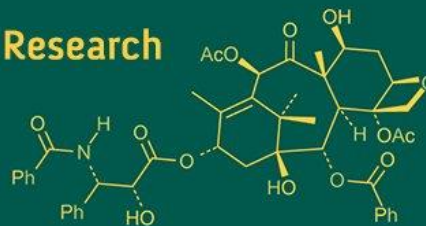


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Effect of blending ratio on sensory characteristics and storage stability of Guava based RTS

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Abstract

The present experiment carried out entitled "Effect of blending ratio on quality parameters and storage stability of Guava based RTS" was conducted at Post Harvest and Processing Laboratory, Department of Fruit Science, College of Horticulture and Research Station Sankara, Patan, Durg (C.G.). During 2025-26. Two different variety of Guava, first one Allahabad Safeda and another one is red diamond was carried out for preparation of blending RTS. The juice of guava, kinnow, and ginger were blend in different ratio to develop Blended RTS (ready-to-serve) this experiment was carried out in total eight treatment with three replications in Completely Randomized Design. The different types of recipes tasting the combination of guava, kinnow and ginger with different blending ratio. The result of guava blend with kinnow and ginger RTS was recorded that the T₈ (Red diamond 40% + kinnow 58% + 2% ginger) it was found better and superior than other treatment based on organoleptic analysis and overall sensory evaluation.

The results showed the variations among organoleptic properties. The maximum colour was recorded (7.74), appearance was recorded (7.80), Flavour/Aroma (7.91), Taste (7.88) and Overall acceptability was recorded (7.85), was recorded respectively.

Keywords: Guava, kinnow, ginger, RTS, sensory, blend, randomized

1. Introduction

The guava (*Psidium guajava* L.), a significant tropical fruit is prized for its flavour, fragrance and high nutritional content. Significant levels of vitamin C, carbohydrates, minerals, dietary fiber, and other beneficial chemicals can be found in the fruit. Juice, nectar, squash, jam, and ready-to-serve drinks are just a few of the value-added products that may be made from guava pulp which has significant processing potential. However, processing and preservation are crucial methods for lowering post-harvest losses and increasing its use because fresh guava is highly perishable. (Singh *et al.* 2019) [28]. The creation of blended drinks using guava can enhance the final product's nutritional value and sensory qualities

Kinnow (*Citrus reticulata* Blanco × *Citrus nobilis* Lour.) is a significant citrus fruit that is frequently used for juice processing and fresh consumption. Its beautiful color, zesty citrus flavour and significant vitamin C and other nutritionally significant chemical content are its defining characteristics. Kinnow juice can be blended with other fruit juices because of its distinct sweet-acidic flavour and nice scent. Kinnow juice can enhance the flavor, acidity, color and general palatability of guava-based drinks. (M.S. Ladaniya, 2008) Blending fruits with various physicochemical and sensory qualities offers a chance to create drinks that are more palatable to consumers.

Ginger has a number of bioactive compounds and elements, such as phenolics, terpenoids and volatile oils which contribute to its functional qualities. The main compound gingerol has antibacterial, anti-inflammatory and antioxidant capabilities. (Ali and others, 2008). Since it increases flavour variety and prolongs shelf life, ginger juice is essential to the creation of blended RTS beverages. From a sensory perspective ginger juice improves the flavour of several fruits and has a cool aftertaste making it a great mixing ingredient for RTS beverages. Sensory evaluation is crucial to the development and quality assessment of fruit-based beverages. A formulation's appropriateness can be directly determined by sensory attributes as color, appearance, flavor, taste, scent, and general acceptability.

