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**BR Parmar**  
ASPEE College of Horticulture  
and Forestry, Navsari, Gujarat,  
India

**Falguni Patel AB Parmar**  
ASPEE College of Horticulture  
and Forestry, Navsari, Gujarat,  
India

**AK Pandey**  
ASPEE College of Horticulture  
and Forestry, Navsari, Gujarat,  
India

**Correspondence**  
**BR Parmar**  
ASPEE College of Horticulture  
and Forestry, Navsari, Gujarat,  
India

## Effect of organic compounds on seed germination and seedling growth of jack fruit (*Artocarpus heterophyllus* Lam.) Seed

**BR Parmar, Falguni Patel AB Parmar and AK Pandey**

### Abstract

The experiment was carried out during the year 2014 at Regional Horticultural Research Station, ASPEE College of Horticulture & Forestry, Navsari Agricultural University, Navsari. The experiment was laid out in Completely Randomized Design with Factorial concept having fourteen treatment combinations, comprising of two levels of soaking hours viz., 12 and 24 hours; seven levels of organic treatments (cow dung slurry (T<sub>1</sub>), cow urine (T<sub>2</sub>), bijamrut (T<sub>3</sub>), amritpani (T<sub>4</sub>), banana pseudo stem sap (T<sub>5</sub>), panchagavya (T<sub>6</sub>), water soaking (T<sub>7</sub>) and control). The treatments were repeated thrice. The results revealed that among the different soaking hours and organic treatments, 12 hours and cow dung slurry were individually found to be most beneficial for minimized days for germination and improving germination percentage. Similar trend was observed on growth parameters such as height of plant, girth of plant, number of leaves, leaf area, number of roots, fresh weight and dry weight of plant, and survival percentage. The interaction between soaking hours and organic treatments for all parameters were found non significant.

**Keywords:** organic seed germination growth and jack fruit

### Introduction

Jackfruit belongs to the Moraceae family. It was known as *Artocarpus heterophyllus* L. It is an indigenous fruit crop, probably originated in Western Ghats and is widely cultivated in Southern Asia, East India and other warm areas of both the hemispheres. It is widely distributed in Assam, Bihar, Kerala and Tamil Nadu and the foot hills of Himalayas in North India. Jackfruit is a cross pollinated tree and propagated mostly through seeds. The viability of jackfruit seeds lost very quickly. Even one or two weeks delay in planting will lead to poor germination. Jackfruit seeds are consider being recalcitrant, and cannot survive more than few days or weeks in storage at ambient temperature. Realizing the importance of raising jackfruit seedling, for quick germination of seeds and subsequent growth of seedling the pre-soaking treatment of seeds with organic treatments have been taken under the present experiment.

### Materials and Methods

The present investigation was carried out during the year 2014. The experiment was conducted in poly house, located at Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari. The experiment was laid out in Completely Randomized Design with Factorial concept having fourteen treatment combinations, comprising of two levels of dipping hours (12 hours and 24 hours) and seven levels of organic treatments (cow dung slurry (T<sub>1</sub>), cow urine (T<sub>2</sub>), bijamrut (T<sub>3</sub>), amritpani (T<sub>4</sub>), banana pseudo stem sap (T<sub>5</sub>), panchagavya (T<sub>6</sub>), water soaking (T<sub>7</sub>) and control). The treatments were repeated thrice. Fresh jackfruit seeds were collected from the local market. From them, uniform size and healthy seeds were selected and stored for 15 days and then used for the experiment. After treatment seeds were sown in polythene bag of size of 20×15 cm, previously filled with potting mixture which was prepared by mixing one parts of soil, one part of well rotted FYM and one part of sand. The polythene bags were placed in flat beds and proper space. The following observations were taken viz., number of days taken for germination, germination percentage, height of plant, girth of plant, number of leaves, leaf area, number of roots, survival percentage, fresh and dry weight of plant at 60, 90, 120 days after sowing.

