Original Research Article

Studies On the Preparation and Shelf life Of Aloe Vera Juice

ABSTRACT

The study was carried out for the preparation of aloe vera juice. The fresh aloe vera leaves were analyzed for proximate composition. Four formulations of different parentages of juices were prepared. The products were then analyzed for their microbiological study, sensory evaluation and storage studies. The microbiological analysis during storage period showed that the total viable count (Bacteria) was less in the sample containing 30% water + 200 PPM KMS (sample A) in comparison to another sample containing 35% water + 300 PPM KMS (B), 30% water + 300 PPM KMS (C) and 35% water + 200 PPM KMS (D). During 45 days of storage at both room temperature (28-30°C) and refrigeration temperature (4-6 0C) the chemical analysis of the juices was done at different intervals. The acceptability of the samples was studied by a taste testing panel consisting of 13 panelists. The consumers' preferences were measured by statistical analyses of the score obtained from the response of the taste panelists. A simple analysis of variance showed that the acceptability of the juices did not vary from each other. The juice containing 30% water + 200 PPM KMS (sample A) showed the best results. All the samples preserved with KMS were found good in their color, flavor, sourness and sweetness but sedimentation was observed after 30 days of storage. The highest sedimentation was observed in the juice containing highest amount of aloe vera juice. The rate of sedimentation increased with increasing the storage period.

Keywords: Alo vera, Juice, Shelf-life and Storages.

1. INTRODUCTION

Aloe vera, often referred to as Aloe barbadense, is a succulent that is indigenous to tropical areas and has long been used as a remedy. Aloe vera is a typical xerophyte with thick fleshy, strangely cuticularized spiny leaves (Gaurav K et al.;2008). Aloe vera has been used for its healing abilities for thousands of years. Its uses have been documented in ancient cultures from China, India, Egypt, Greece, and Rome. Aloe vera was revered as the herb of immortality by the Egyptians in biblical times. The Chinese called it the "elixir of youth". Aloe vera is known by a variety of common names, including medicine plant, burn plant, and first aid plant. Perhaps the origin of its name is the Arabic word "Alloeh," which signifies dazzling bitter food. When the leaves of the aloe plant are cut, a clear, thick, sticky liquid called aloe vera juice can be extracted. The gel can then be applied topically to moisten skin or to burns. Aloe vera has number of uses and mainly they are used as a food preservative and medicine (Karkala and Bidya; 2008). Additionally, it can be added to juices or elixirs for better digestion and other internal health advantages, or blended into smoothies.

Today, Aloe vera has attracted significant interest because of its nutritional and medicinal characteristics, and its potential as a generator of economic activity in arid and semi-arid areas (Contreras P et al.;2007). An aloe vera juice beverage is a

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clear or nearly clear unfermented liquid which is developed from the removal of the sweet watery sap from live fruits. In the food industry, Aloe vera juice has been used for preparation of soft drinks with healthy nutritional qualities and tonics containing amino acids and minerals (Nagpal R et al.2012). Aloe vera juices are becoming popular in comparison with synthetic beverages evidently because of their taste, flavor, nutritive value and their storage stability. The beverage product Juice has a good demand in this subcontinent as well as many other foreign countries. It can be found in a variety of consumer goods, such as drinks, lotions, ointments, and sunburn and mild burn gel. There is little clinical evidence for the effectiveness or safety of Aloe vera extract as a cosmetic or medicine. the period of time a product can be maintained in storage before losing its fitness for use, consumption, or sale. The shelf life of aloe vera juice will vary depending on what kind of being used. If it has bought aloe vera juice at the store, it should last a long time, as pre-processed juice is usually treated with preservatives to extend its shelf life. This helps to prevent the juice from decomposing once it's exposed to oxygen. The product claims must be tested by intensive clinical trials, verified and certified by the Government regulatory authorities to build consumer confidence and safety of the aloe vera products.

2. MATERIAL AND METHODS

The study was conducted in the laboratory of the Department of Food Technology and Rural Industries under the Faculty of Agricultural Engineering and Technology and Professor Muhammad Hossain Central Laboratory, Bangladesh Agricultural University, Mymensingh.