A popular method for assessing how much a person likes or dislikes food items is the 9-point hedonic scale. (Gupta *et al.*, 2015) [11]. This scale allows the relative preference of various formulations to be measured, with sensory responses ranging from "dislike extremely" to "like extremely." The current study compared the various guava, kinnow, and ginger blending combinations using sensory evaluation to determine which composition had the highest level of consumer approval. The creation of a blended RTS beverage that incorporates the distinctive flavor of ginger can help increase value and make better use of guava and kinnow. Finding the right blending ratio could lead to a beverage with a desired sensory quality and increased customer acceptance. The significance of recipe standardization, blending ratios and organoleptic evaluation in the creation of guava and other fruit-based RTS beverages has also been documented in earlier research. Studies on guava RTS, blended fruit drinks and sensory evaluation are among the references in this file that offer pertinent scientific context for the current study. (Vikram *et al.*, 2014) [36]. The creation of such a blended RTS beverage may help increase value and make better use of guava and kinnow.

2. Material and Method Experimental site

The present investigation entitled "Effect of blending ratio on quality parameters and storage stability of Guava based RTS" was carried out in Post Harvest and Processing Laboratory, Department of Fruit Science, College of Horticulture and Research Station Sankara-Patan, Durg (C.G.) the year of 2025-26. One investigation examined the quality parameters and storage stability of guava blend kinnow and Ginger RTS (ready-to-serve) beverages.

Organoleptic Parameters of guava based RTS

Matured, firm fruits like guava, kinnow and ginger were purchased from local market and brought to Department Fruit Science, College of Horticulture and Research Station Sankara- Patan, Durg (C.G.). Matured, firm fruits were selected, sorted, graded and washed.

The sensory evaluation of guava blended with kinnow and ginger RTS beverage was carried out using a 9-point hedonic scale to assess the sensory acceptability of the developed beverages. A panel of judges evaluated the different treatment combinations based on important sensory attributes such as colour and appearance, aroma, taste, flavour, mouthfeel and overall acceptability. Each attribute was scored on a 9-point hedonic scale, ranging from 1 = "dislike extremely" to 9 = "like extremely" in 10 days interval of storage period during 0-30 days. The judges' scores were collected for each treatment and replication, and the mean sensory scores were calculated to determine the relative acceptability of the different treatment combinations. The treatment receiving the highest overall acceptability score was considered the most preferred formulation.

Rate Organoleptic score

Like extremely	9
Like very much	8
Like moderately	7
Like slightly	6
Neither like nor dislike	5
Dislike slightly	4
Dislike moderately	3
Dislike very much	2
Dislike extremely	1

Treatment Details

Table 1: Treatment details

Treatment	Treatment Combination
T1	Allahabad Safeda Guava 100% + Ginger 2%
T2	Allahabad Safeda Guava 80% + Kinnow 18% + Ginger 2%
T3	Allahabad Safeda Guava 60% + Kinnow 38% + Ginger 2%
T4	Allahabad Safeda Guava 40% + Kinnow 58% + Ginger 2%
T5	Red Diamond Guava 100% + Ginger 2%
T6	Red Diamond Guava 80% + Kinnow 18% + Ginger 2%
T7	Red Diamond Guava 60% + Kinnow 38% + Ginger 2%
T8	Red Diamond Guava 40% + Kinnow 58% + Ginger 2%

