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## Analysis of sensory attributes of giloy and guava based ready-to-serve beverage

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### Abstract

Giloy (*Tinospora cordifolia*) is an herbal nutraceutical being used since ancient times for its medicinal value. The present study was conducted to formulate the giloy based guava Ready-To-Serve Beverage so as to imbibe the nutritional properties of both giloy and guava and provide a delectable healthy drink to the consumers. The aim was to reduce the post-harvest losses of guava fruit by utilizing it into manufacturing of different products like Ready-to-Serve (RTS) Beverage. Experimental treatments taken for the analysis were T<sub>0</sub> (Control), T<sub>1</sub> (3% giloy juice), T<sub>2</sub> (5% giloy juice), T<sub>3</sub> (7% giloy juice) and T<sub>4</sub> (9% giloy juice). The treatments were subjected to sensory evaluation and the mean sensory scores of the following parameters color and appearance, taste, texture, mouthfeel and overall acceptability for the treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were in the range of 6.5 to 8.0, 6.3 to 8.2, 6.9 to 7.9, 6.7 to 7.7 and 6.9 to 8.0 respectively. The sensory analysis revealed that the treatment T<sub>2</sub> with 5% giloy juice incorporated into the guava RTS beverage was satisfactorily more palatable than as compared to other variants.

**Keywords:** Giloy, guava, RTS, beverage, sensory, medicinal

### Introduction

Increasing health concerns and the desire to adopt a healthy lifestyle have emerged as the primary objectives for consumers. The fruit based RTS beverages serve as a nutritive and tasty substitution to the junk food. Guava is one of a nutritious cheap fruit belonging to Myrtaceae family occurring in tropical and sub-tropical parts of the world [3]. The fruit has a high medicinal value as it contains abundant of nutrients including vitamin A & C, folic acid, Niacin, Pantothenic acid, Thiamine, Riboflavin and minerals like potassium, copper, magnesium phosphorous, calcium and iron [5]. It is also rich in pectin, tannins, phenols, terpenes flavonoids, essential oils, saponins, carotenoids, fibres and fatty acids [2]. Polyphenols and Ascorbic acid impart the antioxidant properties that offer protection from the health-degenerative diseases [9]. The post-harvest losses in guava occur about 22% which is due to low shelf life of guava fruit for around 1 week as it has high moisture content which makes it necessary to process the guava fruit into different products like Squash, jam, jellies, RTS beverages etc. to minimize the post-harvest losses and also to utilize the nutritive properties of guava [3].

Giloy (*Tinospora Cordifolia*) is a herb belonging to family Menispermaceae whose consumption has been prevalent since ancient times in Ayurveda due to its medicinal properties [7]. It contains various active compounds like diterpenoid, lactones, aliphatics, steroids, glycosides, alkaloids like bitter gilonin, ammonium salt, non-glycoside gilonin, gilos6terol and essential oils, sesquiterpenoid, mixture of fatty acids, aliphatic compound, polysaccharides which impart antioxidant, antidiabetic, anti-inflammatory, anti-periodic, anti-malarial, anti-allergic, hepatoprotective, anti-spasmodic, anti-leprotic, anti-stress, anti-neoplastic, immune modulatory and anti-arthritis properties [11]. Although the stem has bitter taste but its consumption can cure jaundice and respiratory tract infections [13].

The present study was conducted to utilize the nutritional and medicinal properties of both giloy and guava fruit to formulate a Ready-to-Serve beverage that could be a healthy substitute for junk.

### Material and Methods

#### Preparation of Giloy juice

Fresh giloy stems were procured, cleaned, washed, sorted, peeled and then cut into pieces. The cut pieces were then passed through mixer along with water for extraction of juice. Straining

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through muslin cloth was performed to get the clear giloy juice. The method given by Kamraan and Masih<sup>[6]</sup> was followed for obtaining giloy juice.

