns, as evidenced by the area's astounding expansion.

## 2. Materials and Methods

### 2.1 Experimental Site

Field experiment was carried out during the year 2024-25 at Research cum Instructional Farm KDCHRS, Jagdalpur (C.G.). The experiment consisted of eight treatments as treatments under a Completely Randomized Design with three replications: T<sub>1</sub> College field Soil, T<sub>2</sub> Soil + FYM (3:1), T<sub>3</sub> Soil + vermi-compost

+ rice husk (2:1:1), T<sub>4</sub> Soil + vermi-compost + sawdust (2:1:1), T<sub>5</sub> Soil + vermi-compost + coco peat (2:1:1), T<sub>6</sub> Soil + vermi-compost + rice husk + coco peat (1:1:1:1), T<sub>7</sub> Pond soil, T<sub>8</sub> Farmer field soil (Location - Pandripani).

The data collected during the investigation were statistically analyzed using the analysis of variance (ANOVA) method. Observations related to germination and seedling growth parameters were recorded at monthly intervals up to 120 days after sowing.

### 2.2 Observations recorded

#### 2.2.1 Days taken to start germination

Seed germination was monitored starting from the day of sowing. The number of days taken for the seeds to germinate was noted, and the average number of days required for germination was calculated and reported.

#### 2.2.2 Days taken to 50% germination

The duration from the initial germination to the point where 50% of the seeds germinated was measured.

#### 2.2.3 Germination percentage

Germination percentage for each treatment was assessed 30 days after sowing. It was determined using the following formula and presented as a percentage.

$$\text{Germination\%} = \frac{\text{Total number of seeds germinated}}{\text{Total number of seeds sown}} \times 100$$

#### 2.2.4 Germination index (GI)

The germination index was determined according to the method outlined by the Association of Official Seed Analysts (AOSA, 1983) using the following formula.

$$\text{Germination index} = \frac{\text{No. of germinated seed}}{\text{Days of first count}} + \frac{\text{No. of germinated seed}}{\text{Days of second count}} + \frac{\text{No. of germinated seed}}{\text{Days of final count}}$$

#### 2.2.5 Height of seedling (cm)

The heights of five randomly chosen plants were measured from the collar region to the shoot tip at 60, 90, and 120 days after sowing. The average seedling height was then determined and expressed in centimeters.

#### 2.2.6 Girth of seedling (mm)

Stem girth of five randomly selected plants from each treatment in every replication was measured using vernier calipers at 3 cm above the base at 30, 60, 90, and 120 days after sowing. The average stem girth was then calculated and expressed in millimeters.

#### 2.2.7 Number of leaves per seedling

The total number of leaves per plant was determined by counting the leaves on five randomly selected plants at 60, 90, and 120 days after sowing, and the values were recorded as the number of leaves per seedling.

## 3. Results and Discussion

### 3.1 Days Taken to Start Germination

The days taken to start germination were significantly influenced by different growing media Table 1. The earliest germination (11.72 days) was recorded in T<sub>6</sub> (Soil + vermicompost + rice husk + cocopeat, 1:1:1:1), followed by T<sub>5</sub> (11.82 days). Treatments T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were statistically at par. The maximum time to start germination (16.17 days) was observed in T<sub>1</sub> (control), followed

by T<sub>8</sub> (14.80 days) and T<sub>7</sub> (14.44 days). The early germination observed in T<sub>6</sub> may be attributed to improved aeration, moisture retention and nutrient availability provided by the combined effect of vermicompost, rice husk and cocopeat, which created a favourable environment for rapid seed imbibition and germination. These findings are in close agreement with the reports of Anjanawe in papaya, Desai *et al.* (2017) <sup>[6]</sup> in papaya, Gawankar *et al.*, (2021) <sup>[8]</sup> in jackfruit and Pradhan *et al.* (2024) <sup>[15]</sup> in jackfruit in jackfruit.

### 3.2 Days require for 50% germination

The observations on days taken to attain 50 per cent germination were significantly influenced by different growing media Table 1. The minimum number of days to 50 per cent germination (20.31 days) was recorded in T<sub>6</sub> (Soil + vermicompost + rice husk + cocopeat, 1:1:1:1), followed by T<sub>5</sub> (21.05 days). Treatments T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were statistically at par, whereas the maximum time (27.94 days) was recorded in T<sub>1</sub> (control), followed by T<sub>8</sub> (26.99 days) and T<sub>7</sub> (25.22 days).