2.1 Sample collections, Chemicals, solvents and ingredients

The fresh matured aloe vera leaves were collected from the local market. The aloe vera leaves were cleaned thoroughly with fresh water. Water was glass distilled unless otherwise mentioned, and all chemicals and solvents used in the study were of AR grade. Sugar was procured from the local market. Potassium metabisulphite (KMS), carboxy methyl cellulose (CMC), citric acid and other materials required were used from the laboratory stock.

2.2 Apparatus and Equipment

Blender, oven, electrical balance, juicer, knife, desiccators, disk bowl centrifuge, refractometer, pH meter, heater, conical flask, bottle sealing machine, measuring flask etc.

2.3 Methods

Formulations

The formulations of Aloe vera juices were designed as different sets of ingredients and coded as A, B, C, and D.

Table 1: Formulations of Aloe vera juices

Ingredients	Formulations			
	A	B	C	D
Aloe vera (g)	700	650	700	650
Sugar (g)	115	120	115	120
Citric acid (mg)	3.54	3.73	3.58	3.78
KMS (mg)	0.173	0.260	0.260	0.173
CMC (mg)	4.00	4.00	4.00	4.00
Water	300	350	300	350

2.4 Reception of raw material

After being harvested, aloe vera leaves must be transported from the field to the laboratory for processing in refrigerated vans. The leaves should be sound, undamaged, mold free and mature (0.5-1 years) in order to keep all the active ingredients in full concentration (Lawless and Allen 2000). The treatment of the leaves after harvesting is a significant component that affects the final product's composition because the dissolution of the gel matrix begins immediately after cutting owing to natural enzymatic processes and the activity of bacteria that are typically present on the leaves. The

quality of the finished product can decrease as a result. Therefore, the freshly picked leaves must be refrigerated within 6 hours or they must be fed directly to laboratory processing.

2.5 Preparation of aloe vera juice

Fresh and matured aloe vera leaves were cleaned to remove dirt, residual skin and other undesirable materials. It was washed thoroughly, peeled and cut into slices and blanched in boiling water to make the texture soft. After cooling it was blended in an electric blender. Then calculated amount of sugar, citric acid was mixed properly to make the product TSS 12-14%, acidity 0.7-0.8% and mixed with required amount KMS. Then stored at room temperature (28-32^{0}C) and refrigeration temperature. (4-6^{0}C).

2.6 Storage

For the protection of the delicate bioactive components, aloe vera juice is stored in amber-colored glass bottles. Two of the most crucial environmental factors that influence product quality are temperature and relative humidity. These two parameters can also affect the amount of the volatile substance of the juice absorbed by the packaging material (Hernadez and Giacin;1998).

2.7 Chemical Analysis

The fresh aloe vera leaves and-processed aloe vera juices were analyzed for moisture, ash, vitamin-C, pH, β -carotene, total soluble solids, titrable acidity, reducing sugar, non-reducing sugar and total sugar content as per the methods of Rangana (2003).

2.7.1 Moisture Content

Five grams of juice was taken in porcelain crucibles and oven dried at 80° C until the weight become constant. Percent moisture content was calculated according to the following formula

$$\% \text{ Moisture} = (IW-FW)/IW \times 100$$

Where, IW= Initial weight of Aloe vera samples
FW= Final weight of oven dried sample

2.7.2 Ash Content

Five grams of sample was taken in dry, clean porcelain crucibles and burned using an electric heater. Then the crucibles were placed into a muffle furnace at constant temperature of 550°C for 4 hours. The sample was then cooled in a desiccator and weighed. Ash percent was calculated as follows:

$$\% \text{ Ash} = IW/AW \times 100$$

Where,
AW =Weight of ash and
IW= Initial weight of Aloe vera

2.7.3 Vitamin C

The reagents used for the estimation of vitamin-C were as follows:
i) Metaphosphoric acid (3%)
ii) Standard ascorbic acid solution
iii) Dye solution
For estimation of vitamin- C, the following steps were followed:

Standardization of dye solution

In a conical flask, 5ml of normal ascorbic acid solution and 5ml of metaphosphoric acid (HPO_3) were added and shaken. A micro burette was filled with dye solution. The ascorbic acid solution was titrated with the dye to a pink color which persists for 15 sec. Dye factor (mg of ascorbic acid required to neutralize per ml of the dye) determined using the following formula:

$$\text{Dye factor} = 0.5/\text{Titer}$$

Preparation of samples

10 ml of aloe vera Juice was taken, diluted up to l00 ml with 3% metaphosphoric acid and then filtered. 10ml of the aliquot was taken in a 150ml conical flask. 1ml of 40% formaldehyde and 10 ml of HCl were added to it and kept for 10 minutes. This was titrated with the standard dye to a light pink color (end point) which persists for l5 sec.
The ascorbic acid content of the samples was calculated from the following formula:
mg of vitamin C per 100g sample = T*D*V1/ V2*W100

Where,

T = Titer, D = Dye factor, V1 =Volume made up,
V2 =Aliquot of extract taken for estimation, W = Weight of sample taken for estimation.

2.7.4 Total Soluble Solids

Abbey Refractometer was used for determination of total soluble solids content. One drop aloe vera juice was placed on the prism of the refractometer and covered with the lid and the reading was taken from the refract meter scale directly.

2.7.5 pH

The pH of the aloe vera juice was measured by using pH meter at an ambient temperature.

2.7.6 Titer able Acidity

Twenty grams of sample was blended and homogenized in a blender with distilled water. The blended materials were then filtered and transferred to a 250 ml volumetric flask and the volume was made up to the mark with distilled water. 5ml of solution was taken in a conical flask and titrated with 0.1N solution just below the end point, using phenolphthalein indicator. For accuracy, the titration was performed numerous times. Percent titrable acidity was calculated using the following formula:

$$\% \text{ Titrabic acidity} = (T \times N \times V_1 \times E)/(V_2 \times W \times 1000) \times 100$$

Where, T = Titre, N = Normality of NaOH, V1 = Volume made up,E = Equivalent weight of acid ,W = Weight of sample taken for estimation ,V2 = Volume of sample taken for estimation.

2.7.7 Sugars

2.7.7.1 Standardization of Fehling's solution

10 ml of both Fehling's solution A and Fehling's solution B were mixed together in a beaker. 10ml of mixed solution was pipetted into a 250ml conical flask and 25ml distilled water was added to it. Standard sugar solution was taken in a burette. The conical flask containing mixed solution was heated on a hot plate. When the solution began to boil, three drops of methylene blue indicator solution was added to it. The mixture was titrated using a normal sugar solution. Decolorization of the indication marked the termination point. Fehling's factor was calculated using the following formula:

$$\text{Fehling's factor} = (\text{Titre} \times 2.5)/1000$$

Amount of Vitamin C

10 ml of aloe vera Juice was taken, diluted up to l00 ml with 3% metaphosphoric acid and then filtered. 10ml of the aliquot was taken in a 150ml conical flask. 1ml of 40% formaldehyde and 10 ml of HCl were added to it and kept for 10 minutes. This was titrated with the standard dye to a light pink color (end point) which persists for l5 sec.
The ascorbic acid content of the samples was calculated from the following formula:

mg of vitamin C per 100g sample = $T*D*V_1/ V_2*W100$

Were,

T = Titer, D = Dye factor, V_1 =Volume made up,
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burette. On a hot plate, a combined solution was heated in a conical flask. When the solution began to boil, three drops of methylene blue indicator solution was added to it. The mixture was titrated using a normal sugar solution. Decolorization of the indication marked the termination point. Fehling's factor was calculated using the following formula:

$$\text{Fehling's factor} = (\text{Titre} \times 2.5)/1000$$

2.7.7.2 Preparation of sample

25 ml juice and 100ml distilled water were mixed in a 250m1 volumetric flask. 2ml neutral lead acetate solution was added and a stand for 10min. 5ml potassium oxalate solution was added, made up to the volume with water and filtered.

