

Original Research Article

Development and Evaluation of Ready to Serve Beverage (RTS) from blend of Awala, Aloe-Vera, Mint and Ginger

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ABSTRACT

The demand of Health beverage is growing up and therapeutic beverage sector has been reported to be the fastest growing segment in the soft drink industry. The functional properties and therapeutic benefits of Amla, Aloe-Vera, ginger and Mint are known worldwide. Keeping this in view, an attempt was made to prepare a therapeutic ready- to – serve drink (RTS) from Amla, aloe vera, ginger and mint juice. Varied ratio of Amla; aloe vera: Ginger: Mint in the formulated drink (100: 0: 0: 0), (50: 50: 0: 0), (50: 40: 5: 0) and (35: 40: 20: 5) were used for control, T₁, T₂ and T₃, respectively. The products were subjected to standard physico-chemical, sensory and microbial analysis and accordingly variant T₃ was found to be the most preferred with respect to taste, aroma and overall acceptability. All RTS beverages were found to be good source of Vitamin C. Microbial analysis of the RTS during storage period up to 60 days revealed that it was free from any spoilage.

Keywords

RTS, Awala, Aloe vera, ginger, mint

Introduction

Ready to serve drink is popular among every age group because of their refreshing nature and taste. In recent years, there has been a growing interest in using herbal products as dietary adjuncts in the Food Industry.

Functional beverages are one of its kinds which are tapping into consumer interest in health and wellness. People are now more health conscious and they want all good benefits in one drink. The demand for soft drinks always has an increasing trend and there is a great scope for development of value added beverages by utilizing nutritious food with medicinal properties. Therapeutic beverage sector has been reported to be the fastest growing segment in the soft drink industry sector. (Roberts, 2009)

Awala (*Emlica officinals*) is a subtropical deciduous tree indigenous to Indian sub-continent. It is also known as Indian Gooseberry and has both nutritive and medicinal properties. It is very rich in Vitamin – C (500-1500 mg of ascorbic acid per 100g) (Chauhan *et al.*, 2005). It has also been found to be rich in phenols and tannins such as elegiac acid and gallic acid that prevent the oxidation of vitamin C. The medicinal properties of Awala against several ailments like tuberculosis, asthma, bronchitis, scurvy, diabetes, anaemia, weakness of memory, cancer, influenza are well known. However, its juice is acidic and astringent in nature which has negative impact on its palatability if consumed fresh (Goyal *et al.*, 2008).

The functional properties and therapeutic benefits of *Aloe Vera* are known worldwide. It is a source of active substances including vitamins, minerals, enzymes, sugar, anthraquinones of phenolic compounds, lignin, saponins, sterols, amino acids and salicylic acid. The polysaccharides found in *Aloe vera* have been considered to the active ingredients for Aloe's anti-inflammation and immune modulation effects (Pugh *et al.*, 2001). Its gel is transparent slippery mucilage containing bioactive polysaccharides mainly partially acetylated glucomannans. Besides, it is also a good source of vital nutrients (Rodriguez *et al.*, 2010). That's why the Aloe industry is flourishing and the gel is used in many products such as fresh gel, juice and other formulations for health, medical and cosmetic purpose (Enward and Benward, 2000)

Ginger (*Zingiber officinale* Rosc.) is valued as a spice for ages and is also known for its medicinal properties such as to treat in rheumatoid arthritis, ulcer, preventing heart attack and stroke. Ginger is an aromatic tuber crop having volatile oils that account for the aroma of the tubers (Kikuzaki *et al.*, 1971). Not only this, the use of ginger as antiviral, anti-cancer and anti-ulcerogenic drug has been widely accepted.

The use of Mint is gaining momentum not only because of its use for aroma and flavour characteristics, but also because of its potential health benefit (Chawla and Thakur, 2013). Mint has been reported to have pharmacological effect such as antimicrobial, anti-inflammatory, antispasmodic, antitusive, anticancer and analgesic. It contains minerals like calcium, potassium, sodium, magnesium, phosphorus and iron, as well as Vitamin A, C, K, folic acid, thiamine, riboflavin and niacin (Raghavan, 2006).

