

Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions

Renu B. Sharma¹, Mubarak T.A.², Heba Sayed Mostafa³, Shreya Guleria², Ruby Prakash², Yogesh K. Awasthi^{2, 4, ✉}, Aparna Awasthi⁵, Nikita Chauhan²

1. Department of Nutrition and Dietetics, Manav Rachna International Institute of Research and Studies (Deemed to be University), Faridabad, IND

2. Department of Food Technology, School of Applied and Life Sciences, Uttarakhand University, Dehradun, IND

3. Department of Food Science, Faculty of Agriculture, Cairo University, Giza, EGY

4. Department of Food Technology, School of Chemical Sciences, Harcourt Butler Technical University, Kanpur, IND

5. Nursing, Maa Bhagwati College of Nursing, Lucknow, IND

Received: December 25, 2025 | Review began: January 14, 2026 | Review ended: March 25, 2026 | Published: March 31, 2026

© Copyright 2026

This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

In modern lifestyle, fruit-based ready-to-serve (RTS) beverages play an essential role due to their ease of consumption and nutraceutical-functional properties. The present study investigates the storage stability of an RTS beverage developed from dragon fruit and aloe vera under refrigerated ($4 \pm 1^\circ\text{C}$) and ambient ($25 \pm 3^\circ\text{C}$) storage conditions over a 30-day period. The purpose of this study was to determine the sensory, physicochemical, storage stability, and gas chromatography-mass spectrometry quality of the formulated dragon fruit and aloe vera-based RTS beverage. Various physicochemical parameters, including pH, titratable acidity, total soluble solids, reducing sugar, total sugar, and ascorbic acid, were assessed throughout the 30-day storage period. Sample R12, which was stored at $4 \pm 1^\circ\text{C}$, showed maximum acceptability by sensory panellists based on taste, colour, and overall acceptability. No major differences were observed in samples stored at $4 \pm 1^\circ\text{C}$, but samples stored at $25 \pm 3^\circ\text{C}$ showed maximum degradation. For example, sample R14 ($25 \pm 3^\circ\text{C}$) showed maximum ascorbic acid degradation from 11.01 ± 0.14 mg/100 mL to 6.95 ± 0.28 mg/100 mL compared to R14 ($4 \pm 1^\circ\text{C}$), which decreased from 10.87 ± 0.33 mg/100 mL to 8.59 ± 0.35 mg/100 mL. Maximum changes in reducing sugar from $4.82 \pm 0.08\%$ to $5.23 \pm 0.11\%$ occurred in R14 ($25 \pm 3^\circ\text{C}$). On the other hand, minimum changes in reducing sugar from $2.25 \pm 0.07\%$ to $2.71 \pm 0.08\%$ occurred in R10 ($4 \pm 1^\circ\text{C}$). Major phytochemicals and volatile components detected in gas chromatography-mass spectrometry analysis were benzoic acid as the most abundant (71.49%) compound. Other significant compounds included *n*-nonadecanol-1 (7.35%), 1-hexacosanol (5.26%), and 2,6,10,15,19,23-pentamethyl-2,6,18,22-tetracosahexaene (3.91%). These results can assist in better determining the deteriorative changes in a variety of fruit and vegetable-based beverages, essential changes in product composition that may result in improved product quality.

Categories: Food processing, Food quality, Functional foods

Keywords: rts beverage, dragon fruit, physicochemical parameters, gc-ms analysis, storage stability

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI https://doi.org/10.7759/s44497-025-00044-x

Introduction

The dragon fruit plant has a lifespan of approximately 20 years and begins bearing fruit within two years of planting, reaching full consistency of yield in 3-5 years. It is grown for commercial purposes in various countries worldwide, including China, Vietnam, Colombia, Mexico, Ecuador, Nicaragua, Thailand, Indonesia, Malaysia, the United States, and Australia [1].

Dragon fruit is known to contain a variety of beneficial phytochemicals, including polyphenols, antioxidants, flavonoids, and vitamin C, which contribute to its potent antioxidant properties [2]. The red-fleshed dragon fruit contains betacyanins, which have been found to protect mice from obesity caused by dietary factors and associated metabolic disorders. Studies by Flores-Verastegui et al. [3] have shown that consumption of dragon fruit by individuals with type II diabetes leads to significant reductions in total cholesterol and triglyceride levels while increasing levels of high-density lipoprotein cholesterol. Furthermore, it enhances insulin sensitivity in rodent models and lowers blood glucose levels in individuals with type II diabetes. When administered as juice, white dragon fruit mitigates the adverse impact of a high-fat diet, such as impaired insulin sensitivity, adipose hypertrophy, and hepatic steatosis, without impacting body mass gain in mice [4]. Dragon fruit is a fibre-rich food that aids in digestion. Additionally, it is packed with various B vitamins, including B1, B2, and B3, each playing a vital role in promoting health. Vitamin B1 helps increase energy production and support carbohydrate metabolism, while B2 acts as a multivitamin and improves appetite [5]. Aloe vera, scientifically known as *Aloe barbadensis* Miller, is a succulent plant from the Asphodelaceae family that is capable of withstanding drought conditions. Aloe vera is widely recognized and utilized for its numerous medicinal properties including dietary nutraceutical, medicinal, and therapeutic potential [6].

Fruit juices and beverages have become widely preferred processed food options that offer convenience and fulfill nutritional requirements. In India, a variety of choices are available, such as carbonated drinks, juice-based beverages, and soda water [7]. Ready-to-serve (RTS) drinks provide the advantage of quenching thirst without requiring additional dilution. There is a growing trend among consumers to opt for organic drinks made from fruits, driven by their excellent taste, abundant nutrients, pharmacological benefits, and favourable calorie content [8]. By formulating an RTS beverage, the research aims to provide consumers with a convenient and accessible way to access the beneficial nutrients present in both ingredients, including essential vitamins, minerals, antioxidants, and phytochemicals. The current study focuses on the formulation of RTS beverages using dragon fruit (*Hylocereus undatus*) and aloe vera (*A. barbadensis*) for a better nutraceutical and functional profile with unique sensory characteristics. The study also focuses on the storage stability analysis at different temperatures in terms of the physicochemical and sensory evolution of formulated RTS.

Materials And Methods

The current study was carried out at the Department of Food Technology, Uttaranchal University, Dehradun, Uttarakhand. Dragon fruit was obtained from a local supplier at Prem Nagar Market. Dirt, dust, and other impurities from the fruit surface were rinsed under running tap water. A healthy aloe vera leaf was picked from the herbal garden at the School of Applied and Life Sciences, Uttaranchal University, Dehradun, India. A stainless-steel knife was used for fruit cutting and removal of aloe vera pulp from the leaf. AR-grade chemicals such as sodium benzoate were used as a preservative, along with other chemical reagents used in the titration and analysis process. Total soluble solid (TSS) content was measured using a digital refractometer (Digital Refractometer model DR-A1). Gas chromatography-mass spectrometry (GC-MS) analysis (Agilent Technologies: GC: G3440A 7890A; MS: 7000 Triple Quad GCMS) was performed at Patanjali Research Institute, Haridwar, India.

