



## RESEARCH PAPER

# Effect of different growing media on seed germination and seedling growth of jamun (*Syzygium cumunii* L. Skeels)

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**Abstract :** The study entitled “Effect of different growing media on seed germination and seedling growth of Jamun (*Syzygium cumunii* L. Skeels)” was carried out at College of Horticulture, Dr. Y.S.R Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh, during the year 2018-19. Jamun seeds were sown in media comprising of soil, cocopeat and vermicompost in different ratios, Among which the media comprising of Soil + cocopeat + vermicompost @ 1:1:1 has shown best results in germination parameters like earlier initiation of germination (10.91 days), less days taken to 50 percent germination (14.5 days), highest percent of germination at 15 and 30 DAS (48.37% and 98.14 % respectively). The growth parameters like maximum plant height (96.33cm), more number of leaves (55.75), increased girth (7.58mm) and chlorophyll content, lengthiest primary root (25.82cm), more number of secondary roots per seedling (41.51), highest fresh and dry weight of the shoot (80.24 and 20.67g.) and root and good root: shoot ratio (0.28) at 150 days after sowing were observed in plants that were sown in media comprising of Soil + cocopeat + vermicompost @ 1:1:1.

**Key Words :** Jamun seeds, Soil, Cocopeat, Vermicompost

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## INTRODUCTION

Jamun is an important indigenous underutilized fruit crop belongs to the family Myrtaceae consisting of over 75 species. It is also known as *Syzygium jambolanum* and *Eugenia cumini*. Other common names are Jambul, Black plum, Javaplum, Indian Black berry, Jamblang etc. Jamun has gained tremendous importance and recognition in recent past not only because of its hardy nature but also its uncomparable medicinal properties. It is effective in the treatment of diabetic mellitus, inflammation, ulcers and diarrhea. Preclinical studies have

also shown that it possess chemopreventive, radio protective and antineoplastic properties. The plant is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaemferol and myrecetin. The seeds are claimed to contain alkaloid, jambosine and glycoside jambolin or antimellin, which halts the diastatic conversion of starch into sugar. Therefore, the powdered seeds are useful for diabetic patients (Swami *et al.*, 2012).

Jamun is propagated by seeds as well as vegetatively but is usually multiplied by seeds. The seeds have no dormancy, hence fresh seeds are sown immediately after

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extracting from fruits. The time required to grow jamun seedlings to a suitable size for grafting may be as long as one year. Seedling plants bear fruits of variable size and quality. As this crop has gained importance, there is a demand for the plants of early bearing, dwarf statured with high yield potential. This is only possible with vegetative propagation. For vegetative propagation of jamun, there is need of healthy, quick growing and attaining graftable size of seedlings in short span of time from their sowing time. Therefore, shortening this time is considered very important and it can be achieved by enhancing the seedling growth. Growth media composition influences seed germination and quality of the seedlings. Growth medium directly affects seed germination, seedling growth, development and later maintenance of the extensively functional rooting system. A good growth medium provides sufficient anchorage or support to the plant, serves as a reservoir for nutrients and water, allows oxygen diffusion to the roots and permits gaseous exchange between roots and the atmosphere outside root substrate.

Keeping in view the above points, the present investigation was carried out to study the effect of different media on seed germination and growth of jamun seedlings in order to obtain maximum graftable size of root stock in short duration.

## MATERIAL AND METHODS

The present experiment was carried out during the period of 2018-19 at college farm, Dr. Y.S.R. Horticultural University in Factorial Randomized Block Design with three replications. Media is composed of different proportions of soil, cocopeat and vermicompost. Cocopeat is soaked in water and washed thoroughly to reduce the EC (electrical conductivity) and sun dried. A total of 120 polythene bags were filled with soil, 120 bags were filled with the media comprising of soil and cocopeat in the ratio of 1:1, 120 bags were filled with the media

comprising of soil and vermicompost in the ratio of 1:1 and 120 bags were filled with the media comprising of soil, cocopeat, vermicompost in the ratio of 1:1:1. Germination and growth parameters were taken accordingly by selecting five different plants in each replication. Statistical analysis was done as per procedure given by Panse and Sukhatme (1978).

