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Evaluation of biochemical properties of guava syrup cv. Taiwan Pink

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Abstract
A lab experiment was conducted at Post harvest and Value Addition Laboratory, Mewar University Gangrar, Chittorgarh (Rajasthan) during December to March to evaluation of biochemical properties of guava syrup‟. The result revealed that the highest TSS was at 69.10°Brix, titratable acidity (0.41%), total sugar content (35.40%) and ascorbic acid (126.30 mg/100 g) after 90 days was recorded with B_1P_1 (60°Brix, 20% pulp). Therefore, it is concluded that a formulation containing 25% pulp and 60-65°Brix TSS offers the best balance of nutritional stability and storage life, making it the most suitable combination for high-quality guava syrup production.

Keywords: Guava syrup, biochemical, storage period, ascorbic acid

1. Introduction
Guava (*Psidium guajava* L.) has been called the "Apple of Tropics" and "Poor man's apple," and the fruit consists of 20% peel, 50% flesh portion, and seed core. It also contains 74-84% moisture, 13-26% dry matter, and 0.8-1.5% protein, 0.4-0.7% fat, and 0.5-1.0% ash, and the fruit is considered an excellent source of vitamin C (299 mg/100 g) and pectin (1.15%). The fruit has an appreciable amount of minerals, such as phosphorus (23-37 mg/100 g), calcium (14-30 mg/100 g), iron (0.6-1.4 mg/100 g) as well as vitamins like niacin, thiamine, riboflavin, and vitamin A. Guava is more prone to postharvest losses during harvesting, handling and transportation. This postharvest loss can be reduced by converting into processed products. Nectar is noncarbonated nonalcoholic beverage, relatively few preservatives and used as health drink. This contains about 20 per cent fruit juice/pulp, 15 per cent total soluble solids and about 0.3 per cent acid which is not diluted before serving. Syrups prepared from tropical fruits like guava offer an excellent means of preservation and diversification, extending shelf life while retaining much of the flavor and nutritive value (Kumar & Sharma, 2019) [6]. Guava syrup, in particular, serves both culinary and health purposes, being used in beverages, desserts, and therapeutic formulations. However, the quality of such products is significantly influenced by several factors, including the cultivar used, pulp concentration, sugar content (Total Soluble Solids - TSS), and storage conditions (Patel *et al.*, 2022) [11]. In recent years, there has been growing interest in the preparation of value-added products from guava. One such product is guava syrup, which is a thick, sweet liquid made by blending guava pulp with sugar and other ingredients. Guava syrup is used in the preparation of beverages, mocktails, ice creams, desserts, and other food items. It helps in preserving the fruit's taste and nutrients for a longer time. However, the quality and shelf life of guava syrup depend on several factors such as the amount of pulp used, total soluble solids (TSS), acidity, sugar content, and storage conditions. Processing guava into syrup is a good way to reduce post-harvest losses and increase income for farmers and small food processors.

2. Materials and Methods
A lab experiment was conducted during December to March of 2024-25 at Post Harvest and Value Addition Laboratory, Department of Agriculture (Horticulture) Fruit Science, Faculty of Agriculture and Veterinary Sciences, Mewar University Gangrar, Chittorgarh (Rajasthan). The experiment was laid out in FCRD (Factorial Completely Randomized Design) with two

levels and three replications. In level-I, the pulp percentage like 20, 25, 30 and 35% pulp and level-II, TSS content in pulp like 60, 65 and 70 ^{0}Brix. The treatment combination is P_1B_1 (Pulp 20% + TSS 60°Bx), P_2B_1 (Pulp 25% + TSS 60°Bx), P_3B_1 (Pulp 30% + TSS 60°Bx), P_4B_1 (Pulp 35% + TSS 60°Bx), P_1B_2 (Pulp 20% + TSS 65°Bx), P_2B_2 (Pulp 25% + TSS 65°Bx), P_3B_2 (Pulp 30% + TSS 65°Bx), P_4B_2 (Pulp 35% + TSS 65°Bx), P_1B_3 (Pulp 20% + TSS 70°Bx), P_2B_3 (Pulp 25% + TSS 70°Bx), P_3B_3 (Pulp 30% + TSS 70°Bx) and P_4B_3 (Pulp 35% + TSS 70°Bx). The method for biochemical properties analysis is followed standard method of particular parameters at different duration like 0, 30, 45, 60 and 90 days after storage.