2.7.7.3 Total sugar

50 ml of the clarified solution was taken in a 250m1 volumetric flask. 50 cc of water and 5g of citric acid were combined, and the inversion process was completed by gently boiling the mixture for 10 minutes before cooling. Transferred to a 250m1 volumetric flask and neutralized with 1N NaOH using phenolphthalein as indicator and made up to volume. 10ml of concentrated HCI was added to it. The mixture was allowed to stand for 24 hrs at room temperature for inversion. Neutralized with NaOH, made volume up to 250ml and then titrated against standard Fehling's solution. Percent total sugar was calculated using the titre value obtained in the determination of total sugars after inversion.

2.7.7.4 Reducing Sugar

Ten ml of mixed Fehling's solution was taken in a conical flask and 25m1 of distilled water was added to it. Purified juice was taken in a burette. Conical flask containing mixed Fehling's solution was heated on a heater. Three drops of methylene blue indicator were added to the flask when boiling started and titrated with solution taken in the burette at the same time. The end point was indicated by decolorization of indicator. Percent reducing sugar was calculated from the following formula:

$$\% \text{ Reducing Sugar} = (F \times D \times 100)/(T \times W \times 1000)$$

Where, F = Fehling's factor, D = Dilution, T = Titre, W = Weight of sample, Non-Reducing Sugar.

2.7.7.5 Non-reducing Sugar content was calculated as follows:

$$\% \text{ Non-Reducing Sugar} = \% \text{ Total Sugar} - \% \text{ Reducing Sugar}$$

2.8 Storage Studies

The aloe vera leaves were processed to aloe vera juices and packed in bottles. The bottles were stored in a shelf at room temperature and at refrigeration temperature for 45 days.

2.9 Microbiological Examination

2.9.1 Determination of total viable bacteria

For total viable count of samples, standard plate count was done according to the method described in "American Public Health Association (1967)". Preparation of Media: In this study Tryptone Glucose Yeast Extract (TGYE) agar from Difco Laboratories, Detroit, USA was employed. Twenty-four grams of TGYE agar was dissolved in 1000 ml of cold distilled water and heated to boiling to dissolve the ingredients completely. Then media was filled into different screw cap bottles and sterilized at 121°C for 15 min in an autoclave. After sterilization the media were kept in water bath at 45°C until used.

Procedure of plating:

Ten grams aloe vera leave was blended into 100 ml buffer distilled water. The buffer distilled water. 1g well blended Aloe vera was transferred into 99 ml buffer distilled water and the sample was Shaked up and down movement for 25 times at a height about 30 cm (1 ft) at a time interval not exceeding 7 sec. The solution was made in 1:10, 1:102, 1: 103 dilutions in the sterilized buffer distilled water. 1 ml and 1/10 ml from each dilution were placed into sterilized Petri dishes. Then the mouth of the agar bottle was flamed and poured 10-15 ml agar into each Petridis, rotting and tilting gently and allowed them some time for solidification.

Incubation and colony count: After solidification Petri dishes were placed in the incubator at 32°C for 24 hrs. After incubation, the overloaded Petri dishes were avoided and the Petri dishes containing countable colony were selected.

Colonies were counted with the aid of a Gurbar colony counter. The number of colonies was multiplied by the dilution and the total viable count per gram of sample was recorded.

2.9.2 Observation of fungal growth

The fungal growth in different formulations was examined by visual observation at different storage periods.

2.10 Sensory Evaluation

Formulated juices were subjected to sensory evaluation by a taste testing panel comprising 13 panelists from the department's teachers, students, and staff. The panelists were required to rate the juices' quality attributes (color, flavor, texture, and overall acceptability) using a 1–9-point scale, reflecting their personal preferences and acceptability. The scale went from 1 (Extremely dislike) to 9 (Extremely like). Statistical analysis, including variance analysis and Duncan's Multiple Range Test (DMRT), was performed on the collected data to assess preference differences among the panelists.

3. RESULTS AND DISCUSSION

During the off-season, processed aloe vera juices can be used. The purpose of the study was also to identify a good formulation for making aloe vera juice.