The earlier attainment of 50 per cent germination in T<sub>6</sub> may be attributed to improved aeration, moisture retention and nutrient availability provided by vermicompost, rice husk and cocopeat, which promoted rapid seed imbibition and uniform germination. In contrast, delayed germination in the control was likely due to poor aeration and greater soil compaction. These findings are in close agreement with the reports of Gawankar *et al.* (2021) <sup>[8]</sup> in jackfruit.

### 3.3 Germination Percentage (%)

The observations on seed germination percentage were significantly influenced by different growing media and are presented in Table 2. The highest germination (91.41%) was recorded in T<sub>6</sub> (Soil + vermicompost + rice husk + cocopeat in 1:1:1:1 ratio), which was statistically superior to all treatments including control (T<sub>1</sub>). This was followed by T<sub>3</sub> (81.46%) and T<sub>2</sub> (78.54%). Treatments T<sub>5</sub> and T<sub>4</sub> recorded 75.02% and 70.22% germination, respectively. The lowest germination (61.42%) was observed in T<sub>1</sub> (control), followed by T<sub>8</sub> (64.88%) and T<sub>7</sub> (65.51%).

Higher germination in T<sub>6</sub> may be due to improved aeration, moisture retention and nutrient availability provided by vermicompost, rice husk and cocopeat, which created favorable conditions for seed imbibition and growth. In contrast, lower germination in control and field soils may be due to compaction and poor aeration. Overall, incorporation of organic components improved soil properties and enhanced germination. These findings are in agreement with Anjanawe in papaya, Bhardwaj (2014)<sup>[2]</sup> in papaya and Gawankar *et al.* (2021)<sup>[8]</sup> in jackfruit.

### 3.4 Germination Index

The observations on germination index were significantly influenced by different growing media and are presented in Table 2. The highest germination index (33.42) was recorded in T<sub>6</sub> (Soil + vermicompost + rice husk + cocopeat in 1:1:1:1 ratio), which was statistically superior over all treatments including control (T<sub>1</sub>). This was followed by T<sub>5</sub> (27.69) and T<sub>3</sub> (27.21), which were at par with T<sub>2</sub> (26.55). Treatment T<sub>4</sub> recorded 23.91, while the lowest germination index (18.02) was observed in T<sub>1</sub>, followed by T<sub>8</sub> (20.27) and T<sub>7</sub> (20.67). Higher germination index in T<sub>6</sub> may be due to improved aeration, moisture retention and nutrient availability from vermicompost, rice husk and cocopeat, which enhanced germination rate and uniformity. In contrast, lower values in control and field soils may be due to poor soil structure and less favourable conditions. These results are in agreement with Prajapati *et al.*, (2017) in acid lime, Arvind (2014) in papaya, Bhardwaj (2014)<sup>[2]</sup> in papaya and Gawankar *et al.*, (2019)<sup>[7]</sup> in jackfruit.

**Table 1:** Effect of growing media on days taken to start germination and Days taken to 50% germination of jackfruit

| Notations      | Days taken to start germination | Days taken to 50% germination |
|----------------|---------------------------------|-------------------------------|
| T <sub>1</sub> | 16.17                           | 27.94                         |
| T <sub>2</sub> | 13.40                           | 23.61                         |
| T <sub>3</sub> | 13.41                           | 22.95                         |
| T <sub>4</sub> | 13.08                           | 23.83                         |
| T <sub>5</sub> | 11.82                           | 21.05                         |
| T <sub>6</sub> | 11.72                           | 20.31                         |
| T <sub>7</sub> | 14.44                           | 25.22                         |
| T <sub>8</sub> | 14.80                           | 26.99                         |
| SE (m) ±       | 0.29                            | 0.40                          |
| C.D. at 5%     | 0.89                            | 1.23                          |