**Results and Discussion**

**Number of days taken for germination**

The data presented in Table 1 revealed that 12 hours soaking period and cow dung slurry recorded least number of days taken for germination (15.32 and 13.73, respectively) which was followed by panchagavya (3%). It is might be due to the stimulating effect of imbibitions. On subsequent seed germination caused by increased water absorbing capacity resulting in increased analysed activity. Similar results were obtained by Prakash, (1998) [5] in jackfruit.

**Germination percentage**

It is evident from Table 1 that 12 hours soaking and cow dung slurry showed significantly highest germination (59.10 % and 62.84 %, respectively). It might be due to presence of efficient water, N, P, K, micronutrients and biodegradable enzymes which have been the cause for softening of seed coat and there by effecting the radical protrusion. The result of present investigation are in confirmation with those of earlier workers Chaudari (2010) [2], Shanmugavelu, (1971) [6] in mango, Shirol *et al.* (2003) [9] in khirnee.

**Height of plant (cm)**

The data presented in Table 1 revealed that significantly maximum height of plant was observed at 60, 90 and 120 DAS in 12 hours (24.54, 36.67 and 48.12 cm, respectively) and cow dung slurry (28.63, 40.23 and 51.67 cm, respectively) which was followed by panchagavya (3%). The increased in seedlings height with cow dung slurry treatment was due to the fact that this hormone increased osmotic uptake of nutrients, causing cell elongation and thus increasing height of the plant. Similar results are in close conformity with findings of Nimbalkar, *et al.* 2012 [3] in karonda.

**Girth of plant (mm)**

The data presented in Table 1 revealed that maximum girth of plant was observed in 12 hours soaking ( 3.82, 5.92 and 8.29 mm, respectively) and cow dung slurry ( 4.70, 6.99 and 9.06 mm, respectively) at 60, 90 and 120 DAS which were significantly superior over all the remaining treatments. It might be due to greater cell division and elongation at the stem portion. These results are in accordance with Chaudhari (2010) [2] in mango.

**Number of leaves**

It is evident from Table 2 that maximum number of leaves was noticed in 12 hours (4.78, 11.56 and 14.11, respectively)

and cow dung slurry (5.96, 13.94 and 16.95, respectively) at 60, 90 and 120 DAS and significantly greater than rest of the treatments. The increased in number of leaves might be due to activity of growth hormones was increased at the apical meristem resulting in more synthesis of nucleoprotein responsible for increasing leaf initiation. These results are in agreement with those reported by Singh, *et al.*, 1979 [7] and Chaudhari and Chakrawar, 1981 [1] in citrus.

**Leaf area (cm<sup>2</sup>)**

The data presented in Table 2 revealed that 12 hours (38.00, 49.31 and 59.59 cm<sup>2</sup>, respectively) and cow dung slurry (46.34, 58.25 and 69.58 cm<sup>2</sup>, respectively) showed significantly maximum leaf area at 30, 60, 90 and 120 DAS.

**Number of roots**

It is evident from Table 2 revealed that 12 hours (8.18 %) and cow dung slurry (9.98 %) at 120 DAS showed significantly maximum leaf area at 120 DAS which was followed by panchagavya (8.89 %).

**Survival percentage**

Table 3 revealed that 12 hours (59.34 %) and cow dung slurry (62.84 %) at 120 DAS showed significantly highest survival percentage which was followed by panchagavya (61.79 %). This might be due to the overall performance in relation to growth parameters were good in same treatment which ultimately increased the survival percentage. These results are in agreement with Chaudhari (2010) [2], Yelleshkumar *et al.* (2008) [8] in mango.