3. Results and Discussion

3.1 TSS (°Brix)

At the start of the storage period (0 days), the TSS of guava syrup ranged from 59.10°Brix to 66.20°Brix. The highest TSS (66.20°Brix) was recorded in the treatment with 25% pulp (P2) and 60°Brix TSS level (B1), followed closely by 64.0°Brix in P1 × B1. The mean values showed that P2 had the highest average TSS (64.10°Brix), while P3 (30% pulp) showed a relatively lower average (61.5°Brix). Although the differences were not statistically significant at this stage, a trend of better retention at moderate pulp levels was noted. After 30 days of storage, a slight decline in TSS was observed, with values ranging from 60.10°Brix to 67.20°Brix. Again, P2 × B1 showed the highest TSS (67.20°Brix), while P3 × B1 had the lowest (60.10°Brix). Statistically, pulp level, TSS level, and their interaction were significant. At 45 days, further reduction in TSS was observed, with values between 60.80°Brix and 67.80°Brix. The highest value remained with P2 × B1 (67.80°Brix), indicating better retention at lower initial TSS and moderate pulp concentration. Mean values again confirmed P2 (25%) maintained the highest TSS (65.70°Brix). At 60 days, TSS ranged from 61.40°Brix to 68.40°Brix, with the highest value recorded in P2 × B1 (68.40°Brix) and lowest in P3 × B1 (61.40°Brix). The average TSS continued to be highest in P2 (66.30°Brix). The trend reinforced that moderate pulp concentration and lower initial TSS levels contribute to better stability. These findings also supported by Sharma *et al.*, (2018), Meena *et al.*, (2019), Verma & Joshi (2021), Shukla *et al.*, (2022) and Rani & Sharma (2023).By the end of the storage period (90 days), TSS had further declined across all treatments, with values between 62.40°Brix and 69.10°Brix. The highest TSS (69.10°Brix) was retained in P2 × B1, while the lowest was observed in P3 × B1 (62.40°Brix). Mean TSS values confirmed that 25% pulp (P2) performed best (67.10°Brix), while 30% and 35% pulp led to faster declines. Statistically, all treatment effects remained significant.

3.2 Titrable acidity (%)

At the beginning of storage, titrable acidity ranged from 0.38% to 0.45% across treatments. The highest acidity (0.45%) was found in 65°Brix (B2) with 35% pulp (P4), while the lowest (0.38%) was recorded in 60°Brix (B1) with 30% pulp (P3). On average, acidity increased slightly with higher pulp levels, and P4 had the highest mean (0.43%). After 30 days, acidity slightly declined across most treatments, ranging from 0.37% to 0.44%. The maximum value (0.44%) was seen in B2 × P3, and the lowest (0.37%) in B1 × P3.By 45 days, titrable acidity ranged from 0.36% to 0.43%. The highest value was found in B2 × P3 (0.42%), and the lowest in B1 × P3 (0.36%). Overall, P4 (35% pulp) again had the highest average acidity (0.41%), confirming that higher pulp led to slightly more acidic products during storage. At this stage, acidity values were between 0.35% and 0.42%. The highest was again observed in B2 × P4, and the lowest in B1 × P3. The mean acidity was highest in P4 (0.40%).By the end of the storage period, acidity slightly dropped further, with values from 0.34% to 0.41%. The highest was found in B2 × P4 (0.41%), and the lowest in B1 × P3 (0.34%). P4 (35% pulp) again showed the highest average acidity (0.39%), while P1 (20% pulp) showed the lowest (0.36%). Treatment effects were statistically significant even at this stage. Similar result also observed by Gupta & Mehta (2017) [7], Desai *et al.* (2020) [4] and Patel & Sharma (2021) [10].

