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# Standardization of Method for Extraction of Guava (*Psidium guajava* L.) Pulp Cv. Sardar and G-Vilas

**Sonali Pawaskar, DB Kshirsagar, AV Kshirsagar and SM Choudhary**

## Abstract
The experiment "Standardization of Method for Extraction of Guava Pulp" was conducted separately for cv. Sardar and G-Vilas with the same treatment combinations. Guava pulp was extracted from fruit of two different maturity stages ($M_1$ -fruit of edible maturity and $M_2$ - fully ripe fruit) with pre-treatment of fruit ($T_1$ - without blanching and $T_2$ - with blanching) using two different types of pulp extractor ($E_1$ - screw type pulp extractor and $E_2$ - brush type pulp extractor). Observations for in quality and sensory parameters of fresh pulp were recorded. Pulp extracted from fully ripe fruit without blanching with screw type pulp extractor ($M_2T_1E_1$) recorded maximum overall acceptability followed by pulp extracted from fully ripe fruit with blanching using screw type pulp extractor ($M_2T_2E_1$). These two treatment combinations were found to be best with respect two quality and sensory attributes.

**Keywords:** Guava, Sardar, G-Vilas, pulp extraction, fruit maturity, blanching

## Introduction
Guava (*Psidium guajava* L.) is one of the most important crop belonging to myrtaceae family was introduced to India in early 17th century and gradually became a crop of commercial importance. Guava is often marketed as "Super-fruits" which has a considerable nutritional importance in terms of vitamins A and C with seeds that are rich in omega-3, omega-6 poly-unsaturated fatty acids and especially dietary fiber, riboflavin as well as in proteins, and mineral salts. It is also rich in anti-oxidant, pectin and good source of calcium, phosphorus and iron. Guava is quite hardy, prolific bearer and highly remunerative even without much care. Owing to high neutraceutical values of guava, hardiness and wider adaptability there has been a growing consumer preference, resulting in expansion of area across the country. As the farmers are adopting high density planting and meadow orchard system, it turns in increased productivity. Guava fruit has very limited storage potential it ripens rapidly after harvest and therefore has a short shelf-life.

The prevention of losses of the seasonal surplus of the fruit by processing and preservation techniques at farmers' level and as well as industrial scale should be warranted. Guava fruit can be processed and preserved in the form of pulp. Processed guava pulp is an excellent raw material for preparation of various products like juice, blended RTS beverages, guava wine, guava powder, jam, toffee, cheese, ice cream topping and nectar. These products have good potential for internal as well as external trade. Researchers have extracted pulp of fully ripe guava fruit and preserved it successfully. Guava fruit of edible maturity mostly accepted by consumer than fully ripe due to its crispiness and excellent taste. Such fruit contains high phenolic compounds, which decrease during fruit ripening (Bashir and Abu-Goukh, 2003 [1] and Patel *et al*., 2013) [2]. Edible maturity fruit also have attractive greenish colour which may added to pulp and could increase sensory score for pulp colour. By considering all these things it was thought to evaluate the quality of pulp extracted from fruit of edible maturity and fully ripe fruit. It is the immense need to develop efficient method for pulp extraction to obtain high value trait pulp.

## Material and Methods
An investigation on "Standardization of Method for Extraction of Guava (Psidium guajava L.) Pulp Cv. Sardar and G-Vilas" was conducted during October 2017 to May 2019 at laboratory of Postharvest Technology, Department of Horticulture, MPKV. Rahuri, Dist. Ahmednagar. Guava fruit of cv. Sardar, procured from Horticultural Farm and Central Nursery, Department of Horticulture, Mahatma Phule Krishi Vidyapeeth Rahuri, Maharashtra and fruit of cv. G-Vilas were collected from the field of a progressive farmer Rahata Tahsil, Dist. Ahmednagar,

Maharashtra. The winter season guava fruit were harvested in the morning and brought to laboratory, on the day before the experiment to be start. Healthy, sound guava fruit free from any disease were selected according to their stage of maturity *viz*. fruit of edible maturity ($M_1$) and fully ripe fruit ($M_2$) and washed thoroughly. Then fruit were subjected to pretreatment of no blanching ($T_1$) and blanching ($T_2$). Fruit of edible maturity were blanched for 5 minutes and that of the fully ripe for 3 minutes at boiling temperature. Fruit were cut into quarters after tip cutting and then passed through screw type pulp extractor ($E_1$) and brush type pulp extractor ($E_2$) to obtain smooth pulp. Pulp obtained from brush type pulp extractor was seedless but seeded pulp obtained from screw type pulp extractor which was passed through 1mm stainless steel sieve. Fresh pulp obtained from different treatment combinations was analyzed for quality and sensory attributes.

