



Research Paper

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Evaluation of certain papaya varieties and hybrids for physico-chemical characteristics

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ABSTRACT : Papaya (*Carica papaya* L. Caricaceae) is a fruit crop of commercial significance in tropical and subtropical regions of the world. The field genebank at Indian Institute of Horticulture Research, Bangalore, consists of 26 varieties. Ten varieties from the above 26 were evaluated along with two hybrids 39 and 57. The present investigation was conducted to assess the physico-chemical characteristics of these varieties of papaya under Bangalore conditions. The results revealed that the varieties Sunrise Solo, Waimanalo and the hybrids 39 and 57 had medium sized fruits. The fruit cavity index was low in the varieties Sunrise Solo, Pink Flesh Sweet and hybrids H-39 and H-57. Further, Sunrise Solo recorded the highest plant height and the least was observed in Pusa Dwarf. The weight of the fruits was found to vary from 486.67g in Sunrise Solo to 1380.33g in Pusa Dwarf. The pulp thickness, TSS and ascorbic acids were found to be maximum in the hybrids 39 and 57. The lowest titratable acidity was observed in case of hybrids H-39 and H-57.

KEY WORDS : *Carica papaya*, Fruit weight, Fruit cavity index, Pulp thickness, Total soluble solids (TSS), Total carotenoids, Ascorbic acid, Titrable acidity

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Papaya (*Carica papaya* L.) is one of the important fruits of tropical and subtropical regions of the country. It has gained commercial importance due to its high productivity and multipurpose usage. Papaya is considered as a poor man's fruit. Aykroyd (1951) ranks it next to mango, as a source of precursor of vitamin A, while this vitamin is generally associated with carotene; the yellow pigment in the papaya is not carotene but caricaxanthin. Cultivar differences and geographic effects on the carotenoid composition and vitamin A values have been reported in papaya. Geographic effect had a greater influence than cultivar on vitamin A values (Kimura *et al.*, 1991). Physico-chemical characters play a very important role in the selection of improved genotypes of papaya with superior quality, which will be useful as breeding material for further improvement. The present investigation was conducted to assess the physico-chemical characteristics in papaya under Bangalore conditions.

RESEARCH METHODS

An experiment was conducted at Indian Institute of Horticultural Research, Bangalore using ten varieties of

papaya (*Carica papaya*) viz., Coorg Honey Dew, Pink Flesh Sweet, Sunrise Solo, Waimanalo, Pant-2, Washington, Red Gold, Pusa Dwarf, PAU selection and CO-4 and two hybrids viz., H-39 and H-57 in the year 1997-98. The experiment was laid out in a Randomized Complete Block Design with three replications. Observations were recorded on plant height, stem circumference, plant spread (N-S and E-W), fruit weight, fruit length, fruit breadth, fruit volume, fruit cavity index, pulp thickness, total soluble solids (TSS), total carotenoids, ascorbic acid, titratable acidity and hundred seed weight. The data were statistically analyzed using standard procedures outlined by Ranganna (1994).

RESEARCH FINDINGS AND DISCUSSION

Marked variations in growth parameters of different varieties and hybrids for different characters were observed. Among the varieties and hybrids studied (Table 1). Sunrise Solo recorded the highest plant height and the least was seen in the variety Pusa Dwarf. The hybrids H-39, H-57 and varieties Washington, Pant-2, PAU-selection and CO-4 showed medium plant height and plant spread. The least plant spread was

Table 1 : Physico-chemical characters of different varieties and hybrids of papaya

Varieties/Hybrids	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅
Coorg Honey Dew	198.83	32.67	191.00	192.00	1089.33	1071.67	22.05	28.33	13.00	2.73	11.83	200	0.17	67.13	1.37
Sunrise Solo	237.77	37.77	189.00	184.67	486.67	443.33	13.64	15.33	7.97	2.83	13.47	300	0.18	50.67	1.37
Waimanab	180.00	32.47	167.00	170.67	803.33	656.67	12.33	25.60	10.17	2.10	11.73	200	0.33	36.27	1.40
Pant-2	166.67	33.47	207.67	207.67	1047.33	1028.00	20.20	36.33	13.13	2.77	11.69	200	0.17	56.47	1.47
Washington	181.67	30.70	236.67	231.67	827.33	796.67	15.59	27.90	10.12	2.13	12.30	257	0.22	61.77	1.20
Red Gold	206.67	35.67	213.00	213.00	1027.33	965.67	19.57	39.50	12.70	2.27	10.77	220	0.16	68.00	1.40
Pusa Dwarf	139.47	29.23	157.33	156.33	1380.33	1367.00	19.27	27.20	15.23	2.37	9.53	153	0.16	66.63	1.30
PAU Selection	159.22	31.57	189.00	191.00	1064.00	1056.33	13.43	37.23	14.17	2.70	10.87	220	0.15	65.93	1.40
Pink Flesh Sweet	192.22	34.33	200.00	199.67	1060.00	1041.33	23.80	25.17	12.10	3.20	13.41	303	0.18	52.77	1.43
C04	191.67	34.57	194.33	193.00	901.00	825.67	16.00	39.70	11.40	2.23	9.87	293	0.14	51.30	1.47
H-39	206.13	33.97	198.00	195.67	703.33	857.67	16.57	15.43	10.65	3.27	14.83	327	0.13	69.00	1.30
II-57	212.77	36.20	166.67	169.00	943.33	716.67	13.50	23.53	10.65	2.57	10.77	270	0.13	59.93	1.40
Grand Mean	189.43	33.52	192.47	192.02	944.78	902.22	17.58	28.44	11.76	2.59	11.75	247	0.18	58.82	1.39
F-test	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
S.E.±	5.67	1.37	8.79	8.67	95.95	96.55	0.61	3.08	0.51	0.08	0.41	0.12	0.03	2.33	0.03
C.D. (P=0.05%)	16.63	4.03	25.76	25.41	281.37	283.18	1.78	9.01	1.50	0.25	1.19	0.35	0.08	6.85	0.08