The development of novel RTS blends is required for meeting the demands of the consumers and also for the growth of food processing industry. A beverage prepared by blending of fruits, vegetables and products from medicinal plants is an emerging sector in food industry.

The blending of two or more juices helps in utilization of astringent and acidic fruits like Awala, blending of Awala based RTS drinks with other medicinal plants like Aloe-Vera, ginger and mint may be an excellent way to deliver those therapeutic benefits of Awala to the consumers.

Keeping this in view, the present investigation was undertaken to develop an Awala based RTS blended with juice of Aloevera, ginger and mint.

Materials and Methods

The research work was carried out in the Department of Home Science, Birsa Agricultural University, Aloevera were procured from the Faculty of Forestry, Birsa Agricultural University, Ranchi. Leaves were washed. Lower one inch of leaf base, the tapering points (2-4') of the leaf top and the short spine located along the leaf margin were removed by a sharp knife. Leaves were then cut longitudinally and gel was scooped out. The gel was mashed with the hand beater and strained with muslin cloth to retrieve the Aloevera juice which was stored under refrigerated conditions for future use.

Other ingredients like ginger, Awala, mint leaves, sugar, citric acid and KMS was purchased from local market and their respective juices were extracted with the help of a laboratory blender followed by filtering through muslin cloth and stored separately under refrigerated conditions for future use.

Formulation of RTS

The Awala based RTS blended with Aloevera, ginger and mint juice was prepared as per the flow chart given in fig. 1. The RTS was prepared in four different variations coded as T₁ (Amla: Aloe vera 50:50), T₂ (Amla; Aloe-vera: ginger: 55: 40.5) and T₃ (Amla; Aloe-vera: mint: ginger: 35; 40: 20: 5). RTS prepared only from Awala juice was kept as control. The calculated amount of sugar and citric acid was added to maintain a constant 10⁰brix and 0.3 % acidity. KMS @ 100 ppm was added and pasteurized at 72⁰C and kept at ambient temperature for 60 days for further analysis.

Physio – chemical analysis

The pH was determined with the help of a digital pH meter; TSS was measured with the help of hand refractometer and values were expressed as ⁰brix. Acidity of various samples was determined by titrating against 0.1 N NaOH according to AOAC (1995) method. Ascorbic acid content was determined by the titration method using 2, 6-diclorophenol dye as recommended by (Ranganna 2001).

Microbiological analysis

The prepared beverages formulations were studied for microbial load. The total microbial load was calculated by standard plate count (SPC) method. The SPC was done according to the method described earlier (APHA, 1967).

Sensory evaluation

The fresh and stored beverages samples prepared with varying levels of *Awala*, Aloevera, ginger and mint were served chilled for sensory evaluation which was

carried out by semi – trained panel of twenty judges on a 9.0 point Hedonic scale. (Lawless and Klein, 1991)

Statistical Analysis

Data were subjected for analysis of variance and T-test to know the significant difference among various treatments (Pansey and Sukkhatme 1961)

Results and Discussion

The raw ingredients used for the preparation of Awala based RTS formulations were analysed for important physico-chemical characteristic and result is presented in table.1. It is apparent that Aloe vera pulp had highest moisture content followed by Awala fruit.

Highest Vitamin C content was observed in Awala (814.2 mg/100 g) followed by mint (29.4 mg/ 100 g). The total soluble solids (TSS) expressed as ⁰ Brix was recorded highest in the Awala juice ((12), while the pH was recorded highest in Aloevera juice (5.2). Highest and lowest acidity was recorded in Awala (2.56%) and Mint (0.19%) respectively.