### Preparation of guava juice

Fresh guava fruits were collected from a local market, washed and cleaned to remove the impurities. The fruits were cut into small pieces and passed through a mixer to obtain pulp which was strained through a muslin cloth to remove seeds. Guava pulp was then mixed with sugar (10% TSS) and water at appropriate concentration as per the method given by Manjusha<sup>[8]</sup> for the preparation of guava RTS beverage.

### Preparation of RTS beverages

The RTS beverage was prepared by the method given by Kamraan and Masih<sup>[6]</sup>. The giloy juice was blended with guava juice at different concentrations for standardization of recipe as shown in Table 1. The sugar syrup was prepared by mixing sugar, citric acid and water at appropriate concentration and boiling the syrup then letting it cool down for few minutes. The syrup was then mixed with the juice, filtered, bottled, pasteurized, cooled and stored.

The five replicates of formulated RTS beverages were prepared and using a 9-point hedonic scale sensory evaluation was performed by panel members to judge the overall acceptability of the RTS in terms of color and appearance, taste, texture and mouthfeel as used by Sood and Shilpa<sup>[13]</sup>. The data was analyzed with of Analysis of Variance (ANOVA) technique and comparisons were made among the variants using critical difference at 5%.

## Results and Discussion

**Table 1:** Different variants of giloy juice incorporated into guava RTS

S. No.	Variants	Guava and Giloy juice based RTS blends
1	T <sub>0</sub>	Control (Guava RTS without the addition of giloy juice)
2.	T <sub>1</sub>	3% giloy juice incorporated to guava RTS
3.	T <sub>2</sub>	5% giloy juice incorporated to guava RTS
4.	T <sub>3</sub>	7% giloy juice incorporated to guava RTS
5.	T <sub>4</sub>	9% giloy juice incorporated to guava RTS

**Table 2:** Sensory Evaluation of giloy juice incorporated into Guava RTS beverage

Treatments	Sensory characteristics				Overall acceptability
	Color and Appearance	Taste	Texture	Mouthfeel	
T <sub>0</sub> (0%)	8.0	7.8	7.7	7.6	7.7
T <sub>1</sub> (3%)	8.0	7.5	7.8	7.4	7.9
T <sub>2</sub> (5%)	7.9	8.2	7.9	7.7	8.0
T <sub>3</sub> (7%)	7.4	7.3	7.6	6.8	7.0
T <sub>4</sub> (9%)	6.5	6.3	6.9	6.7	6.9

### Color and Appearance

The mean sensory scores of Color and appearance for different treatments T<sub>0</sub> (0%), T<sub>1</sub> (3%), T<sub>2</sub> (5%), T<sub>3</sub> (7%), and T<sub>4</sub> (9%) were 8.0, 8.0, 7.9, 7.4, and 6.5 respectively (Table 2). The sample T<sub>1</sub> with 3% giloy juice scored the highest and was similar with the scores of the guava RTS without the addition of giloy juice (T<sub>0</sub>) while the sample T<sub>4</sub> scored the least among other samples. This might be due to intensification of color with increase in concentration of giloy. A significant variation ( $p < 0.05$ ) was found among the treatments. The

sensory scores decreased with increase in proportion of giloy in guava RTS. Kamraan and Masih<sup>[6]</sup> formulated RTS beverage by incorporating different levels of wheat grass, giloy and pomegranate juice. The treatment with 5% giloy juice was found to have a more favourable color score on subjecting to sensory evaluation than as compared to other treatments with 3%, 7%, 9% giloy juice and a control sample without the addition of without the addition of giloy juice. Sood and Shilpa<sup>[13]</sup> also formulated giloy incorporated Kinnow based RTS and the sensory scores revealed the color of treatment 25:75 (Giloy: Kinnow) to be more preferable than other variants.