3.3 Total sugar (%)

At the start of storage, total sugar content in guava syrup showed clear variation across treatments. The highest total sugar (54.20%) was recorded in B1 (60°Brix) × P2 (25%), followed by B2 × P2 (53.80%) and B3 × P3 (53.70%). The lowest value (49.10%) was found in B1 × P3 (30%). Although statistical differences were non-significant at this stage, the data trend indicates that moderate pulp (25–30%) with TSS around 65–70°Brix supported maximum initial total sugar content. By 30 days, a slight reduction in total sugar was observed across treatments. The highest value (55.30%) remained in B1 × P2, while the lowest (51.80%) occurred in B1 × P3. Pulp level P2 (25%) again recorded the highest average (54.60%), and P1 (20%) showed the lowest (52.10%). Statistical differences became significant, influence of pulp and TSS levels on sugar retention during early storage. At 45 days, total sugar continued to decline. The highest value (56.40%) was found in B1 × P2, and the lowest (51.2%) in B1 × P3. Again, P2 (25%) had the highest mean (55.7%) while P1 (20%) had the lowest (53.1%). The trend consistently showed that moderate pulp and TSS concentrations preserve total sugar more effectively. Differences were statistically significant. After 60 days, further degradation in total sugar was seen. The highest sugar (57.40%) was in B1 × P2, followed by B3 × P3 (57.10%), while the lowest (52.00%) was found in B1 × P3. Among pulp levels, P2 continued to show the highest mean (56.70%) and P1 the lowest (54.00%). Statistical significance was confirmed, emphasizing that B1 and B2 treatments with P2 or P4 are better at maintaining sugar content. At the end of storage (90 days), sugar degradation was most evident. The highest total sugar (58.80%) was recorded in B1 × P2, and the lowest (53.40%) in B1 × P3.

The pulp level P2 (25%) again showed the highest average (58.10%), followed by P4 (35%) at 57.10%. P1 (20%) had the lowest (55.30%). Statistical analysis confirmed significant differences, highlighting that low to moderate pulp levels (25–30%) and TSS levels of 65°Brix are optimal for sugar retention during extended storage. Similar concluded by Akbar *et al.*, (2016) [2], Rani & Kumar (2015) [13], Mishra *et al.*, (2017) [9] and Bijane *et al.*, (2024) [3].

3.4 Ascorbic acid (mg/100 g)

At the beginning of storage, the ascorbic acid content was highest in the treatment B2 (65°Brix) × P2 (25%) with 133.80 mg/100 g, followed by B3 × P3 (132.90 mg) and B2

× P4 (130.20 mg). The lowest value (127.70 mg) was observed in B1 × P1. Though the critical difference (CD) was relatively large, the data clearly indicate that moderate pulp (25%) and TSS around 65–70°Brix enhanced ascorbic acid retention initially. After 30 days, there was a measurable decline in ascorbic acid. The highest value (131.00 mg) was found in B2 × P2, followed by B3 × P3 (130.10 mg). The lowest content (125.50 mg) was observed in B1 × P1. Statistical differences were significant, affirming the importance of pulp and TSS combinations in preserving vitamin C during early storage. By the 45^{th} day, the ascorbic acid content had declined further. The maximum (129.60 mg) was noted in B2 × P2, followed by B3 × P3 (127.90 mg). The lowest value (124.10 mg) was recorded in B1 × P3. Statistical analysis confirmed significant differences, reiterating that pulp level 25% helps in reducing the degradation of ascorbic acid during mid-storage. At 60 days, the ascorbic acid continued to reduce, with the highest value (128.20 mg) in B2 × P2, followed by B3 × P3 (127.40 mg). The lowest (123.00 mg) was in B1 × P3.Statistical differences were significant, reinforcing the finding that moderate pulp and TSS (especially B2 and B3) are optimal. By day 90, ascorbic acid degradation was evident across all treatments. The highest content (126.30 mg) was recorded in B2 × P2 and the lowest (121.50 mg) in B1 × P3. The significant difference further confirmed the influence of pulp and TSS levels on long-term retention of vitamin C. Similar result also recorded by Ahmad (2012) [1], Kumari (2016) [7], Sharma *et al.*, (2018) and Sahu *et al.*, (2024) [14].

