

Performance Evaluation of Red Fleshed Guava (*Psidium guajava* L.) Accessions for Physico-chemical characteristics under North-eastern Transitional Zone of Karnataka

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ABSTRACT: Ten red fleshed guava varieties and local types viz., Arka Kiran, Arka Rashmi, Lalit, H-17-16, Punjab Pink and SRD-HYD-1, SR-I, SR-II, GR-I and GR-II were evaluated for physico-chemical characteristics under North-Eastern transitional zone of Karnataka. The accessions evaluated showed wide range of variation with respect to physico-chemical characteristics. The accession H-17-16 recorded maximum fruit length (7.45 cm) and maximum TSS (15.20°B). However, the ascorbic acid (243.47 mg/100g) and total sugars (12.37 %) was found to be maximum in SRD-HYD-1 and maximum Lycopene was noted in fruits of Arka Kiran (5.14 mg/100g). On the basis of different characters the accessions H-17-16, Arka Kiran, SRD-HYD-1 and Punjab Pink were found to be superior in their performance for physico-chemical characteristics.

Keywords: Guava, quality, Physico-chemical, accessions.

INTRODUCTION

Guava is one of the most important fruit crops of India. It belongs to family myrtaceae. Though, native to tropical America, its cultivation has spread to different parts of the world because of its wider adaptability. Presently it has become one of the most common fruits of India. The major guava producing states are Madhya Pradesh, Uttar Pradesh, Bihar and Maharashtra. Guava fetches a remunerative crop as it flowers almost throughout the year through current season shoots (Sahay and Singh 2001). The fruit is a multi seeded, globose and fleshy berry. Guava shows large variability in fruit character and pulp colour. Fruit shape shows variability with round, pear shaped, truncated, pointed and necked at the stalk end, peel colour varies with yellow white, greyed yellow, yellow green, yellow with red blush and red purple group, pulp of the fruit shows diversified colours like white, yellow, pink, red and red purple (Anonymous, 2016). Guava fruit is known for its 'vitamin-C', minerals like calcium, iron and phosphorous with pleasant aroma and flavour (Dhaliwal and Dhillon 2003). The fruits also contain vitamin A, riboflavin, thiamin, niacin and pantothenic acid (Gurjar *et al.*, 2018). The natural variability in fruit character, pulp colour and rich nutritional status is available

within the species is often exploited to identify superior varieties. There is a meager work on red fleshed varieties of guava, which has a great scope for improvement and development of superior red fleshed varieties suitable for table purpose and for processing industry. Therefore, the present study on performance evaluation of red fleshed guava accessions for Physico-chemical characteristics under North-eastern transitional zone of Karnataka.

MATERIAL AND METHODS

Six genetically diverse red fleshed guava varieties viz., Arka Kiran, Arka Rashmi, Lalit, H-17-16, Punjab Pink and SRD-HYD-1 and four local collections viz., SR-I, SR-II, GRI and GR-II were evaluated with respect to Physico-chemical characteristics of fruit at Department of Fruit Science, College of Horticulture, Bidar (Karnataka) during 2017-18. The experiment was laid out in Randomized block design with three replications and 15 fruits in each replication were analysed. The quality parameters like average fruit weight (g), fruit breadth (cm) and fruit length (cm) were recorded by using 15 representative fruits. Fruit firmness was determined as the force required to puncture the fruit, was measured using an Instron-Universal testing

machine (Model 4201, USA) and expressed as kg/cm². Number of seeds per fruit and seed weight per fruit (g) were noted. The bio-chemical parameters were determined from sample fruits from each accession. The TSS was determined by using hand refractometer and expressed in °Brix and the total sugars was determined by Lane and Eynon method and expressed in percentage. The ascorbic acid (mg/100g) and lycopene content (mg/100g) were worked out by following procedure suggested by Ranganna (1986). The shelf life of fruit was determined by counting the number of days from harvesting till they remained in a good edible condition without spoilage under ambient condition which was judged through visual appearance. The organoleptic scores for colour and appearance, flavour, texture, taste and overall acceptability of fruits were evaluated by the panel of judges by giving marks on the basis of 9-point Hedonic scale suggested by Ranganna (1986).