**Table 2:** Effect of growing media on Germination (%) and Germination index of jackfruit

| Notations      | Germination (%) | Germination index |
|----------------|-----------------|-------------------|
| T <sub>1</sub> | 61.42           | 18.02             |
| T <sub>2</sub> | 78.54           | 26.55             |
| T <sub>3</sub> | 81.46           | 27.21             |
| T <sub>4</sub> | 70.22           | 23.91             |
| T <sub>5</sub> | 75.02           | 27.69             |
| T <sub>6</sub> | 91.41           | 33.42             |
| T <sub>7</sub> | 65.51           | 20.67             |
| T <sub>8</sub> | 64.88           | 20.27             |
| SE (m) ±       | 1.06            | 0.16              |
| C.D. at 5%     | 3.21            | 0.49              |

### 3.5 Height of Seedling (cm)

Seedling height was recorded at 60, 90 and 120 DAS and was significantly influenced by different growing media. The data presented in table 3. At 60 DAS, the maximum seedling height (39.67 cm) was recorded under T<sub>6</sub> (Soil + vermicompost + rice husk + coco-peat in 1:1:1:1), followed by T<sub>4</sub> (37.40 cm), T<sub>5</sub> (36.18 cm) and T<sub>3</sub> (35.28 cm), while the minimum (25.62 cm) was observed in T<sub>1</sub> (control). At 90 DAS, T<sub>6</sub> again recorded the highest height (51.04 cm), followed by T<sub>5</sub> (49.72 cm), T<sub>3</sub> (49.51 cm) and T<sub>4</sub> (48.70 cm), whereas the lowest (30.26 cm) was in T<sub>1</sub>. At 120 DAS, the maximum height (58.04 cm) was recorded in T<sub>6</sub>, followed by T<sub>3</sub> (57.68 cm), T<sub>5</sub> (57.18 cm) and T<sub>4</sub> (56.94 cm), which were at par and superior to T<sub>2</sub> (56.21 cm). The minimum (35.84 cm) was recorded in T<sub>1</sub>. The superior performance of T<sub>6</sub> may be due to improved aeration, moisture retention and nutrient availability provided by vermicompost, rice husk and coco-peat, resulting in better root growth and nutrient uptake. Similar results

were reported by Prajapati *et al.*, (2017) in acid lime, Gawankar *et al.* (2019)<sup>[7]</sup> in jackfruit, Parmar *et al.* (2019)<sup>[13]</sup> custard apple, and Pradhan *et al.* (2024)<sup>[15]</sup> in jackfruit.

### 3.6 Girth of Seedling (mm)

The girth of jackfruit seedlings recorded at 60, 90 and 120 DAS were significantly influenced by different growing media. The data presented in table 3. At 60 DAS, the maximum girth (4.60 mm) was recorded under T<sub>6</sub> (Soil + vermicompost + rice husk + coco-peat in 1:1:1:1), followed by T<sub>5</sub> (4.42 mm), while the minimum (3.06 mm) was observed in T<sub>1</sub> (control). At 90 DAS, T<sub>6</sub> again recorded the highest girth (6.02 mm), followed by T<sub>5</sub> (5.88 mm), whereas the lowest (3.55 mm) was noted in T<sub>1</sub>. At 120 DAS, the maximum girth (9.45 mm) was recorded under T<sub>6</sub>, followed by T<sub>5</sub> (9.25 mm), T<sub>3</sub> (9.08 mm) and T<sub>4</sub> (8.91 mm), while the minimum (5.50 mm) was recorded in T<sub>1</sub>. Overall, T<sub>6</sub> proved superior at all stages, likely due to improved nutrient availability, aeration and moisture retention, which enhanced stem growth. Similar findings were reported by Gawankar *et al.* (2019)<sup>[7]</sup> in jackfruit, Lad *et al.* (2020)<sup>[10]</sup> in mango and Pradhan *et al.* (2024)<sup>[15]</sup> in jackfruit.