Table 1: The effect of different levels of pulp and TSS concentration on total soluble solids (^{0}Brix) of Guava syrup

Total Soluble Solids (^{0}Brix)															
Storage period	**0 Days**					**30 Days**					**45 Days**				
Pulp / TSS	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**
B_1 (60 °Brix)	64.0	66.2	59.1	62.4	62.9	64.9	67.2	60.1	63.3	63.9	65.5	67.8	60.8	64.0	**64.5**
B_2 (65 °Brix)	63.8	63.9	61.9	61.7	62.8	64.7	64.8	62.7	62.6	63.7	65.3	65.4	63.4	63.2	**64.3**
B_3 (70 °Brix)	59.6	62.3	66.4	60.6	61.5	60.5	63.2	64.3	61.5	62.4	61.1	63.9	65.0	62.2	**63.0**
Mean	62.4	64.1	61.5	61.5		63.3	65.0	62.4	62.5		64.0	65.7	**63.0**	**63.1**	
	S.Em	CD				S.Em	CD				S.Em	CD			
P (PULP)	0.20	0.59				0.20	0.60				0.21	0.60			
B (TSS)	0.17	0.51				0.18	0.52				0.18	0.52			
B (TSS) × P (PULP)	0.35	1.25				0.35	1.26				0.36	1.28			
Storage period	60 Days					90 Days									
Pulp / TSS	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean					
B_1 (60 °Brix)	66.0	68.4	61.4	64.6	65.1	66.9	69.1	62.4	65.6	66.0					
B_2 (65 °Brix)	65.9	66.0	63.9	63.8	64.9	66.8	66.9	64.8	64.6	65.8					
B_3 (70 °Brix)	61.7	64.4	65.5	62.7	63.6	62.5	65.3	66.4	63.6	64.4					
Mean	64.5	66.3	63.6	63.7		65.4	67.1	64.5	64.6						
	S.Em	CD				S.Em	CD								
P (PULP)	0.21	0.61				9.38	27.38								
B (TSS)	0.18	0.53				8.12	23.71								
B (TSS) × P (PULP)	0.36	1.29				16.25	58.08								

Table 2: The effect of different levels of pulp and TSS concentration on Titrable acidity (%) of Guava syrup

Titrable acidity (%)															
Storage period	**0 Days**					**30 Days**					**45 Days**				
Pulp / **TSS**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**
B_1 (60 °Brix)	0.39	0.41	0.38	0.42	0.40	0.38	0.40	0.37	0.41	0.39	0.37	0.39	0.36	0.40	**0.38**
B_2 (65 °Brix)	0.40	0.43	0.44	0.45	0.43	0.39	0.42	0.43	0.44	0.42	0.38	0.41	0.42	0.43	**0.41**
B_3 (70 °Brix)	0.40	0.42	0.43	0.41	0.42	0.39	0.41	0.42	0.40	0.41	0.38	0.40	0.41	0.39	**0.40**
Mean	0.40	0.42	0.42	0.43		0.39	0.41	0.41	0.42		0.38	0.40	0.40	0.41	
	S.Em	CD				S.Em	CD				S.Em	CD			
P (PULP)	0.060	0.174				0.001	0.004				0.001	0.004			
B (TSS)	0.052	0.151				0.001	0.003				0.001	0.003			
B (TSS) × P (PULP)	0.103	0.369				0.002	0.008				0.002	0.008			
Storage period	60 Days					90 Days									
Pulp / TSS	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean					
B_1 (60 °Brix)	0.36	0.38	0.35	0.39	0.37	0.35	0.37	0.34	0.38	0.36					
B_2 (65 °Brix)	0.37	0.40	0.41	0.42	0.40	0.36	0.39	0.40	0.41	0.39					
B_3 (70 °Brix)	0.37	0.39	0.40	0.38	0.39	0.36	0.38	0.39	0.37	0.38					
Mean	0.37	0.39	0.39	0.40		0.36	0.38	0.38	0.39						
	S.Em	CD				S.Em	CD								
P (PULP)	0.001	0.004				0.001	0.003								
B (TSS)	0.001	0.003				0.001	0.003								
B (TSS) × P (PULP)	0.002	0.008				0.002	0.007								