RESULTS AND DISCUSSION

The results pertaining to evaluation of red fleshed guava accessions is presented in Table (1-3). The interpretation of data revealed significant differences with respect to physico-chemical characteristics. It is evident from the results mentioned in Table 1 that the quality parameters like average fruit weight, fruit dimensions (length and breadth), fruit firmness (kg/cm²), number of seeds per fruit, Seed weight per fruit and 100 seed weight was recorded and the interpretation of same is mentioned below. The significant difference was observed in average fruit weight among the varieties. Significantly highest average fruit weight was observed in Punjab Pink (217.20 g) followed by Arka Kiran (181.23 g). Moderate fruit weight of 161.27 g was noted in plants of H-17-16. The minimum average fruit weight was observed in GR-I and SR-I. The significant variation was observed in fruit length and breadth. The maximum fruit length was observed in H-17-16 (7.45cm) which was statistically on par with Punjab Pink (7.31 cm). The significant mean maximum fruit breadth was observed in Punjab Pink (6.95cm) which was statistically on par with Arka Kiran (6.84 cm) and Lalit (6.71 cm) respectively. The number of seeds per fruit and seed weight per fruit recorded significant variations. The number of seeds ranged from 241.0 to 509.89. The minimum number of seeds were observed in SR-I and maximum was recorded in Lalit. The number of seed were less in SR-I due to small fruits compared to Lalit. Similarly seed weight was found to be maximum in Lalit. This may be due to maximum number seeds per fruit. The results are supported with observations of Marak and Mukunda (2007) in A.C. Sel. 6/10. Test weight has shown non-significant difference, even though the maximum seed weight was found in Punjab Pink due to bold and hard seeds (Table 1). The results

are in agreement with Patel *et al.* (2007) in Allahabad Safeda. The Significant difference for firmness was observed among different varieties. The highest firmness was recorded in Lalit (22.59 kg/cm²) which was on par with SRD-HYD-1 (20.94 kg/cm²) and Punjab Pink (20.83 kg/cm²). The results are in agreement with Bashir and Abu-Goukh (2003).

The interpretation of results on bio-chemical parameters revealed significant variations for TSS, sugars, ascorbic acid and lycopene content were presented in Table 2. The maximum TSS was recorded in H-17-16 (15.20 °B) followed by Punjab Pink (14.77 °B) and Arka Rashmi (13.46 °B) respectively. However, the minimum TSS was noted in fruits SR-I (11.33 °B) followed by Lilit (11.40 °B). This may be due to varietal character. The results are in agreement with Aulakh (2005) in Behat Coconut, Babu *et al.* (2002) in Selection-11 and Babu *et al.* (2007) in Hybrid-7. The ascorbic acid and sugars have shown significant differences, the maximum ascorbic acid (243.47 mg/100 g), total sugars (12.37 %), reducing sugars (8.58 %) and non-reducing sugar (3.79 %) was found in SRD-HYD-1. While the high yielding variety H-17-16 also recorded statistically on par values for sugars indicating their sweetness. The high values for TSS and sugars may be the variety specific, genetic character expressed under the transitional climate of Northern Karnataka. The significant variation was observed for lycopene content in fruits of different varieties with maximum lycopene content (5.14 mg/100 g) was found in Arka Kiran which was on par with H-17-16 (4.95 mg/100 g). While the lowest lycopene content was noted in Lalit (2.23 mg/100 g). The results are in agreement with findings of Dinesh and Vasugi (2010) in Arka Kiran and Marak and Mukund (2007) who reported highest lycopene content in Apple Colour Selection 6/10.

The data pertaining to shelf life and Organoleptic scores as influenced by different varieties is presented in table 3. Significant variation was observed for shelf life in fruits of different varieties. Maximum shelf life was observed in Lalit (5.06 days) which was on par with SRD-HYD-1 (5.00 days) and Arka Rashmi (4.97 days). The high yielding varieties *viz.*, H-17-16, Punjab pink registered comparatively moderate shelf life owing to very thin skin. The results are in agreement with Killadi *et al.* (2007); Singh (2007). Sensory Parameters as evaluated by a team of expert on 9 point hedonic scale shown significant variation. The maximum organoleptic Scores was obtained in Arka Rashmi in terms of colour and appearance (8.75), Flavour (8.45), Texture (8.70) and overall acceptability (8.62). This was closely followed by Arka Kiran, Punjab Pink and H-17-16. With respect to taste the variety H-17-16 registered maximum value. The overall acceptability was highest for fruits of Arka Rashmi followed by H-17-16 and Arka Kiran.