3.1 Chemical composition of fresh Aloe vera juice

Table 2: Approximate composition of fresh aloe vera and processed aloe vera juice

Components	Fresh Aloe vera juice	Processed Aloe vera juice
Moisture (%)	95.7	91.3
Ash (%)	0.36	0.23
Vitamin C mg/ 100 g	2.56	2.45
TSS (%)	1.56	15
Acidity (%)	1.68	1.52
Reducing sugar (%)	0.26	5.23
Non-reducing sugar (%)	0.56	4.69
Total sugar (%)	0.82	9.92
pH	4.36	4.2

3.2 Storage studies

3.2.1 The effect of storage on proximate composition of juices

Four different types of juices were prepared with different combinations of water and KMS. Juices were bottled and stored at room temperature and refrigeration temperature for 45 days in the laboratory.

3.2.2 Acidity

Acidity for all formulations during storage were determined and the results were shown in Table 2 and 3. From the analysis, it was found that acidity of juices was gradually decreased. Ranganna (1990) recommend that acidity of various fruit juices was within the range of 0.12% to 0.23% that was lower than the ranges of acidity of formulated juice. (Talib, 2016) also found that titrable acidity of all RTS formulations were reported to be increased with storage period. However, at and after 60 days, the acidity begins to cross over 0.4% in all products, that make them unacceptable.

3.2.3 Total soluble solids (TSS)

TSS initially adjusted in formulations A, B, C and D showed a negligible change throughout the 45 days storage period at room temperature and refrigeration temperature. Ranote *et al*., (1993) also observed a negligible change in TSS of processed fruit pulp during prolong storage. It is due to conversion of carbohydrate and acid into sugar. (Talib, 2016) also reported that TSS was found to increase. This may be attributed to the acidic hydrolysis of sugars and polysaccharides. The change in TSS of PRT0 reported to be negligible while more changes were reported in PRT3 (30% aloe vera).

3.2.4 pH

The pH of all juices was represented in Table 3 and 4. Slight variations in pH were observed throughout the 45 days storage period in all the formulations. Samples A, C and D had highest pH than the juices B. The change in pH is associated with number of reasons; it might be due to the effect of heat treatment on the biochemical condition of the fruits and vegetables and slower rate of respiration and metabolic activity (Jitareerat et al., 2007). (Talib, 2016) also found that pH values for aloe vera and pear juice was found to be 4.34 and 4.56 respectively.

3.2.5 Studies on sedimentation of bottled aloe vera juice during storage period

The sediment settles gradually on the bottom of the bottles. At 0 days the total juice was emulsified. The height of total juice was l8 cm. After 7 days of storage clear juice was observed in the upper portion of the bottles. With the increase of storage period the height of clear juice increased and hence the height of sediment decreased i.e., the sediment settled at the bottom of the bottles. If it would shake before use then it would be seen to be fresh homogenous juice. Ranganna (2003) suggested some useful methods for fruit juice clarification. By using peptic enzyme, tannin and gelatin or by the combination of these two or by centrifuging and filtering the juice might be successfully clarified.

3.2.6 Influence of storage period on flavor

At room temperature Flavor of the sample A and D were changed after 30 days and sample B and C were changed after 45 days. At refrigeration temperature flavor of the sample A, C and D were change after 45 days and sample B remain good. It is shown in Table 3.

3.2.7 Observation of fungal growth in formulated Aloe vera juices

The fungal growth in the formulated aloe vera juices at different storage periods was examined through visual observation and the results found are shown in Table 2 and 3. Up to 15 days of storage no fungal growth was observed.

Table 3: Shelf-life studies of Aloe vera juice at room temperature (28-32^{0}C) Storage

Storage period (Days)	Sample	pH	TSS (%)	Acidity (%)	Sedimentation	Flavor Change	Fungal growth
0	A	4.29	14	1.53	Clear	Good	Not visible
	B	4.27	14	1.52	Clear	Good	Not visible
	C	4.25	13	1.50	Clear	Good	Not visible
	D	4.24	12	1.52	Clear	Good	Not visible
7	A	4.30	14.2	1.51	Clear	Good	Not visible
	B	4.30	14.5	1.50	Clear	Good	Not visible
	C	4.28	13.8	1.49	Clear	Good	Not visible
	D	4.25	13	1.50	Clear	Good	Not visible
15	A	4.32	14.8	1.48	Slightly cloudy	Slightly change	Slightly visual
	B	4.32	15.2	1.48	Clear	Good	Not visible
	C	4.30	14.5	1.47	Clear	Good	Not visible
	D	4.29	14	1.49	Slightly cloudy	Change	Not visible
30	A	4.35	15.1	1.47	Slightly cloudy	Change	Slightly visual
	B	4.35	15.6	1.47	Clear Slightly	Good	Not visible
	C	4.32	14.9	1.46	cloudy Slightly	Good	Slightly visual
	D	4.30	14.2	1.48	cloudy	Change	Slightly visual
45	A	4.35	15.2	1.46	Cloudy	Change	Visual