X₁: Plant height (cm) X₂: Fruit weight (g) X₃: Fruit breadth (cm) X₄: Titrable acidity (%) X₅: Stem diameter (cm)
 X₆: Fruit volume (ml) X₇: Pulp thickness (cm) X₈: Ascorbic acid (mg/100g) X₉: Plant spread (E-W) (cm) X₁₀: Fruit length (cm)
 X₁₁: TSS (Brix) X₁₂: Fundred seed weight (g) X₁₃: Pant spread (N-S) (cm) X₁₄: Fruit cavity index (%) X₁₅: Total carotenoids (mg/100g)

recorded by Pusa Dwarf. The weight of fruits was found to vary from 486.67g in Sunrise Solo to 1380.33g in Pusa Dwarf. The varieties Coorg Honey Dew, Waimanalo, Pant-2, Washington, Red Gold and CO-4 had medium sized fruit. Small sized fruits were noticed in the variety Sunrise Solo and hybrids H-39. Dinesh and Yadav (1998) reported the fruit weight to be 600-800g in the variety 'Surya'. The cavity index of fruits was found to vary from 15.33 per cent in Sunrise Solo to 39.70 per cent in CO-4. The varieties Washington, Waimanalo, Pusa Dwarf and Pink Plesh Sweet showed medium cavity index whereas the hybrids H-39 and H-57 have less cavity index. Similar type of observation was recorded in the previous study in the variety "Surya" (Anonymous, 1999). The highest pulp thickness was recorded by H-39 followed by Pink Flesh Sweet. Dinesh and Yadav (1998) reported the pulp thickness of 3.0-3.5 cm in the variety "Surya". Ghanta (1994) recorded the pulp thickness of 3.10 cm in the variety Ranchi. The highest TSS was observed in case of hybrid H-39 and the lowest TSS was observed in case of variety Pusa Dwarf. Dinesh and Yadav (1997) recorded the TSS content of 13.50 Brix in H-39. Similar type of observation was recorded by Auxcilia and Sathiamoorthy (1999). The highest total carotenoid was observed in H-39 and total carotenoid content was observed to be the least in Pusa Dwarf. Ahmad Shah and Shanmugavelu (1975) reported high total carotenoids (1.250 to 2.558 mg/100g) in first generation hybrid (CO1 X Coorg Honey Dew). Auxcilia and Sathiamoorthy (1999) also recorded similar type of observation. The highest titrable acidity was observed in Waimanalo and the lowest in case of hybrids H-39, H-57 and CO-4. Ghanta (1994) recorded the titrable acidity content of (0.003%) in cv. Ranchi. The highest ascorbic acids were recorded in case of hybrids H-39 and Red Gold and lowest in case of variety Waimanalo. Hence, it is seen that the season and agro-climatic region in which the plants are grown influence the vitamin C content of fruit. Auxcilia and Sathiamoorthy (1999) observed a range (27.65 to 71.89 mg/100g) in cv. Ranchi. Similar observation was also reported by Ahmed Shah and Shanmugavalu (1975) in the first generation hybrids. The highest carotenoid content was found in case of hybrid H-39 followed by Pink Flesh Sweet and Sunrise Solo. The lowest titrable acidity was observed in case of hybrids H-39 and H-57, respectively. The highest ascorbic acid content was reported in case of hybrid H-39. The hybrids and varieties mentioned above could be used as potential parents in

breeding for respective quality characters.

Conclusion :

Evaluation of varieties and hybrids for physico-chemical characteristics in papaya revealed that the varieties Sunrise Solo, Waimanalo and hybrids H-39 and H-57 had medium sized fruits. The lower cavity index was observed in varieties Sunrise Solo, Pink Flesh Sweet and hybrids H-39 and H-57. The highest TSS was found in case of hybrid H-39 followed by Sunrise Solo and Pink Flesh Sweet. The highest carotenoid content was found in case of hybrid H-39 followed by Pink Flesh Sweet and Sunrise Solo. The lowest titrable acidity was observed in case of hybrids H-39 and H-57, respectively. The highest ascorbic acid content was reported in case of hybrid H-39. The hybrids and varieties mentioned above could be used as potential parents in breeding for respective quality characters.

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