Cleaned dragon fruits were cut into two halves, peeled, manually cut into small pieces, and then ground using a grinder. To preserve the full concentration of active ingredients, a traditional hand-filleting technique was employed to ensure the absence of contamination from the yellow sap within the internal fillet. The filleting process was completed within 36 hours after the leaves were harvested to maintain optimal quality. Once the pulp was extracted, it was subjected to gentle heating at a temperature of 60-65°C for 10 minutes. A mild heating temperature of 60-65°C is commonly applied to aloe vera pulp processing to minimize enzymatic activity and microbial load while preserving the structural integrity of

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

thermolabile bioactive compounds [9]. Controlled pasteurization at 80-85°C for a short duration ensures microbiological stability and increases the shelf life of the RTS beverage without damaging vitamin C. Following the heating step, the pulp was mashed using a hand beater. To obtain aloe vera juice, the mashed pulp was strained through a muslin cloth. The blended RTS beverage, combining dragon fruit and aloe vera, consisted of a composition of 75% dragon fruit pulp and 25% aloe vera pulp. This mixture exhibits variable TSS levels, denoted as R10 (10° Brix), R12 (12° Brix), and R14 (14° Brix). TSS of the samples was adjusted by the addition of appropriate amount of sugar and water. The RTS beverage, once prepared, was carefully dispensed into pre-sterilized glass bottles, each containing 200 mL of the product. These glass bottles were then hermetically sealed to ensure an airtight closure. Following this, samples underwent controlled heating within the temperature range of 80-85°C for a duration of 1-3 minutes [10]. After this heat treatment, the samples were allowed to cool, and the sealed bottles were subsequently stored at room temperature for a period of 30 days to facilitate further research and analysis. Major unit operations and step-by-step instructions are outlined in Figure 7, which clearly represents the formulation of the RTS beverage by describing the flow chart.

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

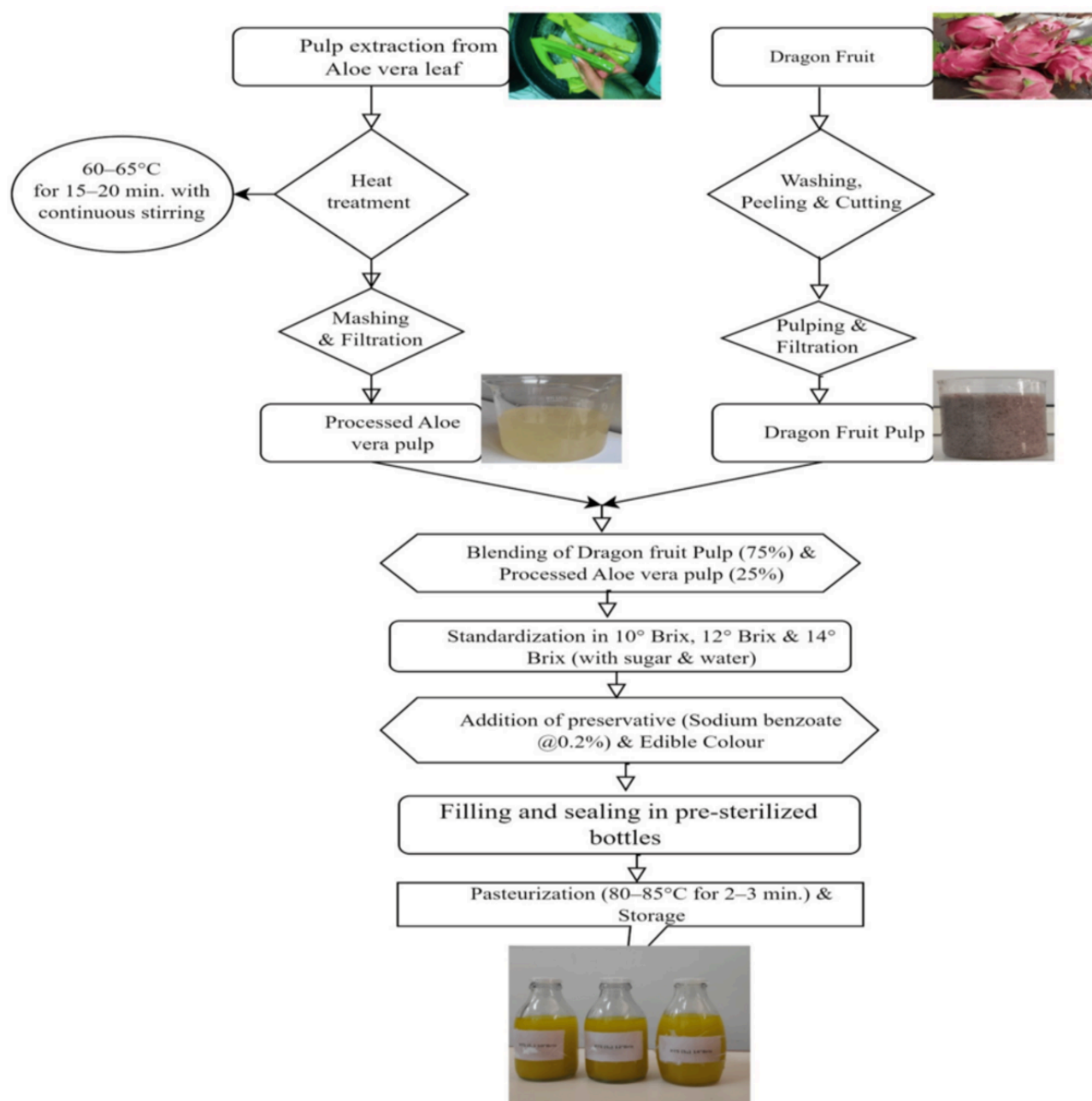


FIGURE 1: The process flow chart depicting the formulation of RTS beverage

RTS, Ready to Serve

The dragon fruit and aloe vera RTS beverage was meticulously prepared using the optimal blending combination. Various concentrations of TSSs, namely 10°Brix, 12°Brix, and 14°Brix, were employed in the formulation. Subsequently, the RTS beverages were carefully dispensed into pre-sterilized bottles and stored under different temperature conditions. The samples corresponding to the different soluble solid concentrations, i.e., 10°Brix, 12°Brix, and 14°Brix, were designated as follows: R10 ($4 \pm 1^\circ\text{C}$ and $25 \pm 3^\circ\text{C}$), R12 ($4 \pm 1^\circ\text{C}$ and $25 \pm 3^\circ\text{C}$), and R14 ($4 \pm 1^\circ\text{C}$ and $25 \pm 3^\circ\text{C}$). Over the course of 30 days, the changes in sensory quality and physicochemical characteristics of these samples were systematically monitored. Observations were meticulously recorded at 15-day intervals to comprehensively assess the beverage's stability and quality over time.

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

Sensory quality evaluation

The acceptability of the RTS beverages was evaluated using sensory analysis. The sensory test was conducted by a panel of 17 trained individuals comprising both men and women. The panellists were selected based on their working experience and knowledge in the evaluation of food products. Panel characteristics indicated an equal proportion of both genders, with ages ranging from 22 to 35 years, and all members were trained in sensory analysis. The panellists provided their informed consent and participated willingly in the assessment of colour, flavour, and overall acceptability of the formulated RTS beverage. This analysis did not involve the use of any invasive procedures or tools. The samples were served in a randomized order to avoid bias in the serving order, and a palate cleanser (water) was used between samples to prevent flavour carryover. The assessment was conducted in a sensory laboratory with controlled light and temperature conditions to ensure uniformity in evaluations. Each sample was rated on a 9-point hedonic scale, with the panellists rating it as 1 (dislike extremely) or 9 (like extremely) [11]. The attributes evaluated included flavour, colour, and overall acceptability. Each value of the sensory attribute data was reported as the average of the seventeen observations made by the trained panellists (n = 17).

