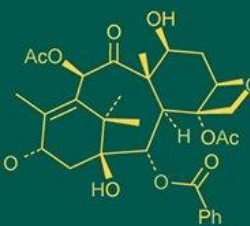
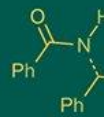


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Evaluation of fruit quality attributes in guava (*Psidium guajava* L.) cultivars under the subtropical conditions of Himachal Pradesh

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Abstract

The present investigation was carried out to characterize the fruit quality attributes of seven guava (*Psidium guajava* L.) cultivars, namely Allahabad Safeda, Lalit, Arka Amulya, Shweta, Lucknow-49, Hisar Surkha and Hisar Safeda, under the subtropical conditions of the north-western Himalayas. Significant differences were observed among the cultivars for all quality parameters studied. Total soluble solids (TSS) ranged from 9.65 to 13.23 °Brix, with the highest value recorded in Hisar Safeda. Titratable acidity varied from 0.31 to 0.59%, while ascorbic acid content ranged from 126.86 to 205.34 mg 100 g⁻¹, with Shweta recording the highest value. Hisar Safeda exhibited the highest total sugar (7.43%) and reducing sugar (5.02%), whereas Shweta recorded the highest non-reducing sugar (2.57%). The results demonstrated considerable genetic variability among the cultivars for fruit quality traits. Hisar Safeda and Hisar Surkha were identified as superior cultivars for sweetness and overall eating quality due to their higher TSS, lower acidity and higher sugar content, whereas Shweta and Lucknow-49 were distinguished by their high vitamin C content. The findings provide useful information for cultivar selection, crop improvement and future breeding programmes under subtropical Himalayan conditions.

Keywords: Guava, fruit quality, total soluble solids, ascorbic acid, sugar content, cultivar evaluation

Introduction

Guava (*Psidium guajava* L.) popularly referred to as the "apple of the tropics" or the "poor man's fruit," is one of the most economically and nutritionally important fruit crops of the tropical and subtropical world. Belonging to the family Myrtaceae, guava is believed to have originated in tropical America and has since become naturalized across a wide range of tropical and subtropical regions owing to its remarkable adaptability, hardiness and low input requirement (Kumar *et al.* 2025) [10]. In India, guava occupies a position of considerable commercial importance, ranking as the fifth most important fruit crop and accounting for about 3.38 per cent of the total area under fruit cultivation in the country. As it contributes nearly 5.0 million metric tonnes of production from around 0.32 million hectares, with an average productivity of about 15.6 tonnes per hectare (Anonymous, 2026) [12]. Its popularity among growers and consumers stems from its year-round availability, wide climatic adaptability and comparatively low cost of cultivation. Nutritionally, guava is regarded as one of the richest sources of vitamin C among commonly consumed fruits, containing several times more ascorbic acid than citrus fruits such as orange and lemon and being surpassed only by a few fruits like Barbados, cherry and aonla (Patra *et al.*, 2004; Mishra *et al.*, 2005; Singh *et al.*, 2016) [15, 12, 19]. Besides vitamin C, the fruit is a valuable source of vitamin A and B-complex vitamins along with essential minerals such as calcium, iron, zinc and phosphorus (Hussain *et al.*, 2021) [18]. Despite its wide cultivation and economic significance, systematic characterization of fruit quality attributes among locally grown, region-specific guava cultivars remains limited, particularly under the distinct agro-climatic conditions of hill and sub-mountainous tracts. Such characterization is essential for the proper identification, documentation and conservation of germplasm and for guiding breeding programmes aimed at improving fruit quality traits suited to specific environments. The subtropical belt of the north-western Himalayas, with its distinctive combination of altitude, temperature and

seasonal variation, is expected to influence the physico-chemical characteristics of guava fruit in ways that remain inadequately documented (Rani and David, 2021; Gekonge, 2021) [17, 5]. Keeping this in view, the present investigation was undertaken to characterize the fruit quality attributes of seven guava cultivars grown under the subtropical conditions of the north-western Himalayas. The study aims to generate baseline information on cultivar-wise variability in fruit quality that can assist in the selection of superior genotypes and guide future breeding efforts in this economically important crop.