Pulp recovery was calculated by dividing weight of pulp obtained by weight of fruit taken and was expressed in percentage. The viscosity of the pulp was measured by Rheometer/ Viscometer (Make:Brook Field, Model: R/S SST Coaxial Rheometer) at constant speed of 60 rpm. The pH of the fruit extract was determined with the help of pH meter. (Model Systronics µ pH system 361). Total soluble solids (T.S.S.) were determined with the help of Hand refractometer (Erma Japan, 0 to $32^0$ Brix) and value was corrected at 20 °C with the help of temperature correction chart. The titratable acidity (%), reducing sugars (%), total sugars (%), ascorbic acid (mg/100 g) and pectin (%) were estimated as per the methods suggested by Ranganna (1977) [3] and Ranganna 1986) [4]. For evaluation of various organoleptic quality attributes, the method discussed by Amerine *et al*. (1965) [4] was adopted using a nine-point hedonic scale basis. The design adopted was completely randomized design with factorial concept and the data were subjected to statistical analysis as per the procedure advocated by Panse and Sukhatme (1985) [6].

**Result and discussion**

1. **Effect of different methods of extraction on physicochemical composition of fresh guava pulp cv. Sardar**

The effect of different methods of pulp extraction on quality of guava pulp cv. Sardar is presented in Table 1. It was observed that, individual factors like fruit maturity stage and pretreatment of fruit with or without blanching significantly influenced the pulp recovery and quality parameters. Pulp extracted from fully ripe fruit recorded pulp higher recovery (77.57%), pH (3.83), TSS (13.30 °B), reducing sugars (5.32%), total sugars (8.49%) and ascorbic acid (217.72 mg/100 g). However, pulp extracted from edible maturity fruit recorded higher viscosity (57.52 mPa/s), titratble acidity (0.50%) and pectin content (1.68%). The pulp extracted from un-blanched fruit recorded higher values for some important parameters like, viscosity (49.83mPa/s), TSS (12.46 °B), reducing sugars (4.83%), total sugars (7.50%) and ascorbic acids (190.02 mg/100 g). It was found that, blanching treatment recorded increase pulp recovery (74.12%), pH (3.75) and pectin content (1.44%). Pulp extraction method significantly influenced pulp recovery and ascorbic acid content of guava pulp. Brush type pulp extractor recorded more pulp recovery (74.99%) than the screw type pulp extractor (72.38%). Ascorbic acid content was found higher in pulp extracted by screw type pulper (179.07 mg/100 g) than brush type pulper (168.13 mg/100 g).

Interaction effect of fruit maturity and pretreatments of fruit significantly influenced pulp viscosity. Maximum viscosity (58.99mPa/s) was observed in pulp extracted from edible maturity fruit without blanching. It was also noted that, though the results were statistically non-significant the higher values for TSS (13.57 °B), reducing sugars (5.48%) total sugars (8.66%) and ascorbic acids (234.87 mg/100 g) were observed in $M_2T_1$. Highest pulp recovery (78.01%) was reported by $M_2T_2$. Interaction effect of fruit maturity and type of pulper revealed significant variation in data of pulp viscosity and pH. Pulp extracted from edible maturity fruit with screw type pulp extractor resulted higher viscosity (57.61mPa/s). The pH was found maximum (3.85) in $M_2E_1$ (pulp extracted from fully ripe fruit with screw type pulper) and minimum (3.55) in $M_1E_1$ (pulp extracted from edible maturity fruit with screw type pulper). It was also observed that, though the results were statistically non-significant the higher TSS (13.34ºB), total sugars (8.53%) and ascorbic acid (223.95 mg/100 g) were reported in $M_2E_1$ (pulp extracted from fully ripe fruit with screw type pulper). Higher pulp recovery (79.34%) was found in pulp extracted from fully ripe fruit with brush type pulper ($M_2E_2$). Interaction effect of pretreatments and type of pulp extractor found significant in pulp viscosity only. Maximum (49.94mPa/s) viscosity was recorded in $T_1E_2$ (pulp extracted without blanching by brush type pulper). Highest pulp recovery (75.43%) was reported by $T_2E_2$ (pulp extracted with blanching by brush type pulper) though, results were non-significant.