Preparation of Guava Blend with Kinnow and ginger RTS

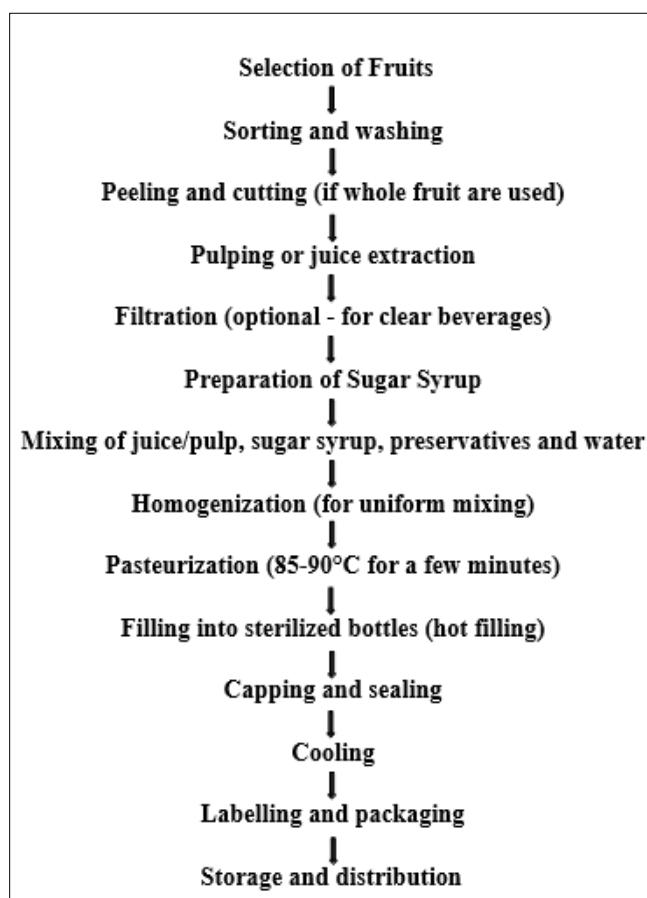


Fig 1: Guava blend with kinnow and ginger RTS flow chart

Results and Discussion

The results revealed that the sensory characteristics of blended RTS prepared from guava, kinnow and ginger of had following performance.

Sensory evaluation of guava based RTS 1.Colour

The highest colour (7.46, 7.60, 7.70, 7.74) at 0, 10, 20 and 30 days respectively was observed in T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%). Whereas the lowest colour (5.43, 5.46, 5.55, 5.65) was observed in T5 (Red Diamond Guava 100% + Ginger 2%) during periods of storage 0, 10, 20 and 30 days.

2. Appearance

The highest appearance (7.58, 7.60, 7.65, 7.80) at 0, 10, 20 and 30 days respectively was observed in T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%). Whereas the lowest appearance (5.42, 5.53, 5.61, 5.67) was observed in T5 (Red Diamond Guava 100% + Ginger 2%) during periods of storage 0, 10, 20 and 30 days.

3. Flavour/Aroma

The highest Flavour/Aroma (7.91, 7.73, 7.56, 7.50) at 0, 10, 20 and 30 days respectively was observed in T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%). Whereas the lowest a Flavour/Aroma (5.71, 5.60, 5.58, 5.45) was observed in T1 (Allahabad Safeda Guava 100% + Ginger 2%) during periods of storage 0, 10, 20 and 30 days.

4. Taste

The highest Taste (7.88, 7.77, 7.55, 7.53) at 0, 10, 20 and 30 days respectively was observed in T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%). Whereas the lowest a Taste (5.76, 5.71, 5.49, 5.33) was observed in T1 (Allahabad Safeda Guava 100% + Ginger 2%) during periods of storage 0, 10, 20 and 30 days.

5. Overall acceptability

The highest Overall acceptability (7.85, 7.78, 7.74, 7.57) at 0, 10, 20 and 30 days respectively was observed in T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%). Whereas the lowest Overall acceptability (5.77, 5.33, 5.29, 5.23) was observed in T5 (Red Diamond Guava 100% + Ginger 2%) during periods of storage 0, 10, 20 and 30 days.

Sensory evaluation of Guava-Based RTS

Table 2: Effect of various treatment combination on Colour of blended RTS prepared from guava, kinnow and ginger

Treatment	0 days	10 days	20 days	30 days
T1	5.47	5.52	5.59	5.71
T2	6.40	6.57	6.61	6.65
T3	7.44	7.50	7.64	7.66
T4	7.47	7.52	7.65	7.71
T5	5.43	5.46	5.55	5.65
T6	6.45	6.61	6.65	6.68
T7	7.44	7.55	7.63	7.70
T8	7.46	7.60	7.70	7.74
C.D.	0.42	0.51	0.52	0.32
S.E(m)	0.14	0.17	0.17	0.10