Determination of physicochemical properties

TSS Concentration

The TSS content of aloe vera RTS was assessed using a handheld refractometer, and the results were expressed as a percentage in degrees Brix (°Brix), following the methodology outlined by Singh et al. [12].

T.S.S. (°Brix) = Value indicated by hand refractometer + factor of temperature correction

pH Value

The pH of the RTS beverage was measured using a digital pH meter, and the pH values were recorded in accordance with the procedure detailed by Ranganna [13].

Titration Acidity Content

The titrable acidity of formulated samples was determined by titration using 0.1 N NaOH, following the method described by Ranganna [13]. A 5 mL portion of aloe vera RTS was mixed with 500 mL of distilled water. From this mixture, a 20 mL sample was taken and titrated with 0.1 N NaOH solution, using phenolphthalein as an indicator. The point at which the solution turned pink was considered as the endpoint, and the volume of NaOH required for titration was recorded. The percentage of total acids was then calculated using the following formula:

$$\text{Acidity (\%)} = \frac{\text{Volume of NaOH used (mL)} \times \text{Normality of NaOH} \times \text{Equivalent weight of citric acid} \times 100}{\text{Volume of sample titrated (mL)}}$$

Determination of ascorbic acid content

The ascorbic acid content was determined through the 2,6-dichlorophenol indophenol visual titration method [14].

$$\text{Ascorbic acid concentration (mg/100 mL)} = \frac{\text{Dye factor} \times V_2 \times 100 \times 100}{V_1 \times W}$$

where, dye factor is a constant that represents the dye's response with ascorbic acid, typically achieved through a calibration process, V_1 is the volume of sample taken, and V_2 is the volume dye used in sample titration is volume of sample.

Determination of total sugar content

The Lane and Eynon method, as described by Zena et al. [15], was employed to measure total sugar in the different samples. The reagents used included Fehling's remedy A, Fehling's remedy B, 1% methylene blue indicator, 45% solution of neutral lead acetate, 22% potassium oxalate solution, and standard invert sugar.

$$\% \text{ of total sugar as invert sugar} = \frac{\text{Dilution} \times \text{mg of invert sugar} \times 100}{\text{Weight of sample} \times \text{Titer value} \times \text{Volume of aliquot} \times 100}$$

$$\% \text{ Sucrose} = \% \text{ total sugar as invert sugar} - \% \text{ reducing sugar} \times 0.95$$

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

% of Total sugar = % of reducing sugar + % of sucrose

Determination of reducing sugar content

The Lane and Eynon method, as recommended by Ranganna [13], was employed to determine reducing sugar concentration in the formulated samples.

$$\text{\% of reducing sugar} = \frac{\text{mg of invert sugar} \times \text{Dilution} \times 100}{\text{Weight of the sample} \times \text{Titer value} \times 100}$$

GC-MS analysis of the RTS beverage

GC-MS analysis is the most promising technique for identifying Phyto volatile components in RTS beverage containing dragon fruit and aloe vera. Gas chromatography was performed using a Shimadzu GCMS-TQ8050 NX with a DB-WAX column. Before GC-MS analysis, 10 mL of the RTS beverage was treated with liquid-liquid extraction by using food-grade ethyl acetate (1:1 v/v). The organic was extracted and dried over anhydrous sodium sulphate, filtered, and evaporated under reduced pressure. The obtained extract was then filtered by a 0.22-µm membrane filter before injection into GC-MS. The carrier gas, helium, had a flow rate of 1.2 mL/minute. The oven temperature program started at 40°C (held for 5 minutes) and increased to 200°C at a rate of 5°C/minute, holding it there for 10 minutes [16]. Volatile metabolites were identified by comparing the mass spectra and retention index to those from the Wiley Registry of Mass Spectral Data.

Statistical analysis

The research data were collected in triplicate. IBM SPSS Statistics 26.0 was used for all statistical analyses of the RTS data. To determine significant differences among samples (R10, R12, and R14) for physical and textural quality attributes, one-way analysis of variance was applied. Duncan's test was used for mean separation at a significance level of $p < 0.05$.

Results And Discussion

Sensory quality assessment during storage

Sensory evaluation of the RTS beverages was conducted using a 9-point hedonic scale to determine acceptance and preference, focusing on colour, appearance, and flavour over the storage period. Sample R10 ($4 \pm 1^\circ\text{C}$) exhibited the smallest decrease, declining from 9 to 6.6, whereas sample R14 ($25 \pm 3^\circ\text{C}$) showed the greatest decrease, dropping from 6.9 to 5.9. The flavour scores of the RTS beverages also declined over time, reflecting changes in taste quality during storage. Analysis of the data in Figure 2 indicates a noticeable and significant decline in flavour scores from 0 to 30 days. Among the three samples evaluated, R10 ($4 \pm 1^\circ\text{C}$) demonstrated the least decrease, transitioning from a flavour score of 7.5 to 6.8. This deterioration in flavour quality can be attributed to the emergence of bitterness and increased acidity during storage. Considering the key sensory parameters of colour, appearance, and flavour, the overall acceptability of the formulated beverages was also assessed. Beverage R12 stored at $4 \pm 1^\circ\text{C}$ achieved a mean overall acceptability score of 8.2 on the 9-point hedonic scale, indicating high liking, whereas R10 at $25 \pm 3^\circ\text{C}$ received a significantly lower score of 6.13, indicating reduced acceptability. Previous studies have shown that storing ovine whey-based fruit drinks for extended periods alters their microbial, physicochemical, and sensory properties [17], supporting our findings of significant sensory decline over time. A 30-day storage period was selected based on prior research on short-term shelf-life stability of RTS beverages under refrigerated and ambient conditions, which is particularly relevant for products that do not require advanced preservation methods such as high-pressure treatment or aseptic processing [18]. RTS beverages without advanced preservation methods are typically screened within 30-45 days. Current research on fruit-based beverages has reported similar sensory decline in sensory attributes, especially under ambient temperature condition, due to oxidative degradation and biochemical transformation affecting flavour and colour stability profile of the beverages [19]. In agreement with these, the present study reflects that refrigerated samples retained elevated sensory scores as compared to ambient storage conditions.

