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## Effect of growing media on seedling growth of Kokum (*Garcinia indica* Choisy)

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### Abstract

Kokum (*Garcinia indica* Choisy) is one of the native underexploited tree spices mostly found in Konkan region of Maharashtra, Goa, Karnataka, Kerala and Surat district of Gujarat on the West Coast of India (Haldankar *et al.*, 2012 and Braganza *et al.*, 2012). Only way to propagate is by softwood grafting method. The growth of seedling is slow and requires more than year to attained graftable height. Availability of strong and vigorous seedling as a rootstock plays vital role in the success of nursery programme. With a view to hasten the growth of seedling in order to get strong and vigorous seedling as rootstock at early stage of growth an experiment on effect of growing media on seedling growth of Kokum (*Garcinia indica* Choisy) was undertaken at Department of Horticulture, College of Agriculture, Dapoli, Dist. Ratnagiri 415 712 (M.S.) during the year 2018.

The experiment was laid out in Randomized Block Design with six treatments and four replications. The treatment comprises T<sub>1</sub>: Soil + FYM (3:1) with 1" Cocopeat at top, T<sub>2</sub>: Soil + Vermicompost (3:1) with 1" Cocopeat at top, T<sub>3</sub>: Soil + FYM + Vermicompost (2:1:1) with 1" Cocopeat at top, T<sub>4</sub>: Soil + FYM + Rice husk (1:1:1) with 1" Cocopeat at top, T<sub>5</sub>: Soil + FYM + Vermicompost + Cocopeat (1:1:1:1) and T<sub>6</sub>: Soil + FYM (1:1). Results revealed that treatment T<sub>6</sub> i. e. Soil + FYM at 1:1 proportion recorded maximum height (33.93 cm), girth (4.15 mm), number of leaves (26.53), seedling survival percentage (97.50%) at 360 DAB. Similarly media containing Soil + FYM at 1:1 proportion recorded the highest percentage of graftable seedlings (83.25%) at earliest of 240 days after transplanting in polybag.

**Keywords:** Media, growth, survival and graftable seedlings

### Introduction

Kokum (*Garcinia indica* Choisy) is one of the underexploited tree condiment belongs to family Guttiferaceae. It is commonly known as Kokum butter tree in English and vernacular names are kokum, ratamba, birand, amsol (Braganza *et al.*, 2012) [1]. Kokum is predominantly a dioecious hence crosspollination is essential for fruit setting. Kokum tree starts flowering during November-December and fruits are harvested during April-May (Pruthi, 2009) [8].

In Maharashtra area occupied by kokum is 1000 ha and production of 4500 tonnes with productivity of 4.5 t/ha. In Goa, it is grown on 1200 ha area and production is 12000 tonnes with productivity of 8.5 t/ha (Senthilkumar *et al.*, 2014) [11].

Due to dioecious nature of the plant, unproductive maleness, large genetic variability, slow growth, extended harvesting in rainy season etc. are some of the constraints for its area expansion (Patil *et al.*, 2012) [7]. It is observed that the growth of kokum seedling is very slow, hence, there is need to hasten seedling growth for getting vigorous rootstock for grafting at early stage of growth. Potting media is the basic component which affects the growth of container seedling. Soil + FYM (3:1) is a basic media used for nursery production. However, requirement of soil as potting media in nursery programme is very huge and becoming scare with time. Different growing media other than soil like Cocopeat, Rice husk, FYM, Vermicompost etc. are light in weight and also have good porous structure which can be used as component along with soil. Very little work on use of different media on growth of underexploited fruit trees has been done hence, with this view; present investigation on "Effect of growing media on seedling growth of Kokum (*Garcinia indica* Choisy)" was carried out for hastening the growth of kokum seedling.