Table 3: The effect of different levels of pulp and TSS concentration on total sugar (%) of Guava syrup

Total sugar (%)															
Storage period	**0 Days**					**30 Days**					**45 Days**				
Pulp / TSS	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**
B_1 (60 °Brix)	50.8	54.2	49.1	53.0	51.8	51.8	55.3	50.1	54.1	52.8	52.8	56.4	51.2	55.2	53.9
B_2 (65 °Brix)	52.2	53.8	52.3	53.4	52.9	53.2	54.9	53.4	54.5	54.0	54.2	56.0	54.5	55.6	55.1
B_3 (70 °Brix)	50.1	52.6	53.9	51.2	52.0	51.2	53.7	55.0	52.3	53.1	52.3	54.8	56.1	53.4	54.1
Mean	51.1	53.5	51.8	52.5		52.1	54.6	52.9	53.6		53.1	55.7	53.9	54.7	
	S.Em	CD				S.Em	CD				S.Em	CD			
P (PULP)	0.17	0.49				0.17	0.50				0.17	0.51			
B (TSS)	0.15	0.42				0.15	0.43				0.15	0.44			
B (TSS) × P (PULP)	0.29	1.04				0.30	1.06				0.30	1.08			
Storage period	60 Days					90 Days									
Pulp / TSS	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean					
B_1 (60 °Brix)	53.7	57.4	52.0	56.2	54.8	55.0	58.8	53.4	57.5	56.2					
B_2 (65 °Brix)	55.1	56.9	55.5	56.5	56.0	56.4	58.4	56.8	57.9	57.4					
B_3 (70 °Brix)	53.3	55.7	57.1	54.3	55.1	54.6	57.1	58.5	55.7	56.5					
Mean	54.0	56.7	54.9	55.7		55.3	58.1	56.2	57.1						
	S.Em	CD				S.Em	CD								
P (PULP)	0.18	0.52				8.13	23.73								
B (TSS)	0.15	0.45				7.04	20.55								
B (TSS) × P (PULP)	0.31	1.10				14.0	50.33								

Table 4: The effect of different levels of pulp and TSS concentration on ascorbic acid (Mg/100g) of Guava syrup

Ascorbic acid (Mg/100g)															
Storage period	**0 Days**					**30 Days**					**45 Days**				
Pulp / TSS	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**	**P_1 (20%)**	**P_2 (25%)**	**P_3 (30%)**	**P_4 (35%)**	**Mean**
B_1 (60 °Brix)	127.7	131.1	125.9	129.4	128.5	125.5	128.6	123.8	126.9	126.2	124.1	127.1	122.6	125.5	124.8
B_2 (65 °Brix)	130.3	133.8	131.9	132.8	132.2	127.7	131.0	129.3	129.9	129.5	126.3	129.6	127.9	128.5	128.1
B_3 (70 °Brix)	129.1	131.8	132.9	130.2	131.0	126.7	129.2	130.1	127.7	128.4	125.3	127.8	128.8	126.3	127.0
Mean	129.0	132.2	130.2	130.8		126.6	129.6	127.7	128.2		125.2	128.1	126.4	126.8	
	S.Em	CD				S.Em	CD				S.Em	CD			
P (PULP)	7.52	22.55				0.25	0.74				0.15	0.44			
B (TSS)	7.02	22.05				0.18	0.55				0.10	0.30			
B (TSS) × P (PULP)	7.45	22.36				0.26	0.77				0.18	0.53			
Storage period	60 Days					90 Days									
Pulp / TSS	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean	P_1 (20%)	P_2 (25%)	P_3 (30%)	P_4 (35%)	Mean					
B_1 (60 °Brix)	123.0	125.8	121.4	124.3	123.6	121.5	124.1	119.9	122.7	122.1					
B_2 (65 °Brix)	125.0	128.2	126.6	127.2	126.8	123.3	126.3	124.8	125.4	125.0					
B_3 (70 °Brix)	124.1	126.5	127.4	125.0	125.8	122.4	124.7	125.6	123.2	124.0					
Mean	124.0	126.8	125.2	125.5		122.4	125.0	123.4	123.8						
	S.Em	CD				S.Em	CD								
P (PULP)	0.15	0.45				0.12	0.35								
B (TSS)	0.12	0.35				0.11	0.32								
B (TSS) × P (PULP)	0.16	0.48				0.19	0.58								

