



## PHYSICO-CHEMICAL CHARACTERIZATION OF GUAVA CULTIVARS UNDER SAWAI MADHOPUR CONDITIONS OF RAJASTHAN

J. Singh, Prerak Bhatnagar\* and C.B. Meena<sup>1</sup>

*Department of Fruit Science, College of Horticulture and Forestry, Jhalawar (Agriculture University, Kota)*

<sup>1</sup>*Department of Plant Pathology, College of Horticulture and Forestry, Jhalawar*

\*Corresponding Author's E-mail: prerakb\_22@yahoo.co.in

**ABSTRACT :** Based on cumulative assessment of the characters studied during survey of guava orchards in Sawai Madhopur district during 2014-15, it appeared that Gola (Barfkhan) is better over L-49 and Allahabad Safeda with respect to fruit weight, size, thickness of flesh, weight of pure flesh excluding seed cavity, soft texture of seeds, ascorbic acid contents and TSS content which are marketing traits for the guava varieties. In this variety maximum fruit weight (375.87g) and equatorial diameter (82.89 mm) was recorded. This variety had maximum yield of 1.0-1.5 q/tree which was 0.80 and 0.60 q/tree in case of L-49 and Allahabad Safeda, respectively. Gola (Barfkhan) variety's fruit was crunchy in texture with soft seeds. Spreading growth behaviour, compact canopy, green leaf luster and solitary bearing habit were other features of this variety.

**Keywords :** *Guava, Gola (Barfkhan), fruit weight, polar diameter, seed cavity.*

Guava fruit is widely popularized as apple of the tropics. It is one of the most gregarious of fruit trees belonging to family Myrtaceae. In India, it enjoys the position of dominance after mango and citrus having distinctly large acreage in cultivation. On nutritional scale, guava fruit is a good source of Vitamin C, pectin, calcium and phosphorous. Being rich in minerals, guava fruit is ideal for nutritional security. It is an outstanding source of pectin and hence the fruit finds use in the preparation of jam, jelly and nectar. Guava fruit remains in demand throughout the year except during summer season in India. In view of its crunchy taste in grand customer, guava cultivation is catching fast even away from traditional area of cultivation. SawaiMadhopur is one such area where guava has become very popular in short span of time. Initiated at modest 1.25 hectares of land in Karmoda village by Mohammed Yakub Ali, dates back to 1985. Now guava has occupancy over 5000 hectares area in the SawaiMadhopur district. Spread of sandy loam soil all through the guava belt offers best ambience for cultivation of guava in the district. The district receives on an average 500-600mm rainfall. Traditionally the district has the popularity of Sardar (L-49) and Allahabad Safeda varieties of guava. However, sometimes back a private nurseryman introduced a variety known as Gola (Barfkhan) in the district. In present study, it has been attempted to make information as regard to horticultural quality of variety.

In the endeavour, study based on survey and collection of fruits from per se best tree has been summarized.

### MATERIALS AND METHODS

Enchanted by size, yield and quality of fruits, the dominating guava growing areas of SawaiMadhopur district were visited. As the fruits of winter season are better over rainy season fruits, proposed survey was undertaken during winter (2015). The sites of orchardists namely Dondri, Karmoda I, Karmoda II, Soorwal I, Soorwal II, Manpura and Khilchipur were surveyed during the peak growing season in the month of December. Gola (Barfkhan) variety got spurt in the district. It subdued guava growers and inspite recommendations of Government for Sardar and Allahabad Safeda cultivars; the grower has strong inclination towards Gola (Barfkhan) variety. This variety is replacing all other varieties of guava being grown in the district. The plant is having vigorous growth habit. Its fruits are bigger in size; however the physico-chemical attributes of fruits are yet to ascertain in the backdrop of these, a team was constituted to have proper information on physico-chemical attributes of Gola (Barfkhan). The present study synthesizes information in this line. Each location was considered as a treatment. Five orchards each of three cultivars; Gola (Barfkhan), Sardar (L-49) and Allahabad Safeda were visited for collection of physiologically mature fruit samples. The random sampling comprised of collection of fruit samples of 3 cultivars by taking five replications of each variety from five different orchards of each cultivar in a single location. Guava fruits develop best flavour and aroma when they ripen on tree. Thus in