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

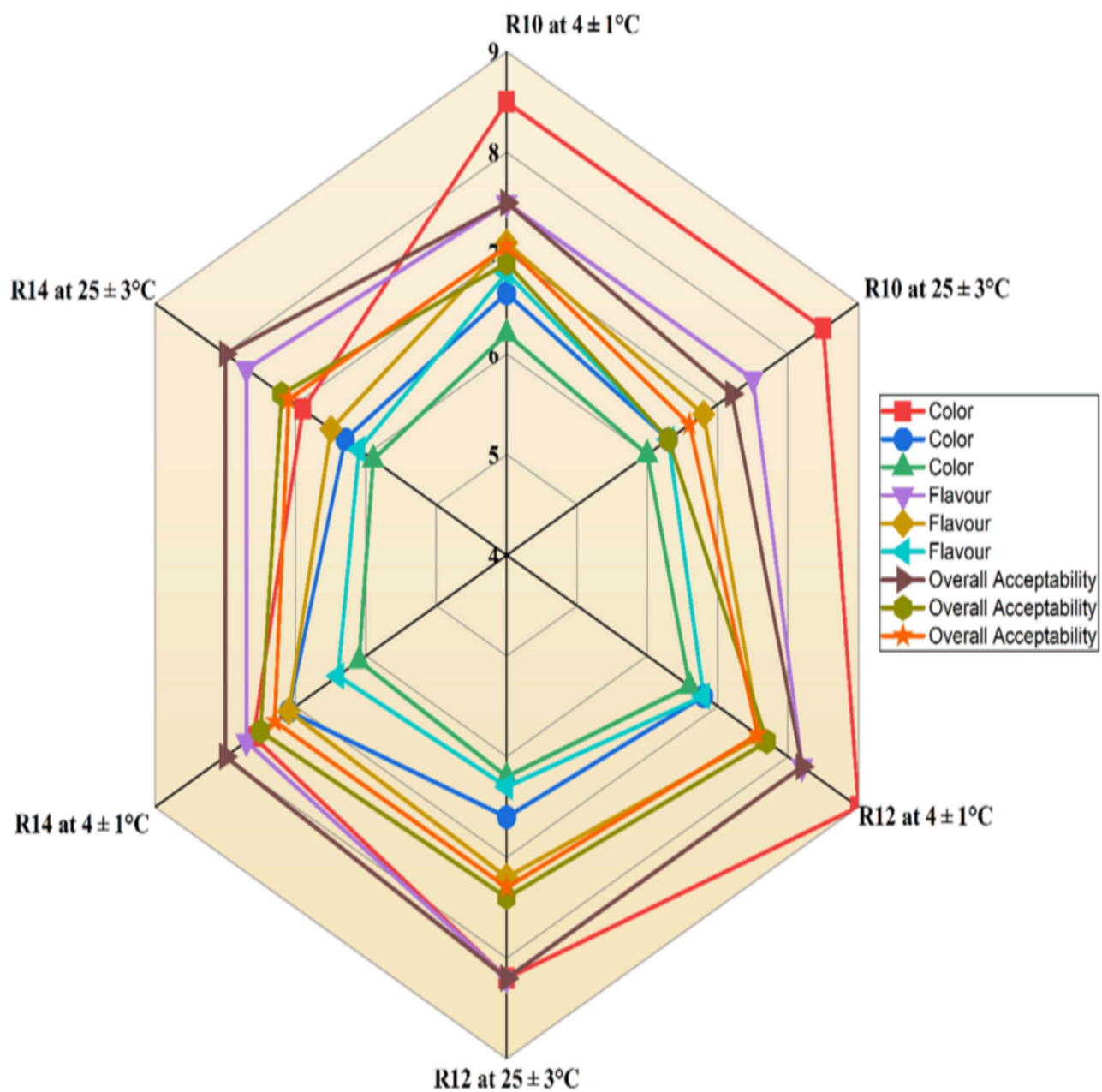


FIGURE 2: Radar chart presenting sensory attributes of the formulated RTS beverage (R10, R12, and R14) stored at 4 ± 1°C and 25 ± 3°C using a 9-point hedonic scale

RTS, Ready to Serve

Changes in TSS content

The TSS (°Brix) of the dragon fruit-aloe vera RTS beverage increased partially over 30 days of storage at both temperatures. As shown in Table 1, there was a noticeable rise in TSS during the 0-30-day storage period. The TSS measurements for the processed RTS drink indicate levels of 10°Brix, 12°Brix and 14°Brix for three different samples, respectively. Among them, sample R14 stored at 25 ± 3°C showed the highest increase, rising from its original value of 14.30 ± 0.13°Brix to 15.00 ± 0.15°Brix, whereas sample R10 stored at 4 ± 1°C showed the least change, with TSS values increasing modestly from 10.30 ± 0.12°Brix to 10.35 ± 0.13°Brix over time. The increase in TSS might be explained by the

conversion of insoluble polysaccharides to sugars. Comparable rises in TSS at the time of storage of blended fruit beverages have been reported in present functional beverage research, where the breakdown of complex carbohydrates contributed to increased TSS [20]. The rise in soluble solids could stem from hydrolysis, a process that transforms sucrose into invert sugar. These observations align with earlier investigations carried out by Parveen et al. [21] in black mulberry RTS drink, which validate these findings.

Variation in titrable acidity values

The results of the experiment that present differences in titratable acidity levels observed over time for dragon fruit-aloe vera RTS beverage are presented. Additionally, Table 7 shows how different samples of RTS beverages underwent changes in titratable acidity while they were stored. The data demonstrate an evident increase in the level of acid throughout the entire 30-day storage period. Among the three groups examined, R10, kept at $4 \pm 1^\circ\text{C}$, exhibited minimum growth in acid content, increasing only from its initial value of $0.33 \pm 0.03\%$ to $0.46 \pm 0.03\%$, whereas R14, kept at $25 \pm 3^\circ\text{C}$, exhibited maximum changes from $0.45 \pm 0.03\%$ to $0.95 \pm 0.04\%$ during the 30-day storage period. Several factors may account for the increase in acidity detected during the 30-day storage period of RTS. Among these, one plausible explanation involves the production of organic acids due to ascorbic acid breakdown and pectin hydrolysis. Likewise, another possible factor could be linked to sugar fermentation that leads to higher acidity levels. These results coincide with those observed by Sharma et al. [22], who also examined pineapple-aloe vera RTS, lending further support to our findings.

Changes in pH value

The experimental results demonstrating the pH fluctuations of the RTS drink over time are shown in Table 7 to provide the changes in pH for various samples. It is evident from the data that there was a significant decline in pH over the course of 30 days during storage. Sample R10, which was kept at $4 \pm 1^\circ\text{C}$, experienced the least decrease in pH compared to other samples, dropping from 5.63 ± 0.05 to 5.39 ± 0.07 . Sample R14, which was kept at $25 \pm 3^\circ\text{C}$, experienced the maximum decrease in pH, from 5.13 ± 0.06 to 4.85 ± 0.07 . The trend observed corresponds with the results presented by Foke et al. [23] in their research on RTS dragon fruit, where they also recorded a progressive reduction in pH, which is noteworthy as it produces an unfavourable environment for the proliferation of harmful microorganisms, thereby functioning as an innate means of preservation.

Total sugar content

The total sugar content of the RTS beverage slightly increased due to the conversion of polysaccharides into simpler sugars [24]. Based on the Table 7 data of total sugar content, it is evident that there was a slight rise in total sugar content during the 30-day storage period. Sample R14 ($25 \pm 3^\circ\text{C}$) exhibited the highest increase, rising from 20.59 ± 0.19 g/100 mL to 21.19 ± 0.21 g/100 mL, whereas sample R10 ($4 \pm 1^\circ\text{C}$) showed the smallest increase, from 15.41 ± 0.18 g/100 mL to 15.72 ± 0.18 g/100 mL. This increase can occur due to the natural enzyme invertase, which is naturally present in fruits and may convert complex polysaccharides into simple sugars. These results coincide with those observed by Mezey and Mezeyová [25], who also examined changes in the levels of selected organic acids and sugars in apple juice after cold storage.

Reducing sugar content

The combination of treatment and storage intervals had a substantial effect on the reducing sugars of the RTS beverage. The effect of treatment and storage intervals on reducing sugar, as shown in Table 7, indicates a substantial increase in reducing sugar levels during the 30-day storage period. Sample R14 ($25 \pm 3^\circ\text{C}$) exhibited the highest increase, rising from 5.22 ± 0.17 g/100 mL to 5.96 ± 0.19 g/100 mL, whereas sample R10 ($4 \pm 1^\circ\text{C}$) showed the smallest increase, from 2.61 ± 0.15 g/100 mL to 2.81 ± 0.16 g/100 mL. The observed increase in reducing sugar can be attributed to hydrolysis, where sucrose is broken down into glucose and fructose by the acidic components present in the beverage. These findings are consistent with those reported by Yusof et al. [26] in sugarcane juice and Arif et al. [27] in soy-based beverages, who found that reducing sugar increased with storage time.