Materials and Methods

The experiment was conducted at Experimental Farm and Laboratory of the Department of Fruit Science, College of Horticulture and Forestry, Neri, Hamirpur, Himachal Pradesh. During monsoon season of 2018-19, on two years old orchard of guava planted at 2.5 × 2.0 m. Total seven cultivars were used for study viz., Allahabad Safeda, Lalit, Arka Amulya, Shweta, Lucknow-49, Hisar Surkha and Hisar Safeda. Three plants of each cultivar that were uniform in growth characteristics, free from insect pests and diseases, growing under healthy conditions were selected for recording observations on various characteristics. The experiment was laid out on bearing guava trees in a randomized block design. Ten fruits were randomly collected from each plant for observation. Various quality parameters were recorded. Total soluble solids (°Brix) was estimated by using an Erma-Hand Refractometer (0 to 30 °B). The titratable acidity, ascorbic acid content, total, reducing and non-reducing sugar was recorded by the standard method of Ranganna (1995) [16]. The statistical analysis was carried out for each observed character using MS-Excel and OPSTAT (Sheoran *et al.* 1998) [18].

Results and Discussion:

The seven guava genotypes evaluated in the present study showed significant differences for all the fruit quality parameters studied (Figs. 1 & 2), indicating considerable genetic variability among the genotypes.

Total soluble solids (TSS): Ranged from 9.65 °Brix in Allahabad Safeda to 13.23 °Brix in Hisar Safeda, followed by Hisar Surkha (12.83 °Brix) and Lucknow-49 (12.71 °Brix) (Fig. 1). Similar variation in TSS among guava cultivars has been reported by Joshi *et al.* (2018) [19], who recorded TSS values ranging from 9.80 to 12.13 °Brix under Punjab conditions, with Hisar Surkha recording the highest TSS. Likewise, Pandey *et al.* (2016) [14] reported higher TSS in Hisar Surkha (14.84 °Brix) and Hisar Safeda (13.45 °Brix), whereas Lalit recorded comparatively lower values. Similar trends have also been reported by Singh *et al.* (2016) [19]. The observed variation among genotypes may be attributed to differences in their genetic makeup as well as the influence of climatic conditions and orchard management practices.

Titrateable acidity: Varied from 0.31% in Hisar Surkha to 0.59% in Allahabad Safeda (Fig 1.). An inverse relationship

between TSS and acidity was observed, with genotypes having higher TSS generally exhibiting lower acidity. Hisar Safeda and Hisar Surkha combined high TSS with low acidity, whereas Allahabad Safeda recorded the lowest TSS and the highest acidity. Similar observations have been reported by Mishra *et al.* (2026) [13], who found a strong negative association between acidity and the TSS: acid ratio in guava germplasm. Comparable variation in acidity among guava cultivars has also been reported by Ghosh *et al.* (2013) [16], Meena *et al.* (2013) [11] and Gupta *et al.* (2016) [17]. The reduction in acidity with fruit ripening may be due to the utilization of organic acids during respiration and their conversion into sugars.

Ascorbic acid: Content ranged from 126.86 mg/100 g in Arka Amulya to 205.34 mg/100 g in Shweta, with Lucknow-49 (200.18 mg/100 g) and Hisar Safeda (197.12 mg/100 g) also recording high values (Fig 1.). These results are in agreement with the findings of Pandey *et al.* (2016) [14] and Joshi *et al.* (2018) [19], who also reported considerable variation in vitamin C content among guava cultivars. Mishra *et al.* (2026) [13] further reported that ascorbic acid is one of the most genetically variable quality traits in guava, making it an important criterion for cultivar selection. Similar variation in ascorbic acid content has also been reported by Gupta *et al.* (2016) [17].

The sugar fractions also differed significantly among the genotypes. Total sugar ranged from 6.64% in Allahabad Safeda to 7.43% in Hisar Safeda, reducing sugar from 4.34% in Hisar Surkha to 5.02% in Hisar Safeda and non-reducing sugar from 1.78% in Allahabad Safeda to 2.57% in Shweta. The higher total and reducing sugar content in Hisar Safeda corresponded with its higher TSS and lower acidity, indicating superior sweetness. In contrast, Allahabad Safeda recorded lower values for most sugar parameters, which is consistent with its lower TSS and higher acidity. Ahir *et al.* (2023) [1] also reported considerable variation in sugar fractions among guava cultivars and hybrids, with total sugars ranging from 6.57–7.30% and reducing sugars from 4.30–4.84%, which closely supports the findings of the present study. Similar genotype-dependent variation in total, reducing and non-reducing sugars has been reported by Pandey *et al.* (2016) [14], Ghosh *et al.* (2013) [16], Meena *et al.* (2013) [11], Singh *et al.* (2016) [19] and Dubey *et al.* (2016) [3]. Such variation is mainly attributed to genetic differences among cultivars, although environmental conditions and crop management also influence sugar accumulation.