The following treatment combinations were replicated thrice and analysed statistically by subjecting to Factorial Randomized Block Design (F.R.B.D).

| Sr.No.         | Treatments                   |
|----------------|------------------------------|
| T <sub>1</sub> | Soil                         |
| T <sub>2</sub> | Soil+cocopeat (1:1)          |
| T <sub>3</sub> | Soil+ vermicompost(1:1)      |
| T <sub>4</sub> | Soil+cocopeat + vermicompost |

## RESULTS AND DISCUSSION

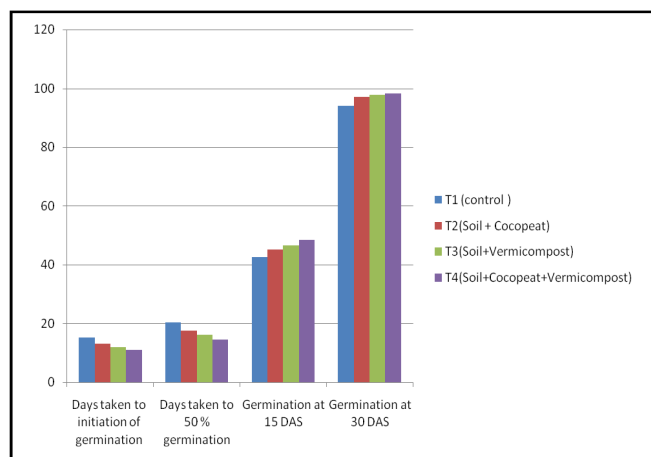
The present experiment was carried out under shade net at DR.Y.S.R. Horticultural University, Tadepalligudem, Andhra Pradesh during the year 2018-19. The following results regarding germination and growth have been collected by analysing five random plants in each treatment and their average has been presented below.

### Germination attributes :

The data in Table (1) and Fig. (1) have shown that the seeds sown in media comprising of soil, cocopeat and vermicompost have taken minimum number of days for initiation of germination (10.91 days), days taken to 50% germination (14.50 days), germination at 15 and 30 days after sowing (48.37 and 98.14% respectively) where as seeds sown in soil have taken maximum days (15.13 days) for initiation of germination and more number of days to reach to 50% germination (20.13 days), germination at 15 and 30 days after sowing (42.46 and 94.05%, respectively).

**Table : 1 Effect of media on germination parameters of jamun seeds**

| Treatments                                  | Days taken to initiation of germination | Days taken to 50 % germination | Germination at 15 DAS | Germination at 30 DAS |
|---|---|--------------------------------|-----------------------|-----------------------|
| T <sub>1</sub> (control)                    | 15.13                                   | 20.31                          | 42.46                 | 94.05                 |
| T <sub>2</sub> (Soil + Cocopeat)            | 13.10                                   | 17.43                          | 45.04                 | 97.13                 |
| T <sub>3</sub> (Soil+Vermicompost)          | 12.01                                   | 16.05                          | 46.61                 | 97.86                 |
| T <sub>4</sub> (Soil+Cocopeat+Vermicompost) | 10.91                                   | 14.50                          | 48.37                 | 98.14                 |
| SE(m) ±                                     | 0.023                                   | 0.26                           | 0.44                  | 0.99                  |
| CD at 5%                                    | 0.065                                   | 0.52                           | 0.89                  | 1.99                  |



**Fig. 1:** Effect of media on germination parameters of jamun seeds

### Growth attributes:

The growth attributes have shown significant differences as shown in Table (2 and 3) the parameters like plant height, number of leaves, girth and chlorophyll content were taken from 30 to 150 DAS at 30 days interval. At 150 DAS maximum height (96.33 cm), number of leaves (55.75), maximum girth (7.58 mm) and more chlorophyll content (56.71) were observed in the seedlings sown in media with soil, cocopeat and vermicompost compared to those seeds sown in soil (control). As per observations recorded and analysed from Table (4) we can interfere that maximum length of root (25.82 cm), number of secondary roots per seedling (41.51), fresh and dry weight of the shoot (80.24 g and 20.67 g, respectively), fresh and dry weight of the root

**Table 2 :** Effect of media on plant height (cm) and number leaves in jamun seedlings

| Treatments                                  | Plant Height (cm) |       |       |        |         | Number of leaves |       |       |        |        |
|---|-------------------|-------|-------|--------|---------|------------------|-------|-------|--------|--------|
|   | 30DAS             | 60DAS | 90DAS | 120DAS | 150 DAS | 30DAS            | 60DAS | 90DAS | 120DAS | 150DAS |
| T <sub>1</sub> (control)                    | 17.06             | 27.87 | 39.77 | 53.95  | 74.91   | 3.83             | 16.16 | 27.16 | 36.41  | 45.67  |
| T <sub>2</sub> (Soil + Cocopeat)            | 20.25             | 32.52 | 47.15 | 64.41  | 84.33   | 6.83             | 18.6  | 30.17 | 39.50  | 52.33  |
| T <sub>3</sub> (Soil+Vermicompost)          | 21.00             | 33.74 | 49.65 | 66.51  | 89.08   | 5.67             | 18.83 | 31.00 | 41.17  | 53.17  |
| T <sub>4</sub> (Soil+Cocopeat+Vermicompost) | 22.98             | 37.41 | 52.30 | 71.90  | 96.33   | 8.83             | 20.16 | 33.25 | 43.08  | 55.75  |
| SE(m) ±                                     | 0.09              | 0.51  | 0.63  | 0.93   | 1.45    | 0.02             | 0.30  | 0.52  | 0.59   | 0.89   |
| CD at 5%                                    | 0.18              | 1.48  | 1.84  | 2.69   | 4.20    | 0.06             | 0.86  | 1.52  | 1.71   | 2.39   |