### 3.7 Number of Leaves per Seedling

The number of leaves per seedling recorded at 60, 90 and 120 DAS showed significant variation due to different growing media. The data presented in table 3. At 60 DAS, the maximum number of leaves (5.07) was recorded under T<sub>6</sub> (Soil + vermicompost + rice husk + coco-peat in 1:1:1:1), followed by T<sub>5</sub> (4.83), while the minimum (3.32) was observed in T<sub>1</sub> (control). At 90 DAS, T<sub>6</sub> again recorded the highest number of leaves (12.65), followed by T<sub>5</sub> (11.52), whereas the lowest (5.84) was noted in T<sub>1</sub>. At 120

DAS, the maximum number of leaves (14.88) was recorded under T<sub>6</sub>, followed by T<sub>5</sub> (14.14) and T<sub>3</sub> (14.10), while the minimum (7.81) was recorded in T<sub>1</sub>. Overall, T<sub>6</sub> was found superior at all stages due to better nutrient availability and improved physical properties of the media, enhancing vegetative growth. Similar

results were reported by Parasana *et al.* (2013)<sup>[12]</sup> in mango, Parmar *et al.* (2019)<sup>[13]</sup> custard apple, Gawankar *et al.* (2019)<sup>[7]</sup> in Jackfruit, Lad *et al.* (2020)<sup>[10]</sup> in mango and Pradhan *et al.* (2024)<sup>[15]</sup> in Jackfruit

**Table 3:** Effect of growing media on height, girth, and leaves of jackfruit seedling.

| Notations      | Seedling (cm) |       |        | Girth (mm) |       |        | Number of leaves |       |        |
|----------------|---------------|-------|--------|------------|-------|--------|------------------|-------|--------|
|                | 60DAY         | 90DAY | 120DAY | 60DAY      | 90DAY | 120DAY | 60DAY            | 90DAY | 120DAY |
| T <sub>1</sub> | 25.62         | 30.26 | 35.84  | 3.06       | 3.55  | 5.50   | 3.32             | 5.84  | 7.81   |
| T <sub>2</sub> | 32.84         | 47.66 | 56.21  | 3.40       | 4.92  | 8.54   | 3.73             | 9.02  | 11.07  |
| T <sub>3</sub> | 35.28         | 49.51 | 57.68  | 3.95       | 5.55  | 9.08   | 4.02             | 10.88 | 14.10  |
| T <sub>4</sub> | 37.40         | 48.70 | 56.94  | 3.51       | 5.32  | 8.91   | 3.90             | 10.80 | 12.99  |
| T <sub>5</sub> | 36.18         | 49.72 | 57.18  | 4.42       | 5.88  | 9.25   | 4.83             | 11.52 | 14.14  |
| T <sub>6</sub> | 39.67         | 51.04 | 58.04  | 4.60       | 6.02  | 9.45   | 5.07             | 12.65 | 14.88  |
| T <sub>7</sub> | 28.61         | 36.03 | 39.15  | 3.12       | 3.95  | 6.33   | 3.54             | 8.95  | 10.70  |
| T <sub>8</sub> | 27.03         | 32.32 | 35.96  | 3.10       | 3.66  | 5.77   | 3.40             | 5.99  | 8.04   |
| SE (m) ±       | 0.66          | 0.80  | 0.29   | 0.06       | 0.05  | 0.06   | 0.05             | 0.06  | 0.14   |
| C.D. at 5%     | 2.00          | 2.43  | 0.90   | 0.19       | 0.17  | 0.20   | 0.17             | 0.18  | 0.45   |

#### 4. Conclusion

Based on the observations recorded during the present investigation entitled “Effect of different growing media on seed germination and seedling growth of jackfruit (*Artocarpus heterophyllus* Lam.) under the Bastar Plateau region of Chhattisgarh.

1. The results of the present investigation revealed that different growing media significantly influenced seed germination, seedling growth of jackfruit seedlings.
2. Among all the treatments, T<sub>6</sub> [Soil + vermicompost + rice husk + coco-peat (1:1:1:1)] recorded the earliest initiation of germination, 50% germination, highest germination percentage and maximum germination index.
3. Treatment T<sub>6</sub> also exhibited superior shoot growth in terms of seedling height, stem girth and number of leaves at 120 days after sowing.

#### Acknowledgement

We sincerely express our gratitude for the valuable guidance and supervision provided by Dr. Ram Kumar Dewangan, Assistant Professor, KDCHRS, Jagdalpur, Bastar (C.G.). We are also thankful to Dr. G.P. Nag, Dean, KDCHRS, Jagdalpur, Bastar (C.G.), and all the faculty members of KDCHRS for their support and encouragement throughout the research work.