Pulp viscosity was varied significantly with three way interaction effect of fruit maturity, pretreatment of fruit and type of pulp extractor. Treatment combination $M_1T_1E_1$ (59.11mPa/s) revealed maximum viscosity. Though, the results were statistically non-significant, higher values for TSS (13.61 °B), total sugars (8.70%) and ascorbic acid (240.77 mg/100 g) were reported by treatment combination $M_2T_1E_1$ (pulp extracted from fully ripe fruit without blanch with screw type pulper). Highest pulp recovery (79.77%) was reported by $M_2T_2E_2$ (pulp extracted from fully ripe fruit with blanching by brush type pulper).

It was observed that, pulp extracted from fully ripe recorded higher pulp recovery than edible maturity fruit. It was because ripe fruit are soft, which facilitate whole fruit to convert into pulp by reducing wastage. The decline in pectin content during ripening is due to conversion of insoluble protopectin into soluble pectin leads to softening of fruits (Brummel, 2006) [7]. It was also noted that, pulp of fully ripe fruit have more TSS, sugars and ascorbic acids. During fruit development TSS, sugars and ascorbic acids goes on increasing up to climacteric peak. During ripening process, hydrolysis of polysaccharides like starch, cellulose and pectin substance into simpler substances results in increase of total soluble solids. (Kumar and Sagar 2014) [8]. Ascorbic acid production is linked with pectin degradation, galacturonic acids being postulated as a substrate for synthesis of ascorbic acid (Mapson and Isherwood 1956) [9]. Higher viscosity of pulp extracted from unripe and un-blanched fruit is due hardiness of fruit which maintains resistance. Higher pulp recovery and reduced TSS, sugars and ascorbic acids was found in pulp extracted from blanched fruit. Blanching soften the fruit tissue, loosen the skin which facilitate pulping operation and higher drained weights are obtained. For hot-water blanching the large volume of water needed and its direct contact with the product, which may result in some leaching of water-soluble food constituents such as vitamins, sugars, and starch. In addition, vitamins are degraded by heat. Ascorbic acid loss is more because of its high solubility and heat susceptibility (Xiao *et al*., 2017) [10]. Higher pH of blanched fruit is might due to reduction of titratable acidity as an effect of leaching in blanching water. Pectin content of pulp might have increased due to maximum extraction of pectin into the pulp as a result of heating. Extraction methods significantly influenced pulp recovery and ascorbic acid content of pulp. In brush type pulper, rotating brush abled to separate all fruit tissue including skin thereby increased pulp recovery reducing wastage. Repeated rotation of brush of brush type pulper creates heat which might have caused more loss of heat sensitive ascorbic acid.

**2. Effect of different methods of extraction on overall acceptability of fresh guava pulp cv. Sardar**

Table 2 represents overall acceptability of guava pulp influenced by different extraction methods. The organoleptic character i.e. colour, flavour, texture, taste of guava pulp were recorded for each treatment combination. The average of all the above characters was calculated and expressed as overall acceptance or palatability rating. A score of 5.5 and above is considered acceptable for consumer appeal.

Overall acceptability score of pulp extracted by all methods was more than 5.5, indicating its acceptability. Pulp extracted with fully ripe fruit without blanching using screw type pulp extractor ($M_2T_1E_1$) recorded maximum (8.89) overall acceptability followed by pulp extracted from fully ripe fruit + with blanching + screw type pulp extractor ($M_2T_2E_1$) (8.21). The overall acceptability score above 8 indicated that, pulp extracted by these two treatment combination was between the range of liked very much and like extremely.

**3. Effect of different methods of extraction on physicochemical composition of fresh guava pulp cv. G-Vilas**

The effect of different methods of pulp extraction on quality parameters of guava pulp cv. G-Vilas is presented in Table 3. It was observed that, individual factors like fruit maturity stage and pretreatment of fruit with or without blanching significantly influenced the pulp recovery and quality parameters. Pulp extracted from fully ripe fruit recorded higher pulp recovery (74.99%), pH (3.75), TSS (11.81 °B), reducing sugars (4.45%), total sugars (6.18%) and ascorbic acid (133.95 mg/100 g). However, Pulp extracted from fruit of edible maturity recorded higher viscosity (52.71mPa/s), titratble acidity (0.43%) and pectin content (1.40%). The pulp extracted from unblanched fruit recorded higher values for some important parameters like, viscosity (45.52mPa/s), TSS (11.25 °B), reducing sugars (4.24%), total sugars (5.73%) and ascorbic acids (115.54 mg/100 g). It was found that, blanching treatment recorded increase in pulp recovery (71.76%), pH (3.78) and pectin content (1.23%). Pulp extraction methods significantly influenced pulp recovery and ascorbic acid content of guava pulp. Brush type pulp extractor influenced more pulp recovery (72.49%) than the screw type pulp extractor (70.14%). Ascorbic acid content was found higher in pulp extracted by screw type pulper (107.27 mg/100 g) than brush type pulper (99.06 mg/100 g).