Overall, Hisar Safeda and Hisar Surkha exhibited desirable quality attributes, including higher TSS, lower acidity and higher sugar content, making them suitable for fresh consumption and dessert purposes. Shweta and Lucknow-49 were distinguished by their high ascorbic acid content, indicating their potential for developing nutritionally enriched products. In contrast, Allahabad Safeda and Arka Amulya recorded comparatively lower TSS and sugar content, while Arka Amulya had the lowest ascorbic acid content and Allahabad Safeda showed the highest acidity among the genotypes evaluated.

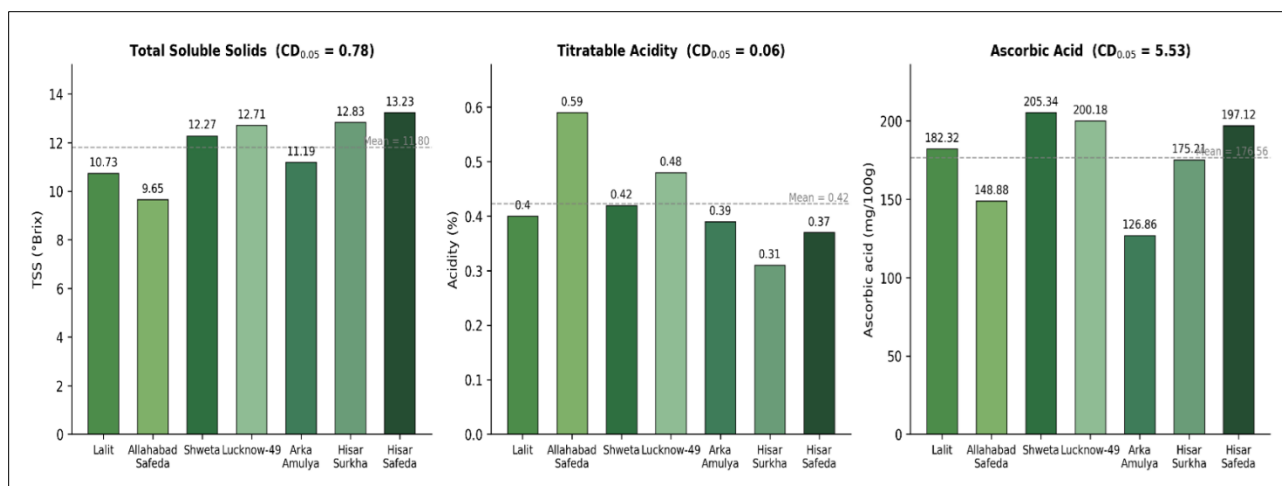


Fig 1: Quality parameters of guava genotypes (Total Soluble Solid, Titratable acidity and Ascorbic acid) of fruits