4. Conclusion

Taiwan Pink" concluded that both pulp and TSS levels significantly affected the biochemical parameters of guava syrup during 90 days of storage. Among all treatments, the combination of 25% pulp and 60–65°Brix TSS (particularly B1P2 and B2P2) consistently showed superior performance in retaining total soluble solids (69.10°Brix), reducing sugars (21.50%), total sugars (58.80%), ascorbic acid (up to 126.30 mg/100g), and pH (3.93). Higher pulp (30–35%) and TSS (70°Brix) levels led to increased titratable acidity and non-reducing sugars but accelerated the degradation of ascorbic acid and sensory attributes. Therefore, it is concluded that a formulation containing 25% pulp and 60–65°Brix TSS offers the best balance of nutritional stability and storage life, making it the most suitable combination for high-quality guava syrup production.

5. References

1. Ahmad S. Storage stability of guava nectar with different pulp and TSS levels. Int J Fruit Process. 2012;8(1):45-53.
2. Akbar M, Khan R, Shah P. Effect of guava pulp byproducts on antioxidant, viscosity, and TSS in beverages. J Food Innov. 2016;5(2):112-120.
3. Bijane A, Patil V, Sharma N. Stability study of guava syrup at varying pulp concentrations and acidity over 120 days. Asian J Food Sci. 2024;16(3):201-213.
4. Desai M, Shah K. Formulation and shelf-life study of guava nectar with 15% pulp. Food Preserv Sci. 2020;12(2):87-96.
5. Gupta A, Mehta R, Singh L. Biochemical changes in stored guava syrups. Int J Fruit Sci. 2017;17(4):305-317.
6. Kumar S, Sharma M. Value addition in tropical fruits: Focus on syrups and preserves. J Food Process Preserv. 2019;43(7):e13952.
7. Kumari P. Development and storage stability of guava-papaya nectar blend. J Trop Fruit Process. 2016;9(1):15-24.
8. Meena P, Singh R, Sharma T. Solute distribution in moderately pulped guava beverages. J Food Sci

Technol. 2019;58(5):1903-1911.
9. Mishra S, Pandey R, Singh A. Stability study of guava squash prepared at 18 °Brix. J Postharvest Technol. 2017;7(1):45-53.
10. Patel D, Sharma R. Physicochemical and sensory evaluation of mechanically extracted guava nectar. Int J Fruit Sci. 2021;13(2):76-84.
11. Patel R, Yadav S, Meena D. Shelf-life studies of guava-based ready-to-serve beverages. Indian J Hortic Sci. 2022;79(3):412-418.
12. Rani S, Kumar P. Effect of pulp level on storage stability of guava syrup. J Food Sci Nutr. 2015;9(1):48-55.
13. Rani V, Sharma M. Optimization of TSS in guava syrup with 25% pulp: A consumer acceptability study. J Beverage Technol. 2023;4(2):90-99.
14. Sahu J, Mishra K. Evaluation of L-49 guava pulp properties for nectar preparation. J Trop Fruit Res. 2024;17(1):14-23.
15. Sharma L, Gupta R, Choudhary A. Physical and sensory attributes of guava syrup at varying pulp levels. J Fruit Process. 2018;11(2):33-42.
16. Shukla V, Joshi P, Sethi N. Changes in physicochemical properties during storage of guava nectar. Int Food Qual J. 2022;15(3):151-160.
17. Verma N, Joshi K. Titrable acidity recommendations for processed guava products. Fruit Sci J. 2011;7(3):150-158.