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions

RTS Treatment	Storage Temperature (°C)	Storage Days	TSS (*Brix)	Titration Acidity (%)	pH	Total Sugar (g/100 mL)	Reducing Sugar (g/100 mL)
R10	4 ± 1°C	0	10.30 ± 0.12 ^a	0.33 ± 0.03 ^a	5.63 ± 0.05 ^a	15.41 ± 0.18 ^a	2.61 ± 0.15 ^a
R10	4 ± 1°C	15	10.12 ± 0.11 ^a	0.9 ± 0.02 ^b	5.70 ± 0.06 ^a	15.53 ± 0.17 ^a	2.61 ± 0.14 ^a
R10	4 ± 1°C	30	10.35 ± 0.13 ^a	0.46 ± 0.03 ^b	5.39 ± 0.07 ^a	15.72 ± 0.18 ^a	2.81 ± 0.16 ^b
R10	25 ± 3°C	0	10.25 ± 0.12 ^a	0.45 ± 0.03 ^a	5.60 ± 0.06 ^a	16.17 ± 0.18 ^b	2.59 ± 0.14 ^a
R10	25 ± 3°C	15	10.40 ± 0.13 ^a	0.32 ± 0.02 ^b	5.21 ± 0.07 ^a	15.55 ± 0.17 ^a	3.71 ± 0.15 ^c
R10	25 ± 3°C	30	10.72 ± 0.14 ^b	0.57 ± 0.03 ^c	5.17 ± 0.06 ^b	16.35 ± 0.19 ^b	3.75 ± 0.17 ^c
R12	4 ± 1°C	0	12.15 ± 0.13 ^a	0.27 ± 0.03 ^a	5.72 ± 0.06 ^a	17.96 ± 0.18 ^a	3.59 ± 0.15 ^a
R12	4 ± 1°C	15	12.38 ± 0.14 ^b	0.56 ± 0.02 ^b	5.49 ± 0.05 ^b	18.36 ± 0.19 ^b	4.09 ± 0.16 ^b
R12	4 ± 1°C	30	12.75 ± 0.15 ^c	0.75 ± 0.03 ^c	5.73 ± 0.06 ^a	19.05 ± 0.20 ^c	4.65 ± 0.17 ^c
R12	25 ± 3°C	0	12.20 ± 0.12 ^a	0.35 ± 0.02 ^b	5.52 ± 0.05 ^b	18.43 ± 0.18 ^b	4.12 ± 0.15 ^b
R12	25 ± 3°C	15	12.57 ± 0.14 ^b	0.61 ± 0.02 ^c	5.38 ± 0.06 ^b	18.82 ± 0.20 ^c	4.31 ± 0.16 ^c
R12	25 ± 3°C	30	13.00 ± 0.15 ^c	0.82 ± 0.03 ^c	5.25 ± 0.06 ^c	19.63 ± 0.21 ^c	4.81 ± 0.17 ^c
R14	4 ± 1°C	0	14.13 ± 0.14 ^a	0.30 ± 0.03 ^a	5.42 ± 0.05 ^a	20.24 ± 0.18 ^a	4.88 ± 0.15 ^a
R14	4 ± 1°C	15	14.40 ± 0.13 ^b	0.65 ± 0.02 ^b	5.26 ± 0.06 ^b	20.73 ± 0.19 ^b	4.85 ± 0.16 ^b
R14	4 ± 1°C	30	14.82 ± 0.15 ^c	0.89 ± 0.03 ^c	5.06 ± 0.07 ^c	20.92 ± 0.21 ^c	5.62 ± 0.18 ^c
R14	25 ± 3°C	0	14.30 ± 0.13 ^a	0.45 ± 0.03 ^b	5.13 ± 0.06 ^b	20.59 ± 0.19 ^b	5.22 ± 0.17 ^b
R14	25 ± 3°C	15	14.56 ± 0.14 ^b	0.69 ± 0.03 ^c	5.52 ± 0.06 ^a	21.22 ± 0.21 ^c	5.59 ± 0.17 ^c
R14	25 ± 3°C	30	15.00 ± 0.15 ^c	0.95 ± 0.04 ^c	4.85 ± 0.07 ^c	21.19 ± 0.21 ^c	5.96 ± 0.19 ^c

TABLE 1: Changes in the physicochemical properties of the formulated ready-to-serve (RTS) beverages (R10, R12, and R14) at different storage temperatures (4 ± 1°C and 25 ± 3°C) over a 30-day storage period

All experimental values are presented as mean ± SD (n = 3). Mean values in the same column followed by different superscript letters are significantly different (p < 0.05) according to one-way ANOVA test followed by Duncan's test.

TSS, Total Soluble Solid

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

Changes in ascorbic acid content

The effect of storage period and temperature on ascorbic acid depletion in juices is clearly described in Figure 3. The data indicate a notable decrease in ascorbic acid content over the 30-day storage period. Sample R14 ($25 \pm 3^{\circ}\text{C}$) exhibited the highest decrease, dropping from 11.01 ± 0.14 mg/100 mL to 6.93 ± 0.28 mg/100 mL, whereas sample R10 ($4 \pm 1^{\circ}\text{C}$) showed the smallest decrease, from 11.05 ± 0.38 mg/100 mL to 9.04 ± 0.46 mg/100 mL. The obtained results are consistent with the findings reported by Hamid et al. [18] in their study on mulberry RTS drink, supporting our findings. Recent studies indicate that ascorbic acid deterioration in fruit beverages is mostly temperature dependent, with markedly higher losses observed under conventional thermal storage compared to refrigerated conditions [28]. Emerging preservation and packaging methods have been proposed to reduce oxidative losses of vitamin C during storage [29].