Table 3: Effect of various treatment combination on Appearance of blended RTS prepared from guava, kinnow and ginger

Treatment	0 days	10 days	20 days	30 days
T1	5.52	5.57	5.64	5.69
T2	6.49	6.57	6.59	6.71
T3	7.40	7.56	7.61	7.65
T4	7.44	7.58	7.64	7.74
T5	5.42	5.53	5.61	5.67
T6	6.44	6.56	6.64	6.67
T7	7.51	7.58	7.61	7.65
T8	7.58	7.60	7.65	7.80
C.D.	0.38	0.36	0.34	0.28
S.E(m)	0.12	0.11	0.11	0.09

Table 4: Effect of various treatment combination on flavour/aroma of blended RTS prepared from guava, kinnow and ginger

Treatment	0 days	10 days	20 days	30 days
T1	5.71	5.60	5.58	5.45
T2	6.82	6.62	6.41	6.35
T3	7.80	7.71	7.53	7.35
T4	7.85	7.61	7.55	7.47
T5	5.76	5.67	5.61	5.48
T6	6.75	6.65	6.48	6.45
T7	7.86	7.59	7.55	7.37
T8	7.91	7.73	7.56	7.50
C.D.	0.18	0.30	0.28	0.24
S.E(m)	0.06	0.09	0.09	0.08

Table 5: Effect of various treatment combination on Taste of blended RTS prepared from guava, kinnow and ginger

Treatment	0 days	10 days	20 days	30 days
T1	5.76	5.71	5.49	5.33
T2	6.77	6.72	6.54	6.33
T3	7.86	7.75	7.54	7.51
T4	7.67	7.52	7.47	7.31
T5	5.77	5.74	5.56	5.50
T6	6.81	6.63	6.47	6.44
T7	7.52	7.51	7.49	7.48
T8	7.88	7.77	7.55	7.53
C.D.	1.03	0.33	0.34	0.30
S.E(m)	0.31	0.11	0.11	0.10

Table 6: Effect of various treatment combination on overall acceptability of blended RTS prepared from guava, kinnow and ginger

Treatment	0 days	10 days	20 days	30 days
T1	5.79	5.63	5.56	5.36
T2	6.82	6.72	6.58	6.41
T3	7.76	7.68	7.54	7.51
T4	7.79	7.77	7.68	7.53
T5	5.77	5.33	5.29	5.23
T6	6.83	6.75	6.47	6.46
T7	7.73	7.72	7.52	7.39
T8	7.85	7.78	7.74	7.57
C.D.	0.26	0.45	0.39	0.40
S.E(m)	0.08	0.15	0.13	0.13

Discussion

The present investigation was conducted to evaluate the effect of different blending ratios of guava, kinnow and ginger on the sensory characteristics and storage stability of guava-based ready-to-serve (RTS) beverage. Eight treatment combinations comprising two guava varieties, Allahabad Safeda and Red Diamond, blended with different proportions of kinnow and 2% ginger were evaluated using a 9-point hedonic scale. The sensory attributes studied were colour, appearance, flavour/aroma, taste and overall acceptability. The sensory scores indicated considerable variation among the different treatment combinations, demonstrating that the proportion of guava and kinnow had an important influence on the acceptability of the developed RTS beverage.

Colour

The colour scores of the RTS beverages showed variation among treatments during storage. Treatment T8 (Red Diamond guava 40% + kinnow 58% + ginger 2%) recorded the highest colour scores of (7.46, 7.60, 7.70 and 7.74) at 0, 10, 20 and 30 days of storage, respectively. In contrast, T5

(Red Diamond guava 100% + ginger 2%) recorded the lowest scores of (5.43, 5.46, 5.55 and 5.65) during the corresponding storage periods. The higher colour score of T8 may be attributed to the combined contribution of Red Diamond guava and the higher proportion of kinnow juice, which produced a more attractive and appealing colour in the beverage. The gradual increase in colour scores during storage suggests that the visual appearance of the beverage remained acceptable throughout the storage period. Similar treatment-wise variation is evident from the sensory data presented in Table 2.