Interaction effect of fruit maturity and pretreatments of fruit significantly influenced pulp viscosity and pectin content of pulp. Higher viscosity (58.99mPa/s) and pectin content (1.30%) was observed in $M_1T_1$ (pulp extracted from edible maturity fruit without blanching). It was also noted that, though the results were statistically non-significant the higher values for TSS (12.05 °B), reducing sugars (4.59%) total sugars (6.32%) and ascorbic acids (145.27 mg/100 g) were observed in $M_2T_1$ (pulp extracted from full ripe fruit without blanching). Higher pulp recovery (75.43%) was reported by $M_2T_2$ (pulp extracted from fully ripe fruit by brush type pulper). Interaction effect of fruit maturity and type of pulp extractor revealed significant variation in data of pulp viscosity. Pulp extracted from $M_1E_1$ (edible maturity fruit with screw type pulp extractor) resulted higher viscosity (52.80mPa/s). It was also observed that, though the results were statistically non-significant the higher TSS (11.82ºB), reducing sugars (4.46%), total sugars (6.22%) and ascorbic acid (138.40 mg/100 g) were reported in $M_2E_1$ (pulp extracted from fully ripe fruit with screw type pulper). Higher pulp recovery (76.27%) was found in $M_2E_2$ (pulp extracted from fully ripe fruit with brush type pulper). Two way interaction effect of pretreatments and pulp extractors was showed significant variation in viscosity only. $T_1E_1$ (pulp extracted without blanching with screw type pulper) revealed higher viscosity (45.41mPa/s). Highest pulp recovery (72.94%) was reported by $T_2E_2$ (pulp extracted with blanching by brush type pulper).

Three way interaction effect of fruit maturity, pretreatment of fruit and type of pulp extractor showed significant variation in pulp viscosity. Pulp extracted by $M_1T_1E_1$ (54.30mPa/s) revealed maximum viscosity. Though, the results were statistically non-significant higher values for TSS (12.10ºB), reducing sugars (4.62%), total sugars (6.36%) and ascorbic acid (150.23 mg/100 g) were reported by $M_2T_1E_1$ (pulp extracted from fully ripe fruit without blanch with screw type pulper). Highest pulp recovery (76.70%) was reported by $M_2T_2E_2$ (pulp extracted from fully ripe fruit with blanching by brush type pulper).

**4. Effect of different methods of extraction on overall acceptability of fresh guava pulp cv. G-Vilas**

Overall acceptability of G-Vilas guava pulp influenced by different extraction methods is presented in Table 4. Overall acceptability score of pulp extracted by all methods was above 5.5, indicating acceptable sensory quality. Pulp extracted by $M_2T_2E_1$ (Fully ripe fruit + without blanching + screw type pulp extractor) (8.49) recorded maximum overall acceptability of pulp followed by interaction $M_2T_2E_1$ (Fully ripe fruit + with blanching + screw type pulp extractor) (7.91). It was understood from organoleptic evaluation that, pulp extracted from fully ripe fruit without blanching using screw type pulper recorded higher sensory score in both varieties. Fruit flavour in guava is improved with advancement of ripening that might be attributed to accumulation of sugars, decrease in phenols and acids and biosynthesis of aroma volatile compounds (EL Bulk *et al*., 1997 [11], Bashir and Abu-Goukh, 2003 [12] and Soares *et al*., 2007 [13]). During blanching vitamins, minerals, and other water-soluble compounds, such as proteins, sugars, and flavor compounds, diffuse out of the food and into the water, lowering the overall quality of the food. Tannins contains in skin of edible maturity fruit are extracted more into pulp due to friction of brush type pulper. Which might have reduced sensory quality of pulp.