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

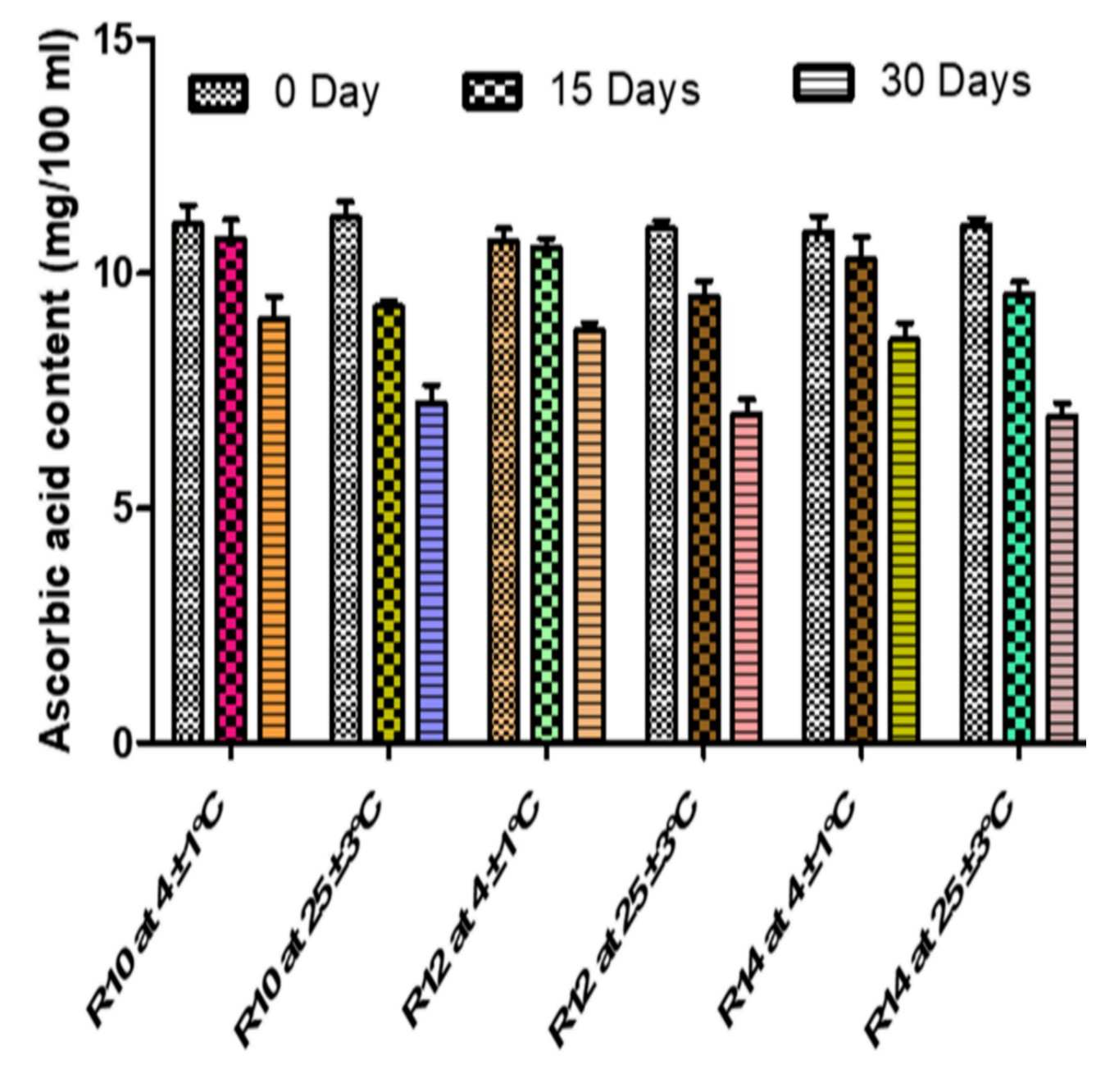


FIGURE 3: Effect of storage period on ascorbic acid content over 30 days at different temperatures (4 ± 1°C and 25 ± 3°C)

GC-MS analysis

GC-MS is one of the most accepted methods that is used for analysing phytochemical flavouring compounds of natural origin because of their sensitivity, stability, and high efficiency [30]. Results of GC-MS analysis of dragon fruit and aloe vera RTS beverage are illustrated in Figure 4 and revealed that 12°Brix (R12) contains 28 different compounds with different concentrations. The major compound was benzoic acid with a ratio of 71.49, which may result from natural phenolic metabolism of fruit matrices and provides antimicrobial stability, similar to that reported for berry-based beverages and fermented fruit drinks. Long-chain fatty alcohols (1-hexacosanol and n-nonadecanol) are present in fruit pulp and are related to lipid metabolism modulation and antioxidant activity. The present beverage had a relatively higher abundance of phenolic-based compounds as compared to other Indian fruit beverages, such as mulberry RTS [18],

How to cite this article:

which may also contribute to enhancing microbial stability at refrigerated storage temperatures. Benzoic acid can inhibit pathogenic microorganisms; therefore, it can be used as a preservative in the food and feed industry. In addition, it can improve gut functions and the digestibility of nutrients. On the other hand, minor compounds were *n*-nonadecanol-1 and 1-hexacosanol with ratios of 7.35 and 5.26%, respectively. *n*-Nonadecanol-1 is known as a long-chain fatty alcohol, while hexacosanol is a saturated primary fatty alcohol. Both compounds have different biological activities, such as 1-hexacosanol, which can decrease cellular and plasma cholesterol levels in HepG2 and 57BL/6J mice [31]. The lowest compounds detected were gamma-sitosterol, 1,6,10,14,18,22-tetracosahexaen-3-ol, and 2,6,10-tridecanol, with ratios of 1.32%, 1.42%, and 1.02%, respectively. All remaining compounds were present at ratios below 1%. Figure 4 illustrates the GC-MS spectrum of the 12°Brix RTS beverage (R12).

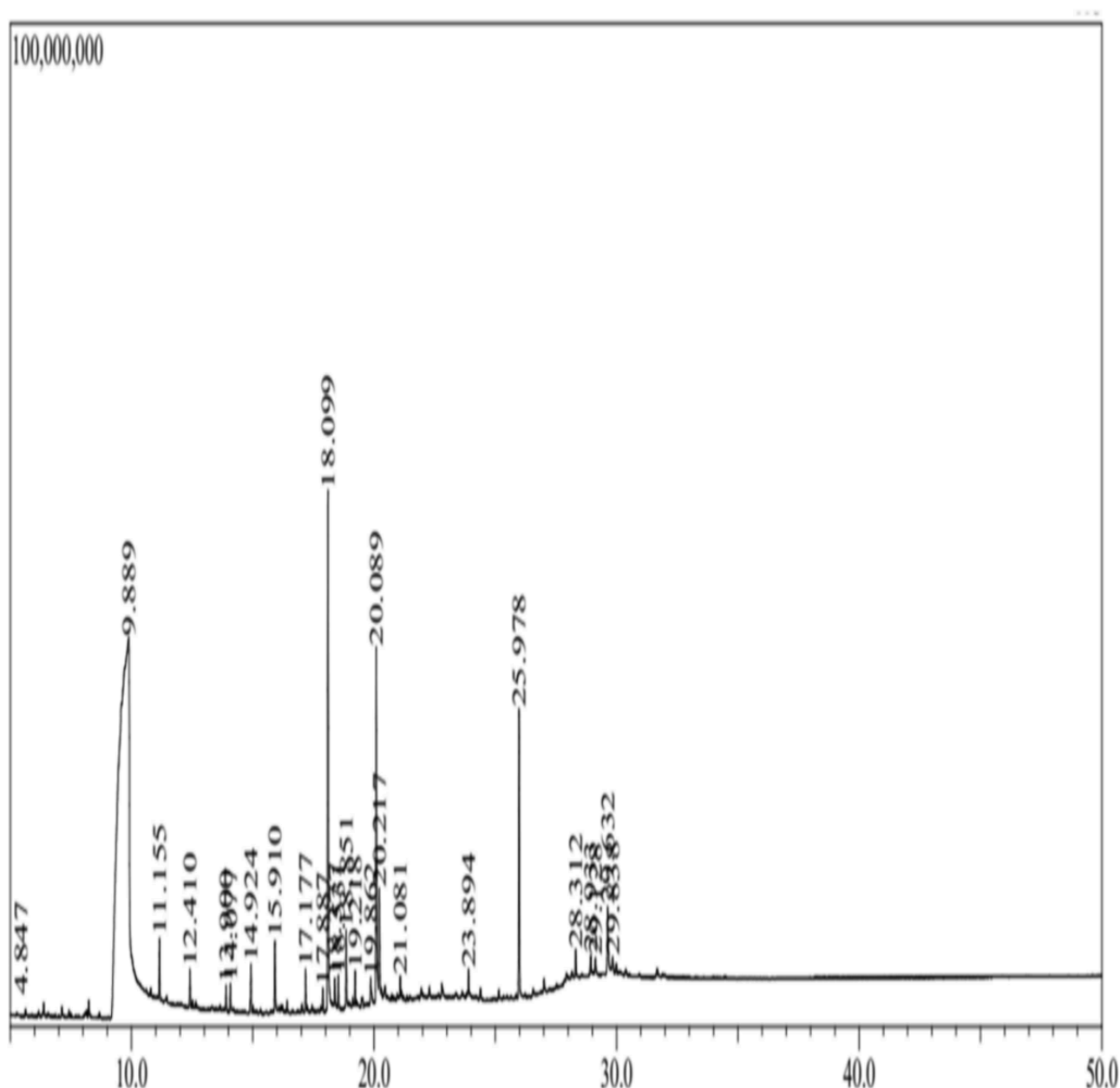


FIGURE 4: GC-MS spectrum of the RTS beverage 12°Brix (R12)