Article's History:

Received : 27-07-2016

Accepted : 08-09-2016

**Table 1 : Quality attributes of guava cvs. of Sawai Madhopur district (2014-15).**

S.No.	Fruit Character	Gola (Barfkhan)	L-49	Allahabad Safeda	CD 5%	SEm
1.	Weight of fruit (g.)	375.67	313.00	103.17	20.56	7.40
2.	Equatorial diameter (mm)	82.89	78.11	60.27	6.21	2.53
3.	Polar diameter (mm)	81.88	78.48	59.93	10.22	4.17
4.	Size of seed cavity (mm)	49.45	56.19	38.29	17.60	6.34
5.	Thickness of flesh (mm)	16.58	15.27	12.21	5.06	1.82
6.	Weight of seed cavity (g)	101.33	71.33	32.50	10.77	3.88
7.	Weight of pure flesh excluding seed cavity (g)	274.34	241.67	70.67	82.62	29.75
8.	Seed weight/fruit (g)	7.00	7.00	3.27	2.26	0.81
9.	No. of seeds	480.00	486.67	236.00	22.66	8.16
10.	TSS (°B)	12.57	11.70	11.25	1.30	0.47
11.	Acidity (%)	0.22	0.19	0.14	0.03	0.01
12.	Ascorbic acid (mg/100g)	148.57	140.34	141.43	6.54	1.66

**Table 2 : Other characters of guava fruits.**

S.No.	Cultivars	Texture of Fruit			
		Crunchy	Mealy	Hard	Soft
1.	Gola(Barfkhan)	✓			✓
2.	L-49	✓			✓
3.	Allahabad Safeda	✓		✓	

**Table 3: Per se performance of tree**

Cultivars	Growth behaviour of plant		Canopy		Leaf Luster		Bearing behaviour		Yield at 8.0 yrs age (q/ha)
	Spreading	Upright	Compact	Sparse	Green	Faint	Cluster	Solitary	
Gola (Barfkhan)	✓		✓		✓			✓	1.00-1.50
L-49	✓		✓		✓			✓	0.80
Allahabad Safeda		✓		✓		✓		✓	0.60

overall 105 physiologically mature yellow colour firm guava fruit samples of three cultivars from seven different locations from middle and lower canopy of orchards (Tamta *et al.*, 7) were collected in polythene bags and brought to laboratory for estimation of physico-chemical attributes. Fruit samples were analyzed replication wise for each of three different cultivars. Fruit weight was measured on an electronic weighing balance and data were recorded. Equatorial and Polar diameter of guava fruits was measured with the help of Vernier Callipers. Size of seed cavity was measured with the help of Vernier Callipers from the inner core portion of the fruit in millimeters. The

thickness of the flesh comprising Epicarp and Mesocarp were also measured with the help of Vernier Callipers. Weight of pure flesh excluding seed cavity was recorded on an electronic weighing balance of Sartorius make. Seeds of three cultivars were extracted after immersing the scooped out pulp in simple water for three days and allowing them to ferment at ambient condition of 30°C temperature. When stickiness disappeared, the pulp mass of the fruit was pounded with hand. Water was further added in the sample, the seed being heavier than pulp, it got settled in the bottom of container (beaker) which was

collected following decantation method. Seeds were counted manually for each of the three cultivars. Total soluble solids of fruit samples was measured with the help of digital Refractometer and measured in degree brix. Titratable acidity percentage was calculated using 0.1 N NaOH solution as per method of AOAC (1). Ascorbic acid content was estimated by volumetric titration method using 2, 6-dichlorophenol indophenols dye solution method and expressed as mg/100 g fresh pulp weight.