**Table 1:** Effect of different methods of extraction on physicochemical composition of fresh guava pulp cv. Sardar

| Treatments | Pulp recovery (%) | Viscosity (mPa/s) | pH | Total Soluble Solids (°B) | Titra-table acidity (%) | Reducing sugars (%) | Total sugars (%) | Ascorbic acid ( mg/100 g) | Pectin (%) |
|---|---|---|---|---|---|---|---|---|---|
| $M_1$ | 69.80 | 57.52 | 3.60 | 11.13 | 0.50 | 4.04 | 6.18 | 129.48 | 1.68 |
| $M_2$ | 77.57 | 39.48 | 3.83 | 13.30 | 0.44 | 5.32 | 8.49 | 217.72 | 1.10 |
| S.Em(±) | 0.37 | 0.03 | 0.02 | 0.03 | 0.00 | 0.03 | 0.03 | 1.51 | 0.02 |
| CD @ 1% | 1.53 | 0.13 | 0.09 | 0.13 | 0.01 | 0.11 | 0.11 | 6.25 | 0.06 |
| $T_1$ | 73.25 | 49.83 | 3.68 | 12.46 | 0.49 | 4.83 | 7.50 | 190.02 | 1.33 |
| $T_2$ | 74.12 | 47.17 | 3.75 | 11.96 | 0.46 | 4.53 | 7.17 | 157.17 | 1.44 |
| S.Em(±) | 0.37 | 0.03 | 0.02 | 0.03 | 0.00 | 0.03 | 0.03 | 1.51 | 0.02 |
| CD @ 1% | NS | 0.13 | 0.09 | 0.13 | 0.01 | 0.11 | 0.11 | 6.25 | 0.06 |
| $E_1$ | 72.38 | 48.50 | 3.70 | 12.24 | 0.48 | 4.66 | 7.35 | 179.07 | 1.39 |
| $E_2$ | 74.99 | 48.50 | 3.73 | 12.19 | 0.47 | 4.70 | 7.32 | 168.13 | 1.39 |
| S.Em(±) | 0.37 | 0.03 | 0.02 | 0.03 | 0.00 | 0.03 | 0.03 | 1.51 | 0.02 |
| CD @ 1% | 1.53 | NS | NS | NS | NS | NS | NS | 6.25 | NS |
| $M_1T_1$ | 69.36 | 58.99 | 3.55 | 11.36 | 0.52 | 4.19 | 6.35 | 145.18 | 1.63 |
| $M_1T_2$ | 70.24 | 56.05 | 3.65 | 10.89 | 0.49 | 3.89 | 6.01 | 113.78 | 1.73 |
| $M_2T_1$ | 77.14 | 40.66 | 3.80 | 13.57 | 0.46 | 5.48 | 8.66 | 234.87 | 1.03 |
| $M_2T_2$ | 78.01 | 38.29 | 3.85 | 13.04 | 0.43 | 5.17 | 8.33 | 200.57 | 1.16 |
| S.Em(±) | 0.52 | 0.05 | 0.03 | 0.05 | 0.00 | 0.04 | 0.04 | 2.14 | 0.02 |
| CD @ 1% | NS | 0.19 | NS | NS | NS | NS | NS | NS | NS |
| $M_1E_1$ | 68.95 | 57.61 | 3.55 | 11.14 | 0.51 | 4.04 | 6.17 | 134.19 | 1.67 |
| $M_1E_2$ | 70.65 | 57.44 | 3.65 | 11.12 | 0.50 | 4.04 | 6.19 | 124.77 | 1.69 |
| $M_2E_1$ | 75.81 | 39.39 | 3.85 | 13.34 | 0.45 | 5.29 | 8.53 | 223.95 | 1.10 |
| $M_2E_2$ | 79.34 | 39.56 | 3.80 | 13.26 | 0.44 | 5.36 | 8.46 | 211.49 | 1.09 |
| S.Em(±) | 0.52 | 0.05 | 0.03 | 0.05 | 0.00 | 0.04 | 0.04 | 2.14 | 0.02 |
| CD @ 1% | NS | 0.19 | 0.13 | NS | NS | NS | NS | NS | NS |
| $T_1E_1$ | 71.94 | 49.72 | 3.65 | 12.51 | 0.49 | 4.81 | 7.53 | 195.31 | 1.34 |
| $T_1E_2$ | 74.56 | 49.94 | 3.70 | 12.42 | 0.49 | 4.86 | 7.47 | 184.74 | 1.33 |
| $T_2E_1$ | 72.82 | 47.28 | 3.75 | 11.97 | 0.46 | 4.52 | 7.16 | 162.83 | 1.44 |
| $T_2E_2$ | 75.43 | 47.06 | 3.75 | 11.96 | 0.46 | 4.53 | 7.17 | 151.52 | 1.45 |
| S.Em(±) | 0.52 | 0.05 | 0.03 | 0.05 | 0.00 | 0.04 | 0.04 | 2.14 | 0.02 |
| CD @ 1% | NS | 0.19 | NS | NS | NS | NS | NS | NS | NS |
| $M_1T_1E_1$ | 68.50 | 59.11 | 3.50 | 11.40 | 0.53 | 4.17 | 6.37 | 149.85 | 1.62 |
| $M_1T_1E_2$ | 70.22 | 58.87 | 3.60 | 11.32 | 0.52 | 4.21 | 6.32 | 140.50 | 1.64 |
| $M_1T_2E_1$ | 69.39 | 56.10 | 3.60 | 10.87 | 0.48 | 3.91 | 5.96 | 118.53 | 1.72 |
| $M_1T_2E_2$ | 71.08 | 56.00 | 3.70 | 10.91 | 0.49 | 3.86 | 6.05 | 109.03 | 1.73 |
| $M_2T_1E_1$ | 75.37 | 40.32 | 3.80 | 13.61 | 0.46 | 5.44 | 8.70 | 240.77 | 1.05 |
| $M_2T_1E_2$ | 78.90 | 41.00 | 3.80 | 13.52 | 0.45 | 5.51 | 8.63 | 228.97 | 1.01 |
| $M_2T_2E_1$ | 76.25 | 38.46 | 3.90 | 13.07 | 0.43 | 5.13 | 8.36 | 207.13 | 1.15 |
| $M_2T_2E_2$ | 79.77 | 38.12 | 3.80 | 13.00 | 0.42 | 5.20 | 8.29 | 194.00 | 1.17 |
| S.Em(±) | 0.74 | 0.06 | 0.04 | 0.06 | 0.01 | 0.06 | 0.06 | 3.03 | 0.03 |
| CD @ 1% | NS | 0.27 | NS | NS | NS | NS | NS | NS | NS |