GC-MS, Gas Chromatography-Mass Spectrometry; RTS, Ready to Serve

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

Comparative analysis and nutritional significance

The recorded pH value range (4.85-5.63) of the formulated beverage lies within the acidic range typical of fruit-based beverages consumed throughout India. Typically, commercial RTS fruit beverages show a pH range between 3.5 and 5.5 and total soluble solids of 10 and 15°Brix. The total sugar levels (15.41-21.19 g/100 mL) observed in the current study are consistent with those reported for various comparable fruit beverages. Moreover, refrigerated storage conditions reduce excessive sugar hydrolysis and acidity development during the 30-day period.

Regulatory standards established by FSSAI for RTS beverages, including minimum fruit content and TSS specifications, must be maintained; however, no defined scientific definition exists solely for classifying a beverage as “healthy” based on sugar, titratable acidity, and pH. Instead, health-related parameters are supported by nutrient composition, bioactive compounds, and controlled levels of sugar. The inclusion of vitamin C, flavonoids, betalains, and phytosterols improves the functional qualities of health beverages. Recent research on sustainable functional beverage development emphasizes the importance of preserving antioxidant stability and the profile of bioactive compounds to maximize health benefits and improve shelf life [32].

Conclusions

The combination of dragon fruit and aloe vera enhances the essential phytochemical profile of the formulated RTS beverage in terms of vitamin C, folic acid, choline, flavonoids (such as quercetin and rutin), betalains, and flavonoids. The composition of the formulation and storage conditions are the major factors influencing the concentration of these compounds. This study reported a significant increase in TSS, reducing sugar, and total sugar content in samples with higher TSS and stored at higher temperature ($25 \pm 3^\circ\text{C}$); on the other hand, slight reductions in pH, acidity, sensory profile, and ascorbic acid were observed in samples stored under refrigerated conditions. The results conclusively indicate that storage temperature plays an important role in determining physicochemical stability, sensory attributes, and retention of vitamin C in dragon fruit-aloe vera RTS beverages. Samples maintained under refrigerated storage conditions ($4 \pm 1^\circ\text{C}$) retained superior quality characteristics over 30 days, whereas ambient storage accelerated compositional deterioration. GC-MS analysis revealed the presence of bioactive compounds with documented antimicrobial and functional qualities, strengthening the nutraceutical importance of the beverages. Future investigations should focus on enhancing shelf life using advanced preservation methods and assessing functional efficiency through in vivo evaluation.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Yogesh K. Awasthi, Renu B. Sharma, Ruby Prakash, Aparna Awasthi, Nikita Chauhan

Drafting of the manuscript: Yogesh K. Awasthi, Mubarak T.A., Heba Sayed Mostafa, Shreya Guleria, Ruby Prakash, Aparna Awasthi, Nikita Chauhan

Critical review of the manuscript for important intellectual content: Yogesh K. Awasthi, Renu B. Sharma, Ruby Prakash, Aparna Awasthi

Supervision: Yogesh K. Awasthi

Acquisition, analysis, or interpretation of data: Mubarak T.A., Heba Sayed Mostafa, Shreya Guleria, Nikita Chauhan

Disclosures

Plant subjects: All authors have confirmed that this study did not involve any herbarium specimen. **Human subjects:** Consent was obtained or waived by all participants in this study. Uttaranchal animal ethics committee issued approval NA. The panelists provided informed consent and voluntarily participated in the evaluation of colour, flavour, and overall

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

acceptability of the formulated RTS beverage. As the analysis did not involve any invasive procedures or instruments, ethical approval was not required in accordance with the university's institutional policy. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Intellectual property info:** Title of the invention: Production of Dragon Fruit Ready-to-Serve Beverage Enriched with Aloevera Pulp Patent Application Publication (India) Date of filing of Application: 06/07/2023 Publication Date: 04/08/2023. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Data Availability Statements

The datasets (and/or code) supporting this study are available from the corresponding author upon reasonable request.

Acknowledgements

I would like to acknowledge Uttaranchal University for providing the infrastructure and well-equipped laboratories during my research work. I would also like to acknowledge Dr. Ajay Singh, Director, School of Applied & Life Sciences, for guiding me in editing the manuscript, and Sagar Khunduri for technical support. This paper is a part of International Conference on Nano-materials & Green Technology for Viksit Bharat "Mission 2047" (ICNMGT-2025).

References

1. Gupta E, Mishra P: [Functional food with some health benefits, so called superfood: a review](#). Current Nutrition & Food Science. 2021, 17:144-166. [10.2174/1573401316999200717171048](#)
2. Arivalagan M, Karunakaran G, Roy TK, et al.: [Biochemical and nutritional characterization of dragon fruit \(Hylocereus species\)](#). Food Chemistry. 2021, 353:129426. [10.1016/j.foodchem.2021.129426](#)
3. Flores-Verastegui MIM, Coe S, Tammam J, Almahjoubi H, Bridle R, Bi S, Thondre PS: [Effects of frozen red dragon fruit consumption on metabolic markers in healthy subjects and individuals at risk of type 2 diabetes](#). Nutrients. 2025, 17:441. [10.3390/nu17030441](#)
4. Song H, Chu Q, Yan F, Yang Y, Han W, Zheng X: [Red pitaya betacyanins protects from diet-induced obesity, liver steatosis and insulin resistance in association with modulation of gut microbiota in mice](#). Journal of Gastroenterology and Hepatology. 2016, 31:1462-1469. [10.1111/jgh.13278](#)
5. Jalgaonkar K, Mahawar MK, Bibwe B, Kannaujia P: [Postharvest profile, processing and waste utilization of dragon fruit \(Hylocereus spp.\): A review](#). Food Reviews International. 2022, 38:733-759. [10.1080/87559129.2020.1742152](#)
6. Ogidi OI, Enenebeaku UE: [Medicinal potentials of Aloe Vera \(Aloe barbadensis Miller\): technologies for the production of therapeutics](#). Sustainable Utilization and Conservation of Africa's Biological Resources and Environment. Izah SC, Ogwu MC (ed): Springer, Singapore; 2023. 32:295-321. [10.1007/978-981-19-6974-4_11](#)
7. Giri NA, Sakhale BK, Nirmal NP: [Functional beverages: an emerging trend in beverage world](#). Recent Frontiers of Phytochemicals: Applications in Food, Pharmacy, Cosmetics, and Biotechnology. Pati S, Sarkar T, Lahiri D (ed): Elsevier, Amsterdam; 2023. 123-142. [10.1016/B978-0-443-19143-5.00002-5](#)
8. Hemalatha R, Kumar A, Prakash O, Supriya A, Chauhan AS, Kudachikar VB: [Development and quality evaluation of ready to serve \(RTS\) beverage from cape gooseberry \(Physalis peruviana L.\)](#). Beverages. 2018, 4:42. [10.3390/beverages4020042](#)
9. Jales STL, de Melo Barbosa R, da Silva GR, Severino P, de Lima Moura TFA: [Natural polysaccharides from Aloe vera L. gel \(Aloe barbadensis Miller\): Processing techniques and analytical methods](#). Polysaccharides: Properties and Applications. Inamuddin, Ahamed MI, Boddula R, Altalhi T (ed): Scrivener Publishing, Beverly, MA; 2021. 1-22. [10.1002/9781119711414.ch1](#)
10. Dhar R, Bhalerao PP, Chakraborty S: [Formulation of a mixed fruit beverage using fuzzy logic optimization of sensory data and designing its batch thermal pasteurization process](#). Journal of Food Science. 2021, 86:463-474. [10.1111/1750-3841.15583](#)