Appearance

The appearance scores also differed among the treatments. T8 showed the highest appearance scores of (7.58, 7.60, 7.65 and 7.80) at 0, 10, 20 and 30 days, respectively. The lowest appearance scores were recorded in T5, with values of (5.42, 5.53, 5.61 and 5.67). The superior appearance of T8 may be related to the attractive colour and balanced blending ratio of Red Diamond guava with kinnow and ginger. The increasing appearance scores during storage indicate that the beverage maintained a favourable visual quality throughout the 0-30 day storage period.

Flavour/Aroma

Flavour and aroma were strongly influenced by the blending ratio. T8 recorded the highest flavour/aroma scores at the beginning and throughout storage, with scores of (7.91, 7.73, 7.56 and 7.50) at 0, 10, 20 and 30 days, respectively. The lowest scores were recorded by T1 (Allahabad Safeda guava 100% + ginger 2%), with values of (5.71, 5.60, 5.58 and 5.45). The higher flavour/aroma score of T8 may be associated with the greater proportion of kinnow, which contributed a characteristic citrus aroma and flavour, while the 2% ginger provided a desirable aromatic note. The gradual decline in flavour/aroma scores with increasing storage period may be due to the reduction or alteration of volatile flavour compounds during storage. Nevertheless, T8 retained comparatively higher flavour/aroma acceptability even after 30 days.

Taste

Taste scores showed that the blending ratio considerably affected the palatability of the RTS beverage. T8 recorded the highest taste scores of (7.88, 7.77, 7.55 and 7.53) at 0, 10, 20 and 30 days, respectively. T1 recorded the lowest taste scores of (5.76, 5.71, 5.49 and 5.33). The superior taste of T8 may be attributed to the balanced combination of Red Diamond guava, kinnow and ginger, in which the citrus character of kinnow complemented the flavour of guava and the ginger contributed a distinctive taste. The gradual decrease in taste scores during storage indicates a slight deterioration in sensory quality over time, but T8 continued to maintain the highest acceptability among the treatments.

Overall Acceptability

Overall acceptability is an important criterion for determining the consumer preference of a developed beverage because it represents the combined response to different sensory attributes. T8 recorded the highest overall acceptability scores of (7.85, 7.78, 7.74 and 7.57) at 0, 10, 20 and 30 days, respectively. The lowest overall acceptability was observed in T5, with scores of (5.77, 5.33, 5.29 and 5.23). The consistently superior performance of T8

indicates that the formulation containing 40% Red Diamond guava, 58% kinnow and 2% ginger provided a better sensory balance than the other formulations. Although a slight decline in overall acceptability was observed during storage, T8 remained the most preferred treatment throughout the 30-day storage period.

Overall, the sensory evaluation demonstrated that increasing the proportion of kinnow in combination with Red Diamond guava generally improved the colour, appearance, flavour/aroma, taste and overall acceptability of the RTS beverage. Among all treatments, T8 consistently performed better for most sensory characteristics and maintained superior overall acceptability during storage. The results indicate that an appropriate blending ratio is important for obtaining a balanced sensory quality in guava-based RTS beverages.

Conclusion

Among the treatments studied, T8 (Red Diamond Guava 40% + Kinnow 58% + Ginger 2%) were found to be the superior treatments. These treatments recorded better sensory quality and greater storage stability compared to the other treatments. The higher proportion of kinnow juice enhanced flavour, colour and vitamin C content, while ginger imparted a pleasant aroma and characteristic taste. Furthermore, the use of Red Diamond guava in T8 contributed attractive natural colour and improved consumer appeal and exhibited excellent overall quality characteristics among Red Diamond -based blends.

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