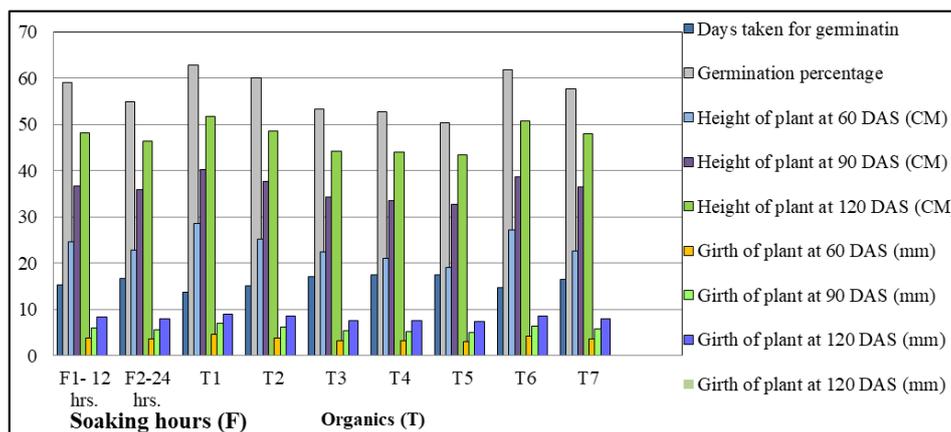
**Fresh weight of plant (g)**

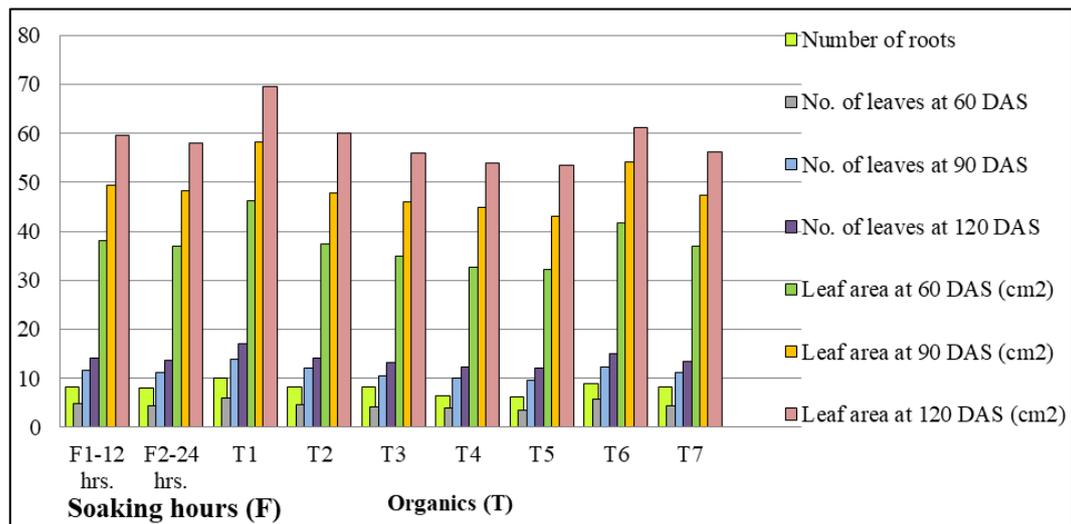
It is evident from Table 3 revealed that maximum fresh weight of plant recorded with 12 hours (46.17 g) and cow dung slurry (63.13 g) at 120 DAS which was followed by panchagavya (55.85 g). It might be due to overall growth of the seedling and increased rate of photosynthesis that lead to the overall assimilation and redistribution of photosynthesis within the seedling and hence, resulted in higher fresh weight of plant. The results are in close conformity with findings of Pampanna and Sulikeri, 1999 [4] in sapota.

**Dry weight of plant (g)**

The data presented in Table 3 revealed that 12 hours (15.59 g) and cow dung slurry (20.90 g) recorded significantly maximum dry weight of plant at 120 DAS which was followed by panchagavya (3%) (18.65 g). Similar results were found in Pampanna and Sulikeri, 1999 [4] in sapota.

**Table 1:** Influence of growth regulators on number of days taken for germination, germination percentage, height and girth of jackfruit seedling.



**Table 2:** Influence of growth regulators on number of roots, number of leaves and leaf area of jackfruit seedling

### Conclusion

Based on the results of the experiment it can be concluded that among all the treatments jackfruit seed soaked for 12 hrs. and cow dung slurry individually superior in rapid emergence, enhancing germination percentage and production of vigorous seedling. Therefore, dipping hours and organic treatments can be utilized for enhancing germination percentage and production of vigorous seedling.

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