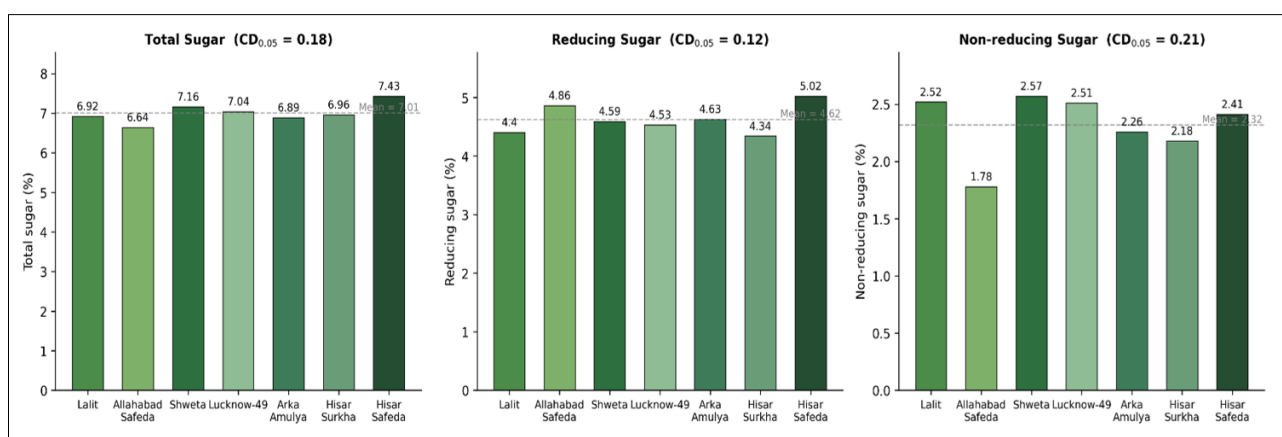


Fig 2: Quality parameters of guava genotypes (Total sugar, Reducing sugar and non-reducing sugar) of fruits

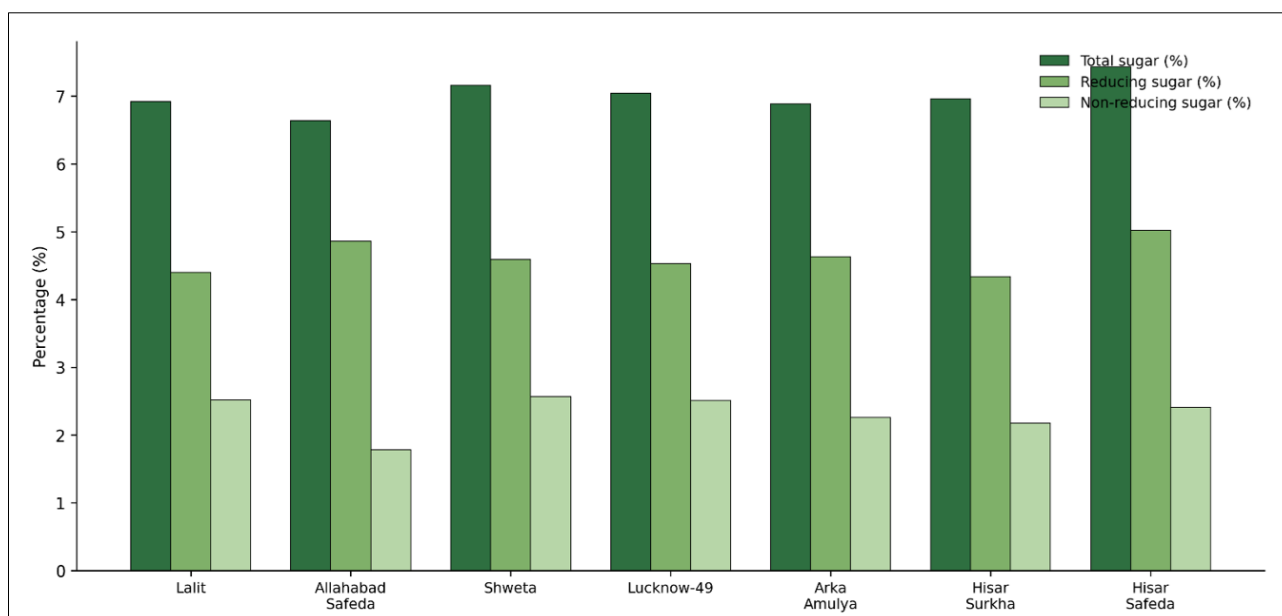


Fig 3: Comparative sugar profile of guava genotypes

Conclusion

Significant variability was observed among the seven guava cultivars for all fruit quality parameters, indicating the existence of substantial genetic diversity. Hisar Safeda and Hisar Surkha exhibited superior fruit quality owing to their higher TSS, lower acidity and greater sugar content, making them suitable for fresh consumption and dessert purposes.

Shweta and Lucknow-49 recorded higher ascorbic acid content and may be preferred for nutritional and processing purposes. The study highlights the importance of cultivar evaluation under specific agro-climatic conditions and identifies promising cultivars that can be utilized in cultivation programmes and future guava breeding for quality improvement.