### Taste

The mean sensory scores of taste for different treatments T<sub>0</sub> (0%), T<sub>1</sub> (3%), T<sub>2</sub> (5%), T<sub>3</sub> (7%), and T<sub>4</sub> (9%) were 7.8, 7.5, 8.2, 7.3, and 6.3 respectively (Table 2). The sample T<sub>2</sub> with 5% giloy juice scored the highest in color in comparison to other variants. There was a significant difference ( $p < 0.05$ ) among the variants. The scores for taste decreased with increase in concentration of giloy juice in guava RTS. This might be due to increase in bitterness of giloy with its increase in concentration<sup>[6]</sup>. Sonker<sup>[12]</sup> formulated pineapple RTS beverage with giloy and amla. The results revealed that the RTS with lesser proportion of giloy to be more liked by the panel members than as compared to more proportions. The taste decreased with increase in concentrations of giloy. Similarly the treatment 5% giloy juice incorporated into the pomegranate RTS beverage by Kamraan and Masih<sup>[6]</sup> was found to be more palatable than as compared to other treatments.

### Texture

The mean sensory scores of texture for different treatments T<sub>0</sub> (0%), T<sub>1</sub> (3%), T<sub>2</sub> (5%), T<sub>3</sub> (7%), and T<sub>4</sub> (9%) were 7.7, 7.8, 7.9, 7.6, and 6.9 respectively (Table 2). The texture of treatment T<sub>2</sub> with 3% giloy juice was found to be more liked in comparison to the other treatments. The scores revealed a significant variation ( $p < 0.05$ ). The sensory scores for texture decreased with increase in concentration of giloy in the guava RTS. Sood and Shilpa<sup>[13]</sup> also reported the sensory quality of giloy kinnow based RTS with different concentrations of giloy and results showed that consistency of the drink was better with less proportion of giloy than as compared to higher proportion of giloy in kinnow RTS.

### Mouthfeel

The sensory scores for the parameter mouthfeel of the RTS formulated ranged from 7.6, 7.4, 7.7, 6.8 and 6.7 for the samples T<sub>0</sub> (0%), T<sub>1</sub> (3%), T<sub>2</sub> (5%), T<sub>3</sub> (7%), and T<sub>4</sub> (9%) respectively. The most acceptable mouthfeel was for treatment T<sub>2</sub> with 5% giloy incorporated in the guava RTS while the treatment T<sub>3</sub> with 3% giloy scored the least. The sensory scores for mouthfeel decreased with increase in proportion of giloy in the guava RTS. Sood<sup>[14]</sup> also performed the sensory analysis of dietetic and sugar based giloy beverage and the results revealed a good score of consistency and taste for different treatments.

### Overall Acceptability

The mean sensory scores for the overall acceptability of the different treatments T<sub>0</sub> (0%), T<sub>1</sub> (3%), T<sub>2</sub> (5%), T<sub>3</sub> (7%), and T<sub>4</sub> (9%) were 7.7, 7.9, 8.0, 7.0 and 6.9 respectively (Table 2). The treatment T<sub>2</sub> with 5% giloy incorporated into the guava RTS was the most acceptable formulation in comparison to

other treatments. The overall acceptability decreased with increase in proportion of giloy juice incorporated in the RTS. The results were in accordance with the findings of Kamraan and Masih<sup>[6]</sup> in giloy and pomegranate juice formulation, Sood and Shilpa<sup>[13]</sup> in giloy Kinnow based RTS and Chauhan<sup>[4]</sup> in basil and giloy based RTS beverage.

### Conclusion

The present study was conducted to prepare a guava Ready-To-Serve Beverage incorporated with the giloy for the consumers as an healthy substitute to the snack foods. The study revealed that the organoleptic properties of the guava Ready-To-Serve Beverage were enhanced and the guava RTS with 5% incorporation of giloy was the utmost favorable and palatable. Therefore for preparation of the giloy based guava RTS, the 5% proportion of giloy is satisfactorily more desirable to incorporate in the drink.

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