Fruit texture was estimated through organoleptic evaluation by a team of three members and was categorized as crunchy and mealy categories and the texture of seeds was observed into as soft and hard seeds. The onsite *per se* performance of guava plant characters were recorded by visually noticing the trees general canopy, growth behaviour, leaf lustre and bearing behaviour (Ray, 6). The yield observations of surveyed orchard were taken randomly from three locations of each cultivar at seven different sites. All the data appeared out of survey and analysis were analyzed using Panse and Sukhatme (5).

## RESULTS AND DISCUSSION

The presentation of results in Table 1 reflects the variation in fruit weight. Maximum fruit weight (375.67 g) was recorded in Gola (Barfkhan) whereas it was minimum (103.17g) in cv. Allahabad Safeda. The better fruit weight in cv. Gola (Barfkhan) could be attributed to inherent genetic character having greater capacity to accumulate food substances in the intercellular spaces of the fruit. The findings are supported by Bollard (3).

The perusal of data in Table 1 further indicates that the polar diameter was maximum (81.88 mm) in cv. Gola (Barfkhan) followed by (78.48 mm) in cv. L-49, however the minimum polar diameter (59.93mm) was there in cv. Allahabad Safeda. Equatorial diameter was found at par in both Gola Barfkhan and L-49 cvs, however it was found maximum (82.89 cm) in cv. Gola (Barfkhan). The values obtained above with respect to polar diameter in cv. Gola (Barfkhan) are better than those results obtained by Patel *et al.* (4). Likewise Bihari and Suryanarayan (2) also observed variation amongst fourteen genotypes of guava with respect to fruit length and fruit diameter. Thickness of flesh was observed maximum (16.58 mm) in cv. Gola (Barfkhan) and corresponding values were recorded as (15.27 mm) and (12.21 mm) in cvs. L-49 and Allahabad Safeda, respectively. Value of weight of pure flesh (excluding seed cavity) was found maximum (274.34 g) which was superior over L-49 and Allahabad Safeda. This trait indicates greater mass of edible portion in cv.

Gola (Barfkhan) over L-49 and Allahabad Safeda, respectively.

The total soluble solids content was found maximum (12.57°brix) in cv. Gola (Barfkhan) and its corresponding value was (11.70°brix) and (11.25°brix) in case of cv. L-49 and Allahabad Safeda, respectively.

The acidity content in case of Gola (Barfkhan) was 0.22%; 0.19% and 0.14% in case of L-49 and Allahabad Safeda, respectively. The maximum ascorbic acid content (148.57 mg/100g) was there in cv. Gola (Barfkhan) and its corresponding value was (140.34mg/100g) and (141.43mg/100g) in case of cv. L-49 and Allahabad Safeda, respectively.

An account of other edible parameters of guava fruits is presented in Table 2. The cultivars Gola (Barfkhan), L-49 and Allahabad Safeda, all were having crunchy texture of fruits; the cultivar Allahabad Safeda only had hard texture of seed.

A peep into Table-3 highlights *per se* performance of trees of different cultivars. The plant had spreading behaviour in case of Gola (Barfkhan) and L-49. The cultivar Allahabad Safeda manifested upright growth habit, cultivar's Gola (Barfkhan) and L-49 canopy was compact, though it was sparse in Allahabad Safeda. The leaf luster of Gola (Barfkhan) and L-49 was green whereas faint in case of Allahabad Safeda. All three cultivars were having solitary bearing habit.

Yield of the fruit at the age of 8 years of the plant appeared maximum (1.0-1.5 q/tree) in cultivar Gola (Barfkhan). In case of L-49 and Allahabad Safeda, it was 0.8q and 0.6q/tree, respectively. The experimental results clearly confirmed the superiority of cultivar Gola (Barfkhan) over L-49 and Allahabad Safeda in terms of fruit physical characters. Hence based on fruit morphology cv. Gola (Barfkhan) was found promising for cultivation.

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**Citation** : Singh J., Bhatnagar P. and Meena C.B. (2016). Physico-chemical characterization of guava cultivars under Sawai Madhopur conditions of Rajasthan. *HortFlora Res. Spectrum*, **5**(3) : 224-227.