#### References

1. Anonymous. Area and production of horticulture crops: 3rd advance estimates. New Delhi: National Horticulture Board, Ministry of Agriculture and Farmers Welfare, Government of India; 2024. p. 1-3.
2. Bhardwaj RL. Effect of growing media on seed germination and seedling growth of papaya cv. Red Lady. *African Journal of Plant Science*. 2014;8(4):178-184.
3. Campbell CW. The Kwai Muk, a tropical fruit tree for Southern Florida. In: *Proceedings of the Florida State Horticultural Society*. 1984;97:318-319.
4. Chaudhary K, Topno SE, Joseph AV. Effect of potting media on seed germination and seedling growth of jackfruit (*Artocarpus heterophyllus*) under Prayagraj agro-climatic condition. *Journal of Experimental Agriculture International*. 2024;46(7):336-343.
5. Dayeswari D, Rayaprolu S, Jon A. Effect of potting media on seed germination, seedling growth and vigour in TNAU papaya Co.-8 (*Carica papaya* L.). *International Journal of Pure and Applied Biosciences*. 2017;5(3):505-512.
6. Desai A, Trivedi A, Panchal B, Desai V. Improvement of papaya seed germination by different growth regulators and growing media under net house condition. *International Journal of Current Microbiology and Applied Sciences*. 2017;6(9):828-834.
7. Gawankar MS, Haldankar PM, Haldavanekar PC, Salvi BR, Jamadagni BM. Studies on seed germination and seedling growth in jackfruit (*Artocarpus heterophyllus* Lam.) as influenced by media. *International Journal of Chemical Studies*. 2019;7(5):1699-1705.
8. Gawankar MS, Juvekar SV, Rajput DC, Salvi BR. Economics of growing kokum (*Garcinia indica* Choisy) seedlings on different potting media. *International Journal of Chemical Studies*. 2020;8(1):2115-2119.
9. Hota SN, Karna AK, Dakhad BK, Jain PK. Influence of growing media on germination, growth and survival of jamun (*Syzygium cumini* L. Skeels). *Bulletin of Environment, Pharmacology and Life Sciences*. 2018;7(11):130-133.
10. Lad OA, Kulkarni MM, Gavankar MS, Burondkar MM, Gokhale NB, Pawar CD, *et al.* Effect of different potting mixture on sprouting, survival and growth of softwood grafts of mango cv. Alphonso. *International Journal of Current Microbiology and Applied Sciences*. 2020;11:1569-1574.
11. National Horticulture Board. Area and production of horticultural crops 2023-24. New Delhi: Ministry of Agriculture and Farmers' Welfare, Government of India; 2024. Anon
12. Parasana JS, Leua HN, Ray NR. Effect of different growing media mixture on the germination and seedling growth of mango (*Mangifera indica* L.) cultivars under net house conditions. *The Bioscan*. 2013;8(3):897-900.
13. Parmar M, Pandey SK, Pandey CS, Singh P, Ravi A. Effect of growing media and GA3 on seed germination and seedling growth of acid lime (*Citrus aurantifolia* Swingle) cv. Vikram. *International Journal of Current Microbiology and Applied Sciences*. 2019;8(8):1260-1271.
14. Patel MS, Nurbhanej KH, Patel VH, Vihol AN, Gohel BC. Effect of media and GA3 on seedling growth of custard apple (*Annona squamosa* L.) cv. Sindhan. *International Journal of Chemical Studies*. 2017;5(5):1717-1723.
15. Pradhan T, Panigrahi HK, Singh P, Verma S, Naik K. Impact of various media on shoot and root growth parameters of jackfruit (*Artocarpus heterophyllus* Lam.) under protected

condition. International Journal of Advanced Biochemistry Research. 2024;8(4):637-642.

16. Purseglove JW. Tropical crops: Dicotyledons. New York: John Wiley and Sons Inc.; 1968. p. 384-387.
17. Singh S, Prasad VM, Wilson D, Bahadur V, Mishra S. Effect of different growing media with soil and sand in polybags on seed germination, seedling growth and survival percentage of papaya (*Carica papaya* L.) cv. Pusa Nanha. International Journal of Current Microbiology and Applied Sciences. 2020;9(12):929-936.