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Evaluation of guava (*Psidium guajava* L.) genotypes in Bastar district of Chhattisgarh based on qualitative traits

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Abstract
An experiment was carried out at, K.D. College of Horticulture and Research Station, Jagdalpur, MGUVV, Sankra-Patan, Durg, Chhattisgarh, during the *winter* season of the year 2022-23. The experiment was laid out under Randomized Block Deign (RBD) with three replications of each genotypes. The results were obtained for their qualitative traits. The acidity was found maximum in (0.57%) BAG-1. Maximum TSS (12.02 ºBrix), total sugar (8.64%) and reducing sugar (6.77%) were noted in BAG-3. Highest ascorbic acid was observed in genotype BAG-1 (256.67 mg/ 100 g pulp). Maximum non- reducing sugar (2.75%) was recorded in genotype BAG-4.

Keywords: Guava, genotype, TSS, sugar

Introduction
Guava (*Psidium guajava* L.) is a member of the family Myrtaceae, native of Tropical America. It is also known as "Apple of Tropics" is a tropical fruit but also grows well under sub-tropical condition. The fruit is rich in vitamins C, A and B, and minerals like phosphorus and iron. It contains about 180-300 mg of vitamin C per 100 g of pulp. Guava is used for preparation of jams, jellies, juices, cakes, pies, ice-cream, milk shakes, sauces, butter, cheese, marmalade, chutney, relish, pickle, puree, beverages, ethanol, wine, animal feed, baby food, soft-drinks, as source of pectin, etc.
Chhattisgarh have many options to select the best guava among the several wild strains that are present in Bastar as well as whole Chhattisgarh because the state has access to lines of guava that are available and exist in the form of land races. The variation with regard to biochemical constitutes among different guava cultivars and genotypes were also reported by Pandey *et al.* (1997) [12], Meena *et al.* (2013) [8], Singh *et al.* (2016) [16], Ulemale *et al.* (2018) [18], in different parts of the country.

Materials and Methods
Chemical analysis of fruits was done in the Quality Laboratory, K.D. College of Horticulture & Research Station, Dharmapura-02, Jagdalpur Bastar, (C.G.). The different genotypes were evaluated for the *winter* season crop. Fruit samples collected at the time of maturity from all the genotypes were evaluated for qualitative traits. Acidity was determined by titrating the juice against N/10 NaOH and expressed as percent citric acid. TSS was measured by using Erma hand refractometer and total sugar content was estimated by using Hadge and Hoffreiter's (1962) [5]. The Reducing sugar content was measured by using method Nelson Somogy (1944) [9]. The difference in percentage between total sugar and reducing sugar was taken as the measure of non-reducing sugar and expressed in percentage. The ascorbic acid content of fruit was determined with the help of the method given in Ranganna, 1986 [15].

Results and Discussions
The data presented in Table 1. reveals that fruit chemical constitutes varies significantly in the different guava genotypes evaluated.

Terrible Acidity (%)
The genotype BAG-1 was registered maximum (0.57%) acidity, which was found to be at par with BAG-15 (0.56%) and BAG-7 (0.54%).

The lowest acidity reported in genotype BAG-8 (0.38%). The increased acidity can be ascribed as due to increased CO_2 and associated bicarbonate content of the sap under low temperature. These results were in close conformity with the results registered by Ghosh *et al.* (2013) [3], Singh *et al.* (2016) [16] and Rajore *et al.* (2021) [14].

Total soluble solids (ºBrix)

The genotype BAG-3 (12.02 ºBrix) recorded the highest total soluble solids, which was found to be at par with BAG-13 (11.41 °Brix), Gwalior -27 (check) (11.40 °Brix) and BAG-10 (11.18 °Brix). The lowest total soluble solids was reported in genotype BAG-1 (8.57 °Brix). This might be due to the favourable temperature and humidity during the fruit growth period which might have influenced the retention of higher TSS in the ripe fruits. An increase in the total soluble solids might be due to conversion of polysaccharide into monosaccharide or soluble sugar content as reported by Gohil *et al.* (2006) [4], Babu *et al.* (2007) [1], Ghosh *et al.* (2013) [3], Singh *et al.* (2018) [17] and Chandel *et al.* (2022) [2].