**Table 2:** Effect of different methods of extraction on overall acceptability (score) of fresh guava pulp cv. Sardar

| Sr. No. | Treatments | Treatment details | Score |
|---|---|---|---|
| 1 | $M_1T_1E_1$ | Fruit of edible maturity + Without blanching + Screw type pulp extractor | 7.49 |
| 2 | $M_1T_1E_2$ | Fruit of edible maturity + Without blanching + Brush type pulp extractor | 6.95 |
| 3 | $M_1T_2E_1$ | Fruit of edible maturity + With blanching + Screw type pulp extractor | 7.35 |
| 4 | $M_1T_2E_2$ | Fruit of edible maturity + With blanching + Brush type pulp extractor | 6.66 |
| 5 | $M_2T_1E_1$ | Fully ripe fruit + Without blanching + Screw type pulp extractor | 8.89 |
| 6 | $M_2T_1E_2$ | Fully ripe fruit + Without blanching + Brush type pulp extractor | 7.58 |
| 7 | $M_2T_2E_1$ | Fully ripe fruit + With blanching + Screw type pulp extractor | 8.21 |
| 8 | $M_2T_2E_2$ | Fully ripe fruit + With blanching + Brush type pulp extractor | 7.23 |

**Table 3:** Effect of different methods of extraction on physicochemical composition of fresh guava pulp cv. G-Vilas

| Treatments | Pulp recovery (%) | Viscosity (mPa/s) | pH | Total Soluble Solids (°B) | Titra-table acidity (%) | Reducing sugars (%) | Total sugars (%) | Ascorbic acid ( mg/100 g) | Pectin (%) |
|---|---|---|---|---|---|---|---|---|---|
| $M_1$ | 67.64 | 52.71 | 3.68 | 10.23 | 0.43 | 3.74 | 5.00 | 72.38 | 1.40 |
| $M_2$ | 74.99 | 35.67 | 3.75 | 11.81 | 0.39 | 4.45 | 6.18 | 133.95 | 0.90 |
| S.Em(±) | 0.40 | 0.06 | 0.03 | 0.02 | 0.00 | 0.03 | 0.03 | 0.93 | 0.01 |
| CD @ 1% | 1.65 | 0.23 | 0.11 | 0.09 | 0.01 | 0.11 | 0.12 | 3.83 | 0.05 |
| $T_1$ | 70.87 | 45.52 | 3.65 | 11.25 | 0.42 | 4.24 | 5.73 | 115.54 | 1.07 |
| $T_2$ | 71.76 | 42.86 | 3.78 | 10.79 | 0.40 | 3.95 | 5.44 | 90.79 | 1.23 |
| S.Em(±) | 0.40 | 0.06 | 0.03 | 0.02 | 0.00 | 0.03 | 0.03 | 0.93 | 0.01 |
| CD @ 1% | NS | 0.23 | 0.11 | 0.09 | 0.01 | 0.11 | 0.12 | 3.83 | 0.05 |
| $E_1$ | 70.14 | 44.19 | 3.70 | 11.01 | 0.41 | 4.10 | 5.62 | 107.27 | 1.15 |
| $E_2$ | 72.49 | 44.19 | 3.73 | 11.03 | 0.41 | 4.09 | 5.56 | 99.06 | 1.14 |
| S.Em(±) | 0.40 | 0.06 | 0.03 | 0.02 | 0.00 | 0.03 | 0.03 | 0.93 | 0.01 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CD @ 1% | 1.65 | NS | NS | NS | NS | NS | NS | 3.83 | NS |