References

- Ahir M, Kumar K, Thakur DS, Chopra ML, Dangi G. Fruit morpho-physical and biochemical characteristics of some guava (*Psidium guajava* L.) cultivars and hybrids under subtropical conditions of Himachal Pradesh. *Indian Journal of Ecology*. 2023;50(1):124-128.
- Anonymous. Horticulture statistics at a glance 2026. New Delhi: Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India; 2026.
- Dubey MC, Kumar R, Kumar A, Kohli K. Evaluation of different guava (*Psidium guajava* L.) genotypes under Tarai condition of Uttarakhand. *The Bioscan*. 2016;11(3):1765-1770.
- Gangappa ND, Singh C, Verma MK, Thakre M, Sevanthi AM, Singh R, *et al.* Assessing the genetic diversity of guava germplasm characterized by morpho-biochemical traits. *Frontiers in Nutrition*. 2022;9:1017680. doi:10.3389/fnut.2022.1017680.
- Gekonge DO. Production, utilization and processing of Kenyan guavas: development of nutrient-enriched guava nectars from local varieties [doctoral dissertation]. Nairobi: University of Nairobi; 2021.
- Ghosh SN, Roy S, Bera B. Study on performance of twenty one guava cultivars in red and laterite soil of West Bengal under irrigated condition. *Journal of Crop and Weed*. 2013;9(2):81-83.
- Gupta N, Wali VK, Singh VB, Singh M, Kumar V. Effect of seasonal variations and weather parameters on yield, quality and disease incidence in guava cultivars under rainfed conditions of Jammu region. *The Bioscan*. 2016;11(1):627-633.
- Hussain SZ, Naseer B, Qadri T, Fatima T, Bhat TA. Guava (*Psidium guajava*): morphology, taxonomy, composition and health benefits. In: *Fruits grown in highland regions of the Himalayas: nutritional and health benefits*. Cham: Springer International Publishing; 2021. p.257-267.
- Joshi H, Kochhar A, Boora RS. Physico-chemical and nutritional evaluation of newly developed guava cultivars under climatic conditions of Punjab. *Journal of Hill Agriculture*. 2018;9(2):251-254.
- Kumar M, Kumar R, Singh NK, Singh VP, Chand S, Raj R, *et al.* Evaluation of guava (*Psidium guajava* L.) cultivars based on morphological traits and yield performance in Tarai region of Uttarakhand. *Journal of Advances in Biology & Biotechnology*. 2025;28(7):227-241.
- Meena R, Waghmare GM, Diwan K, Vadak Y. Variability studies in red-fleshed guava (*Psidium guajava* L.) genotypes for growth, yield and quality attributes. *Asian Journal of Horticulture*. 2013;8(2):609-611.
- Mishra M, Chandra R, Pati R, Bajpai A. Micropropagation of guava (*Psidium guajava* L.). In: *Proceedings of the International Guava Symposium*; 2005. p.155-158.
- Mishra P, Kashyap A, Kumar C, Goswami AK, Sharma RM, Sethi S, *et al.* Morpho-biochemical insights into globally collected guava germplasm (*Psidium* spp.): opportunities for utilization in breeding. *BMC Plant Biology*. 2026.
- Pandey D, Pandey AK, Yadav SK. Evaluation of newly developed guava cultivars and selections under Lucknow conditions. *Indian Journal of Horticulture*. 2016;73(3):334-338.
- Patra RK, Debnath S, Das BC, Hasan MA. Effect of mulching on growth and fruit yield of guava cv. Sardar. *Orissa Journal of Horticulture*. 2004;32:38-42.
- Ranganna S. Handbook of analysis and quality control for fruits and vegetable products. New Delhi: Tata McGraw-Hill Publishing Company Ltd.; 1995. p.1-21.
- Rani R, David J. A review on utility of an astonishing fruit: *Psidium guajava* (guava). *Journal of Science & Technology*. 2021;6(1):60-72.
- Sheoran OP, Tonk DS, Kaushik LS, Hasija RC, Pannu RS. Statistical software package for agricultural research workers. In: Hooda DS, Hasija RC, editors. *Recent advances in information theory, statistics and computer applications*. Hisar: Department of Mathematics and Statistics, CCS Haryana Agricultural University; 1998. p.139-143.
- Singh D, Gill MIS, Arora NK. Morphological characterization of promising guava (*Psidium guajava* L.) varieties under subtropical humid conditions of North India. *The Bioscan*. 2016;11(Suppl 2):681-686.