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions

11. Chapko MJ, Seo H-S: [Characterizing product temperature-dependent sensory perception of brewed coffee beverages: Descriptive sensory analysis](#). Food Research International. 2019, 121:612-621. [10.1016/j.foodres.2018.12.026](#)
12. Singh RK, Jha A, Singh CK, Singh K: [Optimization of process and physico-chemical properties of ready-to-serve \(RTS\) beverage of cane juice with curd](#). Sugar Tech. 2012, 14:405-411. [10.1007/s12355-012-0171-z](#)
13. Ranganna S: [Handbook of Analysis and Quality Control for Fruit and Vegetable Products](#). Tata McGraw-Hill Education, New Delhi; 1986.
14. Mirmohammadmakki F, Massoud R, Mir Mohammadmakki SF, Mirmohammadmakki N, Massoud A: [Spring production on amount of ascorbic acid in coriander](#). International Journal of Agriculture and Environmental Research. 2024, 10:796-809. [10.22004/ag.econ.348941](#)
15. Zena T, Dessalegn E, Hailu W: [Evaluation of physicochemical properties, sugar contents, and sensory attributes of functional beverage developed from sugar cane, moringa, and barley malt](#). Journal of Food Biochemistry. 2025, 2025:1817876. [10.1155/jfbc/1817876](#)
16. Chien HJ, Zheng YF, Wang WC, Kuo CY, Hsu YM, Lai CC: [Determination of adulteration, geographical origins, and species of food by mass spectrometry](#). Mass Spectrometry Reviews. 2023, 42:2273-2323. [10.1002/mas.21780](#)
17. Güler A, Tokuşoğlu Ö: [Evaluation of the effects of storage time and temperature on the beverages](#). International Journal of Agriculture Environment and Food Sciences. 2024, 8:550-560. [10.31015/jaefs.2024.3.8](#)
18. Hamid, Thakur NS, Kumar P, Thakur A: [Studies on preparation and preservation of ready-to-serve \(RTS\) beverage from underutilized mulberry \(*Morus alba* L.\) fruits and its quality evaluation during storage](#). International Journal of Current Microbiology and Applied Sciences. 2017, 6:1067-1079. [10.20546/ijcmas.2017.609.128](#)
19. Dippong T, Pop F, Voşgan Z, Mihali C: [Quality of fruit juices in terms of physico-chemical, microbiological, thermal and antioxidant properties, evaluation of stability during storage](#). Frontiers in Food Science and Technology. 2025, 5:1656271. [10.3389/frfst.2025.1656271](#)
20. Pinto T, Pinto A, Vilela A: [Edible coatings and films for preparation of grapevine by-product infusions and in freshly processed products](#). Coatings. 2023, 13:1350. [10.3390/coatings13081350](#)
21. Parveen S, Masih S, Ishfaq B, Kausar H, Saeed S, Iqbal Z, Abrar M: [Development and optimization of black mulberry RTS drink](#). Journal of Agricultural Research. 2023, 61:57-64.
22. Sharma RB, Awasthi YK, Roy S, Deb S, Naithani P, Gupta D, Saini N: [Formulation of RTS from pineapple \(*Ananas comosus*\) and Aloe vera \(*Aloe barbadensis*\) pulp: evaluation of nutraceutical profile and shelf-life studies](#). Malaysian Journal of Science. 2024, 43:48-57. [10.22452/mjs.vol43no2.6](#)
23. Foke V, Zambare A, Gaikwad D, Alhat N: [Studies on ready to serve \(RTS\) beverage from dragon fruit](#). International Journal of Processing and Post Harvest Technology. 2018, 9:55-59. [10.15740/has/ijppht/9.2/55-59](#)
24. Singh S, Singh AK, Joshi HK, Lata K, Bagle BG, More TA: [Effect of zero energy cool chamber and post-harvest treatments on shelf-life of fruits under semi-arid environment of Western India. Part 1. Ber fruits](#). Journal of Food Science and Technology. 2010, 47:446-449. [10.1007/s13197-010-0074-5](#)
25. Mezey J, Mezeyová I: [Changes in the levels of selected organic acids and sugars in apple juice after cold storage](#). Czech Journal of Food Sciences. 2018, 36:175-180. [10.17221/165/2017-CJFS](#)
26. Yusof S, Shian L, Osman A: [Changes in quality of sugar-cane juice upon delayed extraction and storage](#). Food Chemistry. 2000, 68:395-401. [10.1016/S0308-8146\(99\)00180-6](#)
27. Arif S, Ahmad A, Masud T, Khalid N, Hayat I, Siddique F, Ali M: [Effect of flour processing on the quality characteristics of a soy-based beverage](#). International Journal of Food Sciences and Nutrition. 2012, 63:940-946. [10.3109/09637486.2012.687365](#)
28. Wang M, Chen T, Wang Q, Shi Y: [Antioxidant, bacteriostatic and preservative effects of extractable condensed tannins isolated from longan pericarps and seeds](#). Plants. 2023, 12:512. [10.3390/plants12030512](#)
29. Gupta RK, Manisha, Ali EAE, et al.: [Vitamin C-infused biopolymer films: a multifunctional approach for active food packaging and preservation](#). Sustainable Food Technology. 2026, 4:25-50. [10.1039/d5fb00282f](#)
30. Elghaffar RYA, Amin BH, Hashem AH, Sehim AE: [Promising endophytic *Alternaria alternata* from leaves of *Ziziphus spina-christi*: phytochemical analyses, antimicrobial and antioxidant activities](#). Applied Biochemistry and Biotechnology. 2022, 194:3984-4001. [10.1007/s12010-022-03959-9](#)

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>

31. Lee JH, Jia Y, Thach TT, et al.: [Hexacosanol reduces plasma and hepatic cholesterol by activation of AMP-activated protein kinase and suppression of sterol regulatory element-binding protein-2 in HepG2 and C57BL/6J mice](#). Nutrition Research. 2017, 43:89-99. [10.1016/j.nutres.2017.05.013](#)
32. Naseem Z, Wani SM, Mir SA, Nisar N: [Sustainable delivery of encapsulated probiotics and their survival in fruit-based beverages and under simulated gastrointestinal conditions](#). Sustainable Food Technology. 2026, [10.1039/D5FB00864F](#)

How to cite this article:

Sharma R B, T.A. M, Mostafa H, et al. (March 31, 2026) Storage Stability of Dragon Fruit (*Hylocereus undatus*) and Aloe Vera (*Aloe barbadensis*) Pulp Ready-to-Serve (RTS) Beverage Under Different Storage Conditions. Curues J. Agri. Food Sci 3 : es44497-025-00044-x. DOI <https://doi.org/10.7759/s44497-025-00044-x>