



Research article

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Studies on the Nutritional Evaluation of Dietetic and Sugar Based Giloy (*Tinospora Cordifolia*) Beverage

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Abstract

Giloye stem (*Tinospora cordifolia*) is known for its anti-oxidant and therapeutic values. Since the consumers, trend is towards the natural health drinks rather than chemical based soft drinks which provide only empty calories. Therefore, an effort was made to prepare some health drinks out of Giloye viz. RTS, Squash and Syrup. The products were further blended other locally available herbal species like mint, tulsi and ginger. The prepared products were assessed for quality parameters and storage stability was also assessed. The products remained fit up to 6 months. The values for per cent acidity were found to decrease from 1.40 to 1.08 in RTS; 2.71 to 2.39 in squash and 2.21 to 1.72 in syrup. Ascorbic acid content also decreased with storage in the respective samples. Whereas. Non-reducing sugar content increased from 7.07 to 8.61 per cent in RTS; 19.81 to 21.19 per cent in squash and 32.18 to 30.19 per cent in syrup. The beverages were also assessed for consumer's acceptability.

Introduction

Giloy (*Tinospora cordifolia*) the herb belongs to the *Menispermaceae* family and is commonly known as Gulancha or Tinosporain English and Giloya or Ambervel in Hindi. It has a long history of use in Ayurvedic medicine (the traditional medicine of India). A large, glabrous deciduous climbing shrub. The stems are rather succulent with long filiform fleshy aerial roots form the branches. The bark is gray brown and watery. The leaves are membranous and cordate with flowers small and greenish yellow in color. This herb is found throughout tropical Asia ascending to a height of 300mts. Giloy or Amrita carries anti-inflammatory and antipyretic properties and has been used in Ayurvedic rasayanas since centuries which are very helpful in building up the immune system and the body's confrontation against definite infecting organisms. Evidence hints that *Tinospora* may have anti-cancer [1], immune stimulating [2], anti-diabetic [3], cholesterol lowering [4] and liver protective [5] actions. *T. cordifolia* has also shown some promising speed in healing the diabetic foot ulcers Purandare & Supe (2007). In a scientific study conducted using human WBC (white blood corpuscles), the Ayurvedic herb helps in increasing the killing ability of macrophages, the resistant cells those are accountable for fighting foreign materials as well as microorganisms.

Therefore, Giloy is very useful for the health conscious people. In the present work an effort was made to prepare dietetic beverage using stevia as a source of sweetening agent and compare it objectively as well as subjectively with normal sugar based sample. This will enable the consumers to use in a normal routine.

Materials and Methods

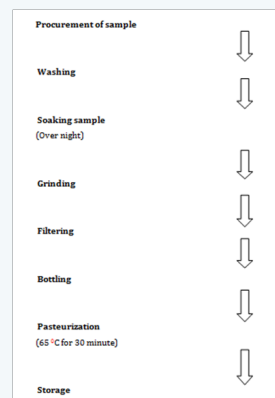


Figure 1: Unit operations for the extraction of juice.

Giloy was procured from the local villages. The stems were cleaned, washed properly to remove any dust and debris. The juice was extracted as explained under (Figure 1).

The stored juice was used for the preparation of value added products as per FSSAI specification. Simultaneously beverages are prepared by using following treatments

- A. S₁: sugar based
- B. S₂: stevia extract
- C. T₀: ginger based
- D. T₁: mint based
- E. T₂: Tulsi based

The raw as well as prepared samples were evaluated for chemical/nutritional and organoleptic evaluation by using standard techniques.

Chemical and nutritional evaluation

The proximate composition is done by using standard methods as prescribed by [6] whereas; ADF and NDF were estimated by the method given by Soest & Wine (1967). The various nutritional parameters viz. pH, TSS, Per cent acidity, Ascorbic acid, Minerals and Sugars were estimated by following the methods given by [7].

Organoleptic evaluation

The organoleptic evaluation was done as per method suggested by Gould (1978). The sensory attributes like colour, flavor, taste, consistency and over all acceptability of the products were evaluated. A minimum of 10 judges were selected at random. The judges were required to record their preferences and acceptability of products on the evaluation sheets.

Results and Discussion

Quality evaluation was affirmed on the basis of chemical analysis of various parameters viz. moisture, protein, fat, ash and fiber contents. Since proximate composition gives the useful information regarding the nutritional quality of the food. The data pertaining to proximate composition of Giloy (*Tinospora cordifolia*) is presented in Table 1.

Table 1: Proximate composition of Giloy.

Parameters (%)	Giloy
Moisture	17.69
Protein	4.13
Fat	3.12
Ash	12.01
Fiber	16.19
NDF	37.9
ADF	34.65

As is evident from the table the values for different constituents in Giloy are estimated as 17.69 per cent for moisture, 4.13 per cent protein, 3.12 per cent for fat, 12.01 per cent ash, 16.19 percent fibre, 37.90 per cent NDF and 34.65 per cent ADF [8] observed proximate composition as ash (12.41%), moisture (18.34%), crude fat (3.10%), crude protein (4.50%) and crude fiber (15.90%) of Giloy. The values observed in the present study were pretty close to the results obtained by other workers. The little bit variations might be due to agro-climatic conditions.