The selection of Mint and ginger was done to mitigate the astringency of Amla and bitterness of Aloe-Vera juice apart from flavour enhancement. Similar effort to alleviate the bitter taste of aloe Vera juice have been made earlier also (Ramchandran and Natrajan; 2014, Sangma *et al.*, 2016)

Physico-chemical attributes of the blend is given in Table – 2. Highest Vitamin –C content was observed in control followed by T₂. Lowest pH was observed in variation T₄. Similarly highest acidity and TSS was recorded in control while lowest was observed in variation T₄

Fig.1 Flow chart describing the preparation of Awala based RTS formulations

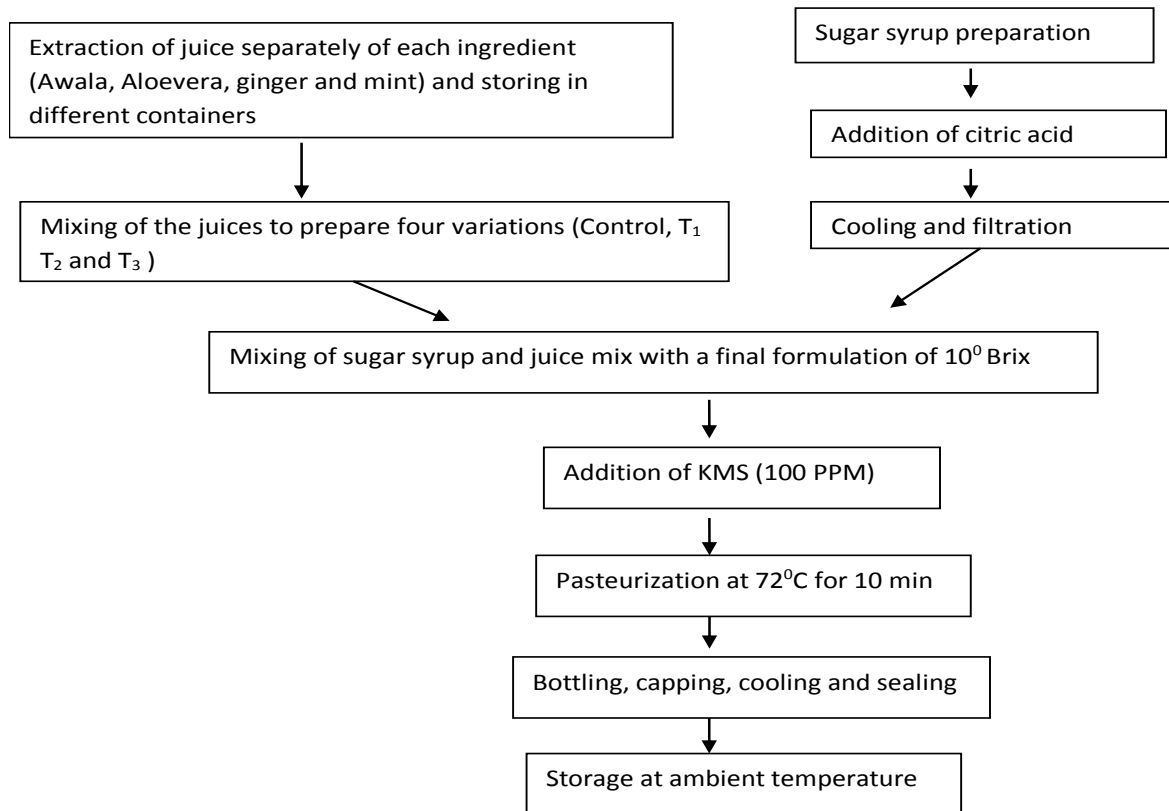


Table.1 Physico-chemical analysis of raw ingredients used in Awala based RTS formulation

S.no	Constituent	Amla	Aloe-vera	Mint	Ginger
01	Moisture (%)	84.3±0.50	95.7±0.30	80±0.42	83.6±0.52
02	pH	4±0.01	5.2±0.20	5±0.03	5.4±0.05
03	Acidity (%)	2.56±0.30	1.4±0.26	0.19±0.30	0.8±0.46
04	TSS(°Brix)	12±0.25	20.18	6±0.21	3±0.22
05	Vitamin C	814.2±20.12	6.7±0.22	29.4±0.30	1.38±0.32

Values are mean ± SE of three replications

Table.2 Physico-chemical analysis of different selected selection for RTS preparation