Table 1: Performance of different red fleshed guava varieties for quality parameters.

Varieties	Average fruit wt. (g)	Fruit length (cm)	Fruit breadth (cm)	Firmness of fresh fruit (kg/cm ²)	Number of seeds/fruit	Seed weight/fruit (g)	100 seed weight (g)
SR-I	95.78	6.21	5.18	12.93	241.00	2.58	1.35
SR-II	117.13	6.88	5.62	13.17	325.33	3.58	1.20
GR-I	95.33	6.09	5.21	13.70	244.60	2.80	1.16
GR-II	106.67	6.47	5.47	14.48	259.60	2.88	0.80
Arka Kiran	181.23	6.39	6.84	18.59	370.67	4.05	1.13
Arka Rashmi	147.67	6.13	6.40	20.26	305.56	2.92	0.97
Lalit	166.40	6.39	6.71	22.59	509.89	5.62	1.10
H-17-16	161.27	7.45	6.43	20.22	371.67	4.92	1.36
Punjab Pink	217.20	7.31	6.95	20.83	416.47	5.48	1.33
SRD-HYD-1	127.00	5.40	6.11	20.94	350.11	3.94	1.17
S. Em±	9.70	0.20	0.16	0.74	37.13	0.40	0.12
C. D. @ 5%	29.04	0.59	0.49	2.22	111.18	1.19	NS
C. V. (%)	11.87	5.25	4.64	7.23	18.94	17.76	17.33

Table 2: Qualitative assessment of different red fleshed guava varieties for bio-chemical composition.

Varieties	TSS (°B)	Sugars (%)			Ascorbic acid (mg/100g)	Lycopene (mg/100g)
		Reducing sugar	Non-reducing sugar	Total sugars		
SR-I	11.31	3.69	0.66	4.35	135.01	2.70
SR-II	12.43	3.88	0.89	4.77	115.09	2.58
GR-I	12.68	3.89	1.71	5.60	181.49	2.39
GR-II	12.57	3.32	0.36	3.68	212.48	2.83
Arka Kiran	13.28	6.79	2.70	9.49	166.56	5.14
Arka Rashmi	13.46	5.34	0.79	6.12	146.08	4.01
Lalit	11.40	5.69	1.01	6.71	163.79	2.23
H-17-16	15.20	7.80	3.04	10.84	157.15	4.95
Punjab Pink	14.77	5.92	2.53	8.45	194.77	4.76
SRD-HYD-1	13.35	8.58	3.79	12.37	243.47	4.27
S. Em±	0.20	0.45	0.21	0.58	7.80	0.11
C. D. @ 5%	0.59	1.36	0.64	1.72	23.17	0.33
C. V. (%)	2.62	14.32	21.02	13.76	7.87	5.34

Table 3: Shelf life and organoleptic evaluation of different red fleshed guava varieties.

Varieties	Shelf life (No. of days)	Organoleptic score (hedonic scale from 1- 9)				
		Colour and appearance	Flavour	Texture	Taste	Overall acceptability
SR-I	3.90	6.16	7.46	6.67	7.22	6.67
SR-II	3.84	6.52	7.52	6.75	7.52	6.70
GR-I	4.37	6.67	6.66	7.25	7.00	7.15
GR-II	4.44	7.13	7.86	7.55	7.50	7.35
Arka Kiran	4.34	8.40	8.44	8.65	8.70	8.53
Arka Rashmi	5.00	8.75	8.45	8.70	8.66	8.62
Lalit	5.06	8.35	8.05	8.48	8.15	8.26
H-17-16	4.28	8.47	8.15	8.38	8.72	8.56
Punjab Pink	4.90	8.71	8.25	8.44	8.15	8.32
SRD-HYD-1	4.97	8.15	8.22	7.83	8.22	8.10
S. Em±	0.15	0.07	0.08	0.07	0.05	0.03
C. D. @ 5%	0.46	0.21	0.24	0.20	0.15	0.08
C. V. (%)	5.90	1.56	1.75	1.44	1.06	0.57



Photographs of red fleshed guava accessions.

CONCLUSIONS

The study concluded that the genotype H-17-16 was superior to other varieties in relation to physico-chemical parameters and organoleptic scores, the other varieties viz., Arka Kiran, Punjab Pink, SRD-HYD-1 and Arka Rashmi were moderate yielders but were good for quality and organoleptic scores.

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Conflict of Interest. None.

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