The prepared products were then analyzed for their nutritional components as follows:

pH

Table shows the results pertaining to the values of pH of RTS. The values of pH varied significantly with treatments i.e. 3.16, 5.12 and 5.40 for S₁ and 3.18, 5.14 and 5.24 for S₂ whereas varied non-significantly with the source of sweetener (S₁ and S₂).

TSS

Table 2 shows the results pertaining to TSS of RTS beverage. TSS was observed as 14.11, 13.58, 14.76 in S₁ and 5.02, 4.11 and 4.26 in S₂ for T₁, T₂ and T₃ respectively.

Acidity (%)

Results related to the values of acidity are shown in Table 2. The values differ with treatments both in sugar and stevia extract added RTS. The values were 0.35 for S₁ and 0.33 per cent for S₂.

Table 2: Nutritional Evaluation of Giloy Beverage.

	pH		TSS		Acidity (%)		Ascorbic acid(mg/100)		Total sugars (%)		Reducing Sugars (%)		Non-reducing sugars (%)	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
T ₀	3.16	3.18	14.11	5.02	0.28	0.34	3.71	3.54	12.09	4.98	4.72	0.1	7.34	4.86
T ₁	5.12	5.14	13.58	4.11	0.39	0.32	4.91	5.02	12.42	4.05	4.85	0.13	7.55	3.91
T ₂	5.4	5.24	14.76	4.26	0.37	0.33	4.69	4.75	12.12	4.07	4.8	0.14	7.31	3.92
Mean	4.56	4.52	14.15	4.46	0.35	0.33	4.44	4.44	12.21	4.37	4.79	0.12	7.4	4.23

Ascorbic acid (mg/100g)

The results presented in the same Table shows the values of ascorbic acid. The values with treatments and varied non-significantly in case of source of sweeteners. The average value was 4.44 mg/100g in both the cases.

Reducing sugars (%)

Table 2 shows the results for values of reducing sugars. The values varied with treatments and varied with source of sweetening i.e. 4.79 and 0.12 per cent.

Total sugars (%)

Table 2 shows the results for total sugars of Giloy RTS. The values varied in treatments of sugar based RTS and in stevia extract treated beverage with storage. The mean values were 12.21 and 4.31 per cent.

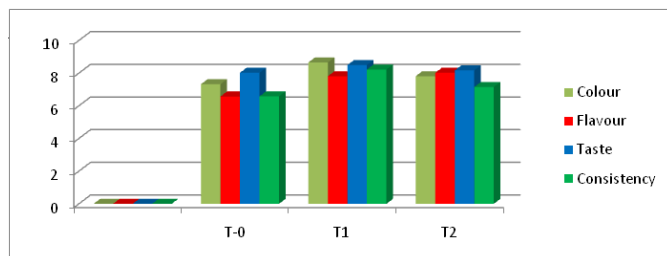
Non-reducing sugars (%)

From the Table 2 it is evident that the values of non-reducing sugars of RTS beverage. The values varied with treatments i.e. 7.34, 7.55 and 7.31 for T₀, T₁ and T₂, in S₁ and 4.86, 3.91, 3.92 for T₀, T₁ and T₂ in S₂ respectively.

Organoleptic evaluation

The products were assessed for subjective evaluation involving color, flavor, taste and consistency of the prepared product and the results are presented in the Table 3.

Table 3: Organoleptic Evaluation of Giloy Beverage



Color

Table 3 shows the results of organoleptic evaluation of RTS beverage. Color scores are shown in Table. The scores for color varied with treatments and also with the sweetener medium. The scores for color were 7.93 in S₁ and 7.90 in S₂.

Flavor

Table 3 shows the scores for flavor of RTS beverage. The scores varied with treatments both in sugar based and stevia

extract based RTS i.e. 6.57, 7.81 and 8.02 for T₀, T₁ and T₂ in S₁ and 6.97, 8.02 and 8.15 for T₀, T₁ and T₂ in S₂.

Consistency

Table 3 shows the values of consistency of RTS beverage. The values varied with treatments both in case of sugar based and stevia extract based RTS. The values were 7.32 and 7.48 for S₁ and S₂.

Taste

Table 3 shows the values of taste of RTS beverage. The score for taste were 8.23 for S₁ and 8.16 for S₂.

Summary

In the present work an effort was made to prepare some ready to serve beverages from Giloy for the health conscious people. It was observed that the prepared products have great nutritional value and was organoleptically acceptable to the consumers. Therefore, it can be concluded that the Giloy which is known for its medicinal value can also be used for the preparation of products that are ready to eat and healthy too.

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