**Table :3** Effect of media on girth of the stem (mm) and chlorophyll content (SPAD units) in jamun seedlings

| Treatment                                   | Girth of the stem (mm) |       |       |        |         | Chlorophyll content (SPAD units) |       |       |        |        |
|---|------------------------|-------|-------|--------|---------|----------------------------------|-------|-------|--------|--------|
|   | 30DAS                  | 60DAS | 90DAS | 120DAS | 150 DAS | 30DAS                            | 60DAS | 90DAS | 120DAS | 150DAS |
| T <sub>1</sub> (control)                    | 0.64                   | 1.71  | 3.21  | 5.13   | 6.59    | 24.25                            | 32.47 | 39.08 | 44.90  | 50.30  |
| T <sub>2</sub> (Soil + Cocopeat)            | 0.78                   | 2.12  | 3.56  | 5.50   | 7.14    | 26.72                            | 35.13 | 41.60 | 53.67  | 54.15  |
| T <sub>3</sub> (Soil+Vermicompost)          | 0.85                   | 2.32  | 3.71  | 5.75   | 7.29    | 27.63                            | 36.75 | 43.67 | 50.75  | 56.04  |
| T <sub>4</sub> (Soil+Cocopeat+Vermicompost) | 0.94                   | 2.61  | 4.13  | 6.08   | 7.58    | 30.88                            | 38.70 | 43.93 | 52.00  | 56.71  |
| SE(m) ±                                     | 0.01                   | 0.03  | 0.05  | 0.09   | 0.10    | 0.14                             | 0.17  | 0.13  | 0.12   | 0.16   |
| CD at 5%                                    | 0.04                   | 0.10  | 0.15  | 0.26   | 0.31    | 0.41                             | 0.51  | 0.40  | 0.36   | 0.46   |

**Table 4 :** Effect of media on growth parameters in jamun seedlings

| Treatment      | Root length(cm) | Fresh weight of shoots(gms) | Dry weight of shoots(gms) | Fresh weight of roots (gms) | Dry weight of roots (gms) | Number of secondary roots | Vigour index I | Vigour index II | Root:shoot ratio |
|----------------|-----------------|-----------------------------|---------------------------|-----------------------------|---------------------------|---------------------------|----------------|-----------------|------------------|
| T <sub>1</sub> | 17.07           | 53.40                       | 14.12                     | 14.58                       | 3.67                      | 17.09                     | 7300.28        | 1723.96         | 0.25             |
| T <sub>2</sub> | 22.11           | 70.24                       | 18.00                     | 19.00                       | 4.75                      | 31.52                     | 8323.05        | 2217.05         | 0.26             |
| T <sub>3</sub> | 23.40           | 77.79                       | 19.55                     | 21.27                       | 5.31                      | 39.33                     | 8742.06        | 2437.99         | 0.27             |
| T <sub>4</sub> | 25.82           | 80.24                       | 20.67                     | 23.97                       | 5.99                      | 41.51                     | 9108.25        | 2605.65         | 0.28             |
| SE(m) ±        | 0.32            | 1.10                        | 0.28                      | 0.30                        | 0.08                      | 0.38                      | 23.70          | 22.09           | 0.004            |
| CD at 5%       | 0.94            | 3.18                        | 0.82                      | 0.87                        | 0.24                      | 1.11                      | 68.80          | 64.12           | 0.011            |

(23.97 g and 5.99 g, respectively), vigour index I (9,108.25), vigour index II (2605.65) higher root: shoot ratio (0.28) were observed in seedlings grown in media comprising of soil, cocopeat and vermicompost over the seeds sown in soil which have shown poor growth.

The above findings may be due to the presence of vermicompost in the medium making it rich in macronutrients, micronutrients and nitrogen fixers present in organic media as reported by Bano *et al.* (1987) and also might be due to the presence of cocopeat which is having good water holding capacity as well as sufficient porosity which permit adequate moisture and gaseous exchange between media and seeds as reported by Prajapathi *et al.* (2017). Media has appropriate cation exchange capacity for retention of nutrients and have properties like good water holding capacity as well as sufficient porosity, thus permitting adequate moisture and exchange of gasses between the growth media and the embryo. It is essential for rapid and uniform germination of seeds (Anjanawe *et al.*, 2013 and Vikas *et al.*, 2015). These results are in conformity with the findings of Ravimycin *et al.* (2016) in Coriander and Barman *et al.* (2016) in jamun, Bhardwaj (2013) in papaya and Singh *et al.* (2015) in custard apple.

### Conclusion:

Among different media used the media comprising of soil, cocopeat and vermicompost @ 1:1:1 ratio have shown the best results in both germination and growth parameters at 150 DAS.

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