Total sugar (%)

The genotype BAG-3 was observed the highest total sugar (8.64%) which was found to be at par with BAG-6 (8.60%), BAG-11 (8.37%) and BAG-10 (8.23%). The lowest total sugar (6.42%) was analysed in genotype BAG-2. The variation in the total sugar among the different genotypes may be due to the difference in genetic makeup of the genotypes as well as agro climatic situations like temperature, humidity, soil type, supply of nutrients and water during growth and development of fruits. These results are in agreement with Pandey *et al.* (2007) [11], Mahour *et al.* (2012) [7] and Singh *et al.* (2018) [17] in guava.

Reducing sugar (%)

The genotype BAG-3 noted maximum reducing sugar (6.77%) which was found to be at par with BAG-13 (6.18%) whereas, the minimum reducing sugar was recorded in genotype BAG-4 (4.14%).The reducing sugar of fruits from different genotypes varied due to the variation in the heredity characters of the genotypes. High reducing sugar in genotypes BAG-3 and BAG-13 might be attributed to presence of more monosaccharide and disaccharides like glucose and fructose in these fruit genotypes during maturity. Similar results were also reported by Mahour *et al.* (2012) [7], Meena *et al.* (2013) [8], Pandey *et al.* (2016) [10] and Singh *et al.* (2018) [17].

Non-Reducing sugar (%)

The genotype BAG-4 recorded highest non-reducing sugar (2.75%) which was found to be at par with BAG-6 (2.60%), BAG-11 (2.57%) and Gwalior-27 (check) (2.54%). Whereas, the lowest non reducing sugar was registered in genotype BAG-13 (1.24%). The non-reducing sugar of fruits from different genotypes varied due to difference in the heredity characters of the genotypes. These parameters may vary from place to place depending on climatic factors and management practices. These results are in accordance with the findings of Patel *et al.* (2007) [13], Mahour *et al.* (2012) [7], Meena *et al.* (2013) [8] and Chandel *et al.* (2022) [2].

Ascorbic acid (mg/100 g pulp)

The highest ascorbic acid (256.67 mg/100 g pulp) was reported in genotype BAG-1 which was at par with genotypes BAG-2 (256.27 mg/100 g pulp) and Gwalior -27 (check) (239.44 mg/100 g pulp). Whereas the minimum ascorbic acid was found in BAG-3 (151.11 mg/100 g pulp). The variation in ascorbic acid content might be due to favorability of seasonal conditions. Similar trend was also reported by Pandey *et al.* (2007) [11], Kaur *et al.* (2011) [6] and Ghosh *et al.* (2013) [3] in guava.

Table 1: Qualitative parameters of *in-situ* guava genotypes.

Genotypes	Terrible Acidity (%)	T.S.S (°Brix)	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)	Ascorbic acid (mg/100 g pulp)
BAG -1	0.57	8.57	6.64	4.92	1.73	256.67
BAG -2	0.50	8.97	6.42	4.70	1.71	256.27
BAG -3	0.41	12.02	8.64	6.77	1.87	151.11
BAG -4	0.51	9.36	6.89	4.14	2.75	187.22
BAG -5	0.48	10.37	8.00	5.57	2.44	194.17
BAG -6	0.47	10.18	8.60	6.00	2.60	183.33
BAG -7	0.54	9.11	6.89	4.82	2.08	196.78
BAG -8	0.38	10.30	7.23	5.04	2.18	172.50
BAG -9	0.48	9.92	7.19	5.13	2.06	194.17
BAG -10	0.39	11.18	8.23	5.69	2.53	182.78
BAG -11	0.49	10.27	8.37	5.80	2.57	169.44
BAG -12	0.45	10.90	8.19	5.72	2.47	175.83
BAG -13	0.42	11.41	7.42	6.18	1.24	157.50
BAG -14	0.53	9.57	7.30	5.09	2.21	215.56
BAG -15	0.56	9.53	7.77	5.56	2.21	223.89
Gwalior-27 (check)	0.43	11.40	8.29	5.75	2.54	239.44
S.E. m±	0.01	0.35	0.24	0.20	0.11	5.992
C.D. at 5%	0.03	1.01	0.69	0.57	0.24	17.39
C.V. (%)	4.21	5.89	5.41	6.31	6.52	5.261

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