### Material and Methods

The experiment was conducted at Department of Horticulture, College of Agriculture, Dr. Balasheb Sawant Konkon Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri 415 712

(MS.) during the year 2018 as a part of M.Sc (Hort.) degree programme. The experiment was laid out in Randomized Block Design with four replications and six treatments namely T<sub>1</sub>: Soil + FYM (3:1) with 1" Cocopeat at top, T<sub>2</sub>: Soil + Vermicompost (3:1) with 1" Cocopeat at top, T<sub>3</sub>: Soil + FYM + Vermicompost (2:1:1) with 1" Cocopeat at top, T<sub>4</sub>: Soil + FYM + Rice husk (1:1:1) with 1" Cocopeat at top, T<sub>5</sub>: Soil + FYM + Vermicompost + Cocopeat (1:1:1:1) and T<sub>6</sub>: Soil + FYM (1:1). Randomly selected uniform kokum seedlings of six month old grown in polybags of size 6" x 8" were transferred in Polythene bags of 9" x 11" size and used for the experimental purpose. Potting mixture was prepared separately for each treatment as per the treatments under study. A group of 100 seedlings was formed a unit. The whole set of treatments was replicated four times in a randomized block design (RBD) as a replications. Statistical analysis of the data was carried out by following the standard method of analysis of variance as given by Panse and Sukhatme (1985). Graphs and plates have been used to project the important results.

### Result and Discussion

Data pertaining to height of seedling, girth, number of leaves, seedling survival percentage and percentage of healthy and vigorous seedling obtained for grafting at the earliest during the growth of kokum seedlings as influenced by different growing media treatments are presented in Table 1

#### Effect of growing media on seedling height

Data presented in Table 1 revealed that the maximum height (33.93 cm) was recorded in T<sub>6</sub> (Soil + FYM 1:1) was superior over the rest of the treatments except treatment T<sub>5</sub>. While minimum height (17.60 cm) was recorded in T<sub>1</sub> i.e. in media having Soil + FYM at 3:1 proportion with 1" Cocopeat at top. Other treatments were at par with each other. This could be due to more amount of FYM in treatment T<sub>6</sub> which would have increased aeration and water holding capacity of the media, availability of essential nutrients for plant growth by improving soil physical, chemical and biological properties (Ramteke *et al.*, 2016) [10]. Similar findings were reported by Panchal *et al.*, (2014) for khirni seedling in Soil + Cocopeat + FYM (1:1:1) and Khot (2017) [4] for Bullock's heart in soil + FYM (2:1) media.

#### Effect of growing media on seedling girth

The maximum seedling girth (4.15mm) was recorded in treatment T<sub>6</sub> (Soil + FYM 1:1) which were at par with T<sub>5</sub> (4.12 mm). The minimum seedling girth (2.72 mm) was recorded in T<sub>2</sub> i.e. in Soil + FYM + Vermicomposting + Cocopeat (1:1:1:1) which was at par with T<sub>3</sub> and T<sub>1</sub> (2.91 mm). From above results it is cleared that treatment T<sub>6</sub> (Soil + FYM 1:1) found to be superior for increasing girth of kokum seedling.

#### Effect growing media on number of leaves

The maximum number of leaves (39.83) were recorded in treatment T<sub>6</sub> (Soil + FYM 1:1) followed by T<sub>4</sub> (24.28) and T<sub>5</sub> (24.25). Treatment T<sub>2</sub> (Soil + Vermicompost (3:1) with 1" Cocopeat at top) recorded minimum number of leaves (19.78) however it was at par with T<sub>1</sub> (19.93) and T<sub>3</sub> (20.28).

Nutrition supplied from the growth media can influence number of leaves. In current investigation Soil + FYM has favored the maximum production of leaves. Nutrients are the key factors for executing many metabolic activities and also hormonal balance within the plant. The variation in number of leaves of the seedlings on different growing media thus obviously appears to be due to different physical and chemical properties of the growing media.