| $M_1T_1$ | 67.19 | 54.18 | 3.60 | 10.45 | 0.44 | 3.90 | 5.15 | 85.82 | 1.30 |
| $M_1T_2$ | 68.09 | 51.24 | 3.75 | 10.01 | 0.42 | 3.58 | 4.85 | 58.94 | 1.51 |
| $M_2T_1$ | 74.55 | 36.85 | 3.70 | 12.05 | 0.40 | 4.59 | 6.32 | 145.27 | 0.84 |
| $M_2T_2$ | 75.43 | 34.48 | 3.80 | 11.57 | 0.39 | 4.32 | 6.04 | 122.64 | 0.95 |
| S.Em(±) | 0.56 | 0.08 | 0.04 | 0.03 | 0.00 | 0.04 | 0.04 | 1.31 | 0.02 |
| CD @ 1% | NS | 0.33 | NS | NS | NS | NS | NS | NS | 0.07 |
| $M_1E_1$ | 66.57 | 52.80 | 3.65 | 10.20 | 0.43 | 3.74 | 5.03 | 76.14 | 1.41 |
| $M_1E_2$ | 68.71 | 52.63 | 3.70 | 10.26 | 0.43 | 3.74 | 4.97 | 68.62 | 1.39 |
| $M_2E_1$ | 73.71 | 35.58 | 3.75 | 11.82 | 0.39 | 4.46 | 6.22 | 138.40 | 0.90 |
| $M_2E_2$ | 76.27 | 35.75 | 3.75 | 11.80 | 0.40 | 4.45 | 6.14 | 129.51 | 0.90 |
| S.Em(±) | 0.56 | 0.08 | 0.04 | 0.03 | 0.00 | 0.04 | 0.04 | 1.31 | 0.02 |
| CD @ 1% | NS | 0.33 | NS | NS | NS | NS | NS | NS | NS |
| $T_1E_1$ | 69.70 | 45.41 | 3.65 | 11.27 | 0.42 | 4.27 | 5.77 | 119.87 | 1.08 |
| $T_1E_2$ | 72.04 | 45.63 | 3.65 | 11.24 | 0.42 | 4.22 | 5.70 | 111.22 | 1.06 |
| $T_2E_1$ | 70.58 | 42.97 | 3.75 | 10.75 | 0.40 | 3.92 | 5.47 | 94.67 | 1.23 |
| $T_2E_2$ | 72.94 | 42.75 | 3.80 | 10.83 | 0.41 | 3.97 | 5.42 | 86.91 | 1.23 |
| S.Em(±) | 0.56 | 0.08 | 0.04 | 0.03 | 0.00 | 0.04 | 0.04 | 1.31 | 0.02 |
| CD @ 1% | NS | 0.33 | NS | NS | NS | NS | NS | NS | NS |
| $M_1T_1E_1$ | 66.13 | 54.30 | 3.60 | 10.43 | 0.44 | 3.92 | 5.18 | 89.50 | 1.31 |
| $M_1T_1E_2$ | 68.25 | 54.06 | 3.60 | 10.47 | 0.43 | 3.87 | 5.11 | 82.13 | 1.28 |
| $M_1T_2E_1$ | 67.00 | 51.29 | 3.70 | 9.96 | 0.41 | 3.55 | 4.88 | 62.77 | 1.51 |
| $M_1T_2E_2$ | 69.17 | 51.19 | 3.80 | 10.05 | 0.42 | 3.60 | 4.83 | 55.10 | 1.50 |
| $M_2T_1E_1$ | 73.27 | 36.51 | 3.70 | 12.10 | 0.40 | 4.62 | 6.36 | 150.23 | 0.85 |
| $M_2T_1E_2$ | 75.83 | 37.19 | 3.70 | 12.00 | 0.40 | 4.56 | 6.29 | 140.31 | 0.83 |
| $M_2T_2E_1$ | 74.15 | 34.65 | 3.80 | 11.54 | 0.38 | 4.29 | 6.07 | 126.56 | 0.94 |
| $M_2T_2E_2$ | 76.70 | 34.31 | 3.80 | 11.60 | 0.39 | 4.34 | 6.00 | 118.71 | 0.96 |
| S.Em(±) | 0.80 | 0.11 | 0.05 | 0.04 | 0.01 | 0.05 | 0.06 | 1.86 | 0.02 |
| CD @ 1% | NS | 0.47 | NS | NS | NS | NS | NS | NS | NS |