Treatment	pH	Acidity (%)	TSS(°Brix)	Vitamin-C(mg/100g)
Control	4.16±0.08	1.04±0.01	6.6±0.33	789.9±0.02
T1 50:50 (Amla: Aloe vera)	5.13±0.08	5.13 ± 0.08	4.33±0.13	390±0.12
T2 55: 40.5 (Amla; Aloe-vera: ginger)	5.2 ±0.03	0.67±0.09	3.66±0.33	404.5±0.08
T3 35 ;40:20:5 (Amla ; Aloe-vera: mint: ginger)	5.3 ±0.03	0.4±0.01	3.33±0.33	273.4±0.05
C.D(P<0.05)	0.22	0.042	1.10	0.27

Values are mean ± SE of three replications

Table.3 Sensory quality of RTS prepared from blends of Amla, Aloe-Vera, Mint and Ginger

Treatment	Colour	Appearance	Aroma	Texture	Taste	Overall acceptability
Control	7.2-0.2	7.0±0.25	6.8±0.20	7.1±0.31	6.6±0.4	6.8±0.25
T ₁ 50: 50 (Amla: Aloe vera)	6.8-0.24	6.5±0.25	6.4±0.30	7.0±0.25	6.9±0.23	6.6±0.21
T ₂ 55: 40.5 (Amla; Aloe-vera: ginger)	7±0.24	7.0±0.25	7.5±0.30	7.5±0.22	7.4±0.22	7.1±0.24
T ₃ 35; 40: 20: 5 (Amla; Aloe-vera: mint: ginger)	7.6±0.45	7.7±0.42	8.0±0.33	7.6±0.26	8.1±0.31	7.8±0.43
C,D (<0.05)	N.S	N.S	0.838	N.S	0.86	0.52

Values are mean ± SE of three replications

Table.4 Physico Chemical analysis of prepared RTS

Treatment	pH	Acidity (%)	TSS(°Brix)	Vitamin –C
	5.2±0.58	0.26±0.06	10.3±0.33	203.7±0.215
T ₁ , 50: 50 (Amla: Aloe vera)	5.2±0.33	0.27±0.06	10.66 ± 0.33	100.3±0.08
T ₂ , 55: 40.5 (Amla; Aloe-vera: ginger)	5.3±0.33	0.27±0.03	10.33±0.33	112±0.08
T ₃ , 35; 40: 20: 5 (Amla; Aloe-vera: mint: ginger)	5.36±0.33	0.27±0.07	10.66±0.33	81±0.07
C.D(P<0.05)	NS	N.S	NS	0.348

Values are mean ± SE of three replications

Result of Sensory evaluation of prepared RTS is presented in Table 3. The result clearly indicates that T₃ scored significantly higher scores with respect to Aroma, taste and overall acceptability. One of the limitations of control i.e. Amla RTS was its astringent taste. The addition of ginger and mint juice had a positive impact on the sensory attributes of RTS. Successful attempts to prepare refreshing RTS blends from Aloe-Vera have been reported by earlier worker (Yadav *et al.*, 2013) using mint and ginger as ingredients. Ramchandram and Nagrajan (2014) also reported the development of spiced papaya and aloe vera based RTS blend. This study is unique as it has utilized Awala, in addition to Aloe-Vera, Mint and ginger to develop an antioxidant rich refreshing drink. The result

clearly indicates that the variation T₃ was the best formulation with respect to Aroma, Taste and over all acceptability. It is evident from table 4 that pH, acidity and TSS of all treatments were same. Highest Vitamin C content was observed in control (203.7mg/100g) followed by T₂ (112.4 mg/100g). Lowest content of Vitamin C content was observed in T₃ which might be due to lower concentration of Amla juice used as compared to other variations.

In the present investigation, efforts were made to develop blended therapeutic RTS using Awala, Aloe vera, ginger and mint juice. Aloe-vera gel contained high moisture content while Awala juice dominated in Vitamin C content and TSS and acidity. Sensory quality revealed that Awala could

be successfully incorporated with Aloe-vera, ginger and mint juice in the development of blended refreshing RTS with improved sensory quality.

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