#### Effect of growing media on seedling survival percentage

The highest survival of seedlings (97.50%) was recorded in treatment T<sub>6</sub> (Soil + FYM 1:1) which was at par with T<sub>4</sub> (97.00%) and T<sub>5</sub> (95.00%). Significantly the lowest survival of seedling (91.50%) was recorded in treatment T<sub>1</sub> (Soil + FYM (3:1) with 1" Cocopeat at top) and was at par with treatment T<sub>2</sub> (93.25%) and T<sub>3</sub> (93.50%). In present investigation treatment T<sub>6</sub> i.e. media having Soil + FYM at 1:1 reported maximum survival percentage of kokum seedling indicating effectiveness of FYM in the media. Effectiveness of media on survival of grafts has also been reported by Qyom (2011) and Gholap and Polara (2015) [2] in mango.

#### Effect of different growing media on graftable size seedlings

Obtaining healthy and vigorous seedling which is further utilized for grafting purpose is the important aspect in any nursery programme. The data pertaining to percentage of graftable size seedlings as influenced by different media presented in Table 1 revealed that significantly highest percentage of graftable seedlings was obtained in the treatment T<sub>6</sub> (83.25%) i.e. in media Soil + FYM at 1:1 proportion and was at par with T<sub>4</sub> (81.75%), T<sub>2</sub> and T<sub>3</sub> (71.75%) and T<sub>5</sub> (71.00%). Significantly lowest percentage graftable seedlings were obtained in T<sub>1</sub> (45.75%) where Soil + FYM at 3:1 proportion with 1" Cocopeat at top was the potting media. Study revealed that kokum seedlings raised in Soil + FYM at 1:1 proportion produced 83.25 per cent graftable seedlings at earliest of 240 days after bagging. Thus media having Soil + FYM at 1:1 proportion found effective in enhancing growth of seedling for obtaining graftable size seedlings at early stage of growth. This may be due to the media containing Soil + FYM might have accredited nutritional status which enhanced photosynthetic activity resulted in more plant stored material, thereby increasing favourable effect on seedling growth (Gholap and Polara 2015) [2].

**Table 1:** Effect of different growing media on growth, survival percentage and percentage of graftable seedlings of kokum at 240 days after bagging

Treatments	Height (cm)	Girth (mm)	Number of leaves	Survival percentage (%)	Percentage of graftable seedlings (%)
T <sub>1</sub> : Soil + FYM (3:1) with 1" Cocopeat at top	17.60	2.91	19.93	91.50(73.41)	45.75(42.47)
T <sub>2</sub> : Soil + Vermicompost (3:1) with 1" Cocopeat at top	24.31	2.72	19.78	93.25(75.08)	71.75(58.29)
T <sub>3</sub> : Soil + FYM + Vermicompost (2:1:1) with 1" Cocopeat at top	23.56	2.91	20.28	93.50(75.34)	71.75(58.17)
T <sub>4</sub> : Soil + FYM + Rice husk (1:1:1) with 1" Cocopeat at top	29.73	3.50	24.28	97.00(80.35)	81.75(65.02)
T <sub>5</sub> : Soil + FYM + Vermicompost + Cocopeat (1:1:1:1)	32.23	4.12	24.25	95.00(77.19)	71.00(57.55)
T <sub>6</sub> : Soil + FYM (1:1)	33.93	4.15	26.53	97.50(82.45)	83.25(65.85)
SEm ±	0.91	0.19	0.92	1.24	4.56

CD @ 5%	2.75	0.57	2.77	3.72	13.75
(Figures in parenthesis are arcsine transformed values)					



**Plate 1:** Randomly selected of Kokum seedlings for transferring in bigger size polybag



**Plate 2:** Comparative performance of kokum seedlings grown in different growing media at 240 days after bagging in 9" x 11" size polybag

### Conclusion

In present study growing media treatment T<sub>6</sub> i.e. Soil + FYM at 1:1 proportion was found better performing for seedling height, girth, number of leaves, survival percentage of seedling after transferring in bigger size polybag and percentage of graftable seedlings at early stage of growth.

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