**Table 4:** Effect of different methods of extraction on overall acceptability of fresh guava pulp cv. G-Vilas

| Sr. No. | Treatments | Treatment details | Score |
|---|---|---|---|
| 1 | $M_1T_1E_1$ | Fruit of edible maturity + Without blanching + Screw type pulp extractor | 7.18 |
| 2 | $M_1T_1E_2$ | Fruit of edible maturity + Without blanching + Brush type pulp extractor | 6.65 |
| 3 | $M_1T_2E_1$ | Fruit of edible maturity + With blanching + Screw type pulp extractor | 6.92 |
| 4 | $M_1T_2E_2$ | Fruit of edible maturity + With blanching + Brush type pulp extractor | 6.24 |
| 5 | $M_2T_1E_1$ | Fully ripe fruit + Without blanching + Screw type pulp extractor | 8.49 |
| 6 | $M_2T_1E_2$ | Fully ripe fruit + Without blanching + Brush type pulp extractor | 7.22 |
| 7 | $M_2T_2E_1$ | Fully ripe fruit + With blanching + Screw type pulp extractor | 7.91 |
| 8 | $M_2T_2E_2$ | Fully ripe fruit + With blanching + Brush type pulp extractor | 6.97 |

## Conclusion

Two treatment combinations were found to be best with respect two quality and sensory attributes. Pulp extracted from fully ripe fruit without blanching with screw type pulp extractor recorded maximum overall acceptability followed by pulp extracted from fully ripe fruit with blanching using screw type pulp extractor.

## References


1. Bashir HA, Abu-Goukh ABA. Compositional changes during guava fruit ripening. Food Chemistry. 2003;80:557-563.
2. Patel RK, Maiti CS, Deka BC, Deshmukh NA, Nath A. Changes in sugars, pectin and antioxidants of guava (*Psidium guajava*) fruits during fruit growth and maturity. Indian Journal of Agricultural Sciences. 2013;83(10):1017-21.
3. Ranganna S. Manual of analysis of fruit and vegetable products. Tata Mc. Craw Hill Publishing Company Ltd., New Delhi; c1977. p. 9-82.
4. Ranganna S. Hand book of Analysis and quality control for fruits and vegetable products. Tata Mc. Graw Hill Publishing Company Limited, New Delhi; c1986.
5. Amerine MA, Pangborn RM, Roessier EB. Principles of sensory evaluation of food. Academic Press, London; c1965.
6. Panse VG, Sukhatme PV. Statistical methods for agricultural workers, I. C. A. R., New Delhi; c1985.
7. Brummell DA. Cell wall disassembly in ripening fruit. Functional Plant Biology. 2006;33:103-119.
8. Kumar P, Sagar VK. Influence of packaging materials and storage conditions on physico-chemical characteristics. International Food Research Journal. 2014;2:396-402.
9. Mapson LW, Isherwood FA. Biological synthesis of ascorbic acid. The conversion of derivatives of D-galacturonic acid into L-ascorbic acid by plant extracts. Biochemical Journal. 1956;64:13.
10. Xiao Hong-Wei, Pan Zhongli, Deng Li-Zhen, El-Mashad, Hamed M, Yang Xu-Hai, *et al*. Recent developments and trends in thermal blanching. A comprehensive review. Information Processing in Agriculture. 2017;4(2):101-127.
11. El-Bulk RE, Babiker EE, El Tinay AH. Changes in chemical composition of guava fruits during development and ripening. Food Chemistry. 1997;59(1):395-399.
12. Abu-Goukh ABA, Bashir HA. Changes in pectin enzyme and cellulose activity during fruit ripening. Food Chemistry. 2003;83:213-218.
13. Soares FB, Pereira T, Marques MOM, Monteriro AR. Volatile and non-volatile chemical composition of white guava fruit (*Psidium guajava*) at different stages of maturity. Food Chemistry. 2007;100:15-21.