	B	4.35	15.7	1.46	Cloudy	Change	Visual
	C	4.32	15	1.45	Cloudy	Change	Visual
	D	4.30	14.7	1.47	Cloudy	Change	Visual

A = 30% water + 200 PPM KMS; B = 35% water + 300 PPM KMS; C = 30% water + 300 PPM KMS; D = 35% water + 200 PPM KMS.

Table 4: Shelf-life studies of Aloe vera juice at refrigeration temperature (4-6^{o}C)

Storage period (Days)	Sample	pH	TSS (%)	Acidity (%)	Sedimentation	Flavour Change	Fungal growth
0	A	4.29	14	1.53	Clear	Good	Not visible
	B	4.27	14	1.52	Clear	Good	Not visible
	C	4.25	13	1.50	Clear	Good	Not visible
	D	4.24	12	1.52	Clear	Good	Not visible
7	A	4.30	14.1	1.50	Clear	Good	Not visible
	B	4.30	14.4	1.49	Clear	Good	Not visible
	C	4.28	13.7	1.48	Clear	Good	Not visible
	D	5.0	13.2	1.49	Clear	Good	Not visible
15	A	4.33	14.7	1.47	Clear	Good	Not visible
	B	4.31	15	1.47	Clear	Good	Not visible
	C	4.30	14	1.45	Clear	Good	Not visible
	D	5.1	13.8	1.47	Clear	Good	Not visible
30	A	4.35	15	1.44	Slightly cloudy	Slightly Change	Slightly visual
	B	4.36	14.9	1.44	Clear	Good	Not visible
	C	4.33	14.6	1.43	Clear	Good	Not visible
	D	5.2	14.2	1.45	Slightly cloudy	Slightly Change	Slightly visual
45	A	4.37	15.2	1.42	Slightly cloudy	Change Slightly	Slightly visual
	B	4.38	15.4	1.40	Slightly cloudy	Change Slightly	Not visible
	C	4.35	15	1.42	Slightly cloudy	Change	Slightly visual
	D	5.3	14.5	1.43	Cloudy	Change	Visual

A = 30% water + 200 PPM KMS; B = 35% water + 300 PPM KMS; C = 30% water + 300 PPM KMS; D = 35% water + 200 PPM KMS.

3.2.8 Microbiological Study of the Formulated Aloe vera Juice

Table 5: Total number of viable bacteria (cfu/ml) after incubation 48 hr at 32°C

Sample	Number of Bacterial colony (cfu/ml)
A	$37x10^{3}$
B	$39 x10^{3}$

C	40 x10^3
D	45x10^3

A = 30% water + 200 PPM KMS; B = 35% water + 300 PPM KMS; C = 30% water + 300 PPM KMS; D = 35% water + 200 PPM KMS.

3.2.9 Vitamin-C degradation at storage period

During storage, it has been seen that vitamin c decreased with increase of storage period. Ascorbic acid prolongs the shelf life of a product by reacting with residual oxygen and retarding the development of off-flavor (Pollard and Timberlake, 1971). The ascorbic acid reduced remarkably when increasing storage time (0- 45 days) and the reduction was prominent with different treatments. The loss of vitamin-C is dependent on temperature and storage time. Sufi (1976) found that vitamin-C content decreased from 35.1 to 2.8 mg per 100 gm in the guava juice based carbonated beverage for the storage period of 35 days at 20-25oC. Fig. 1 showed that vitamin C gradually decreased with the increase of storage period. (Talib, 2006) reported more similar result that is ascorbic acid content of aloe vera based RTS was noticed to be decreased over 90 days period, owing to storage loss. The ascorbic acid loss was also noticed more in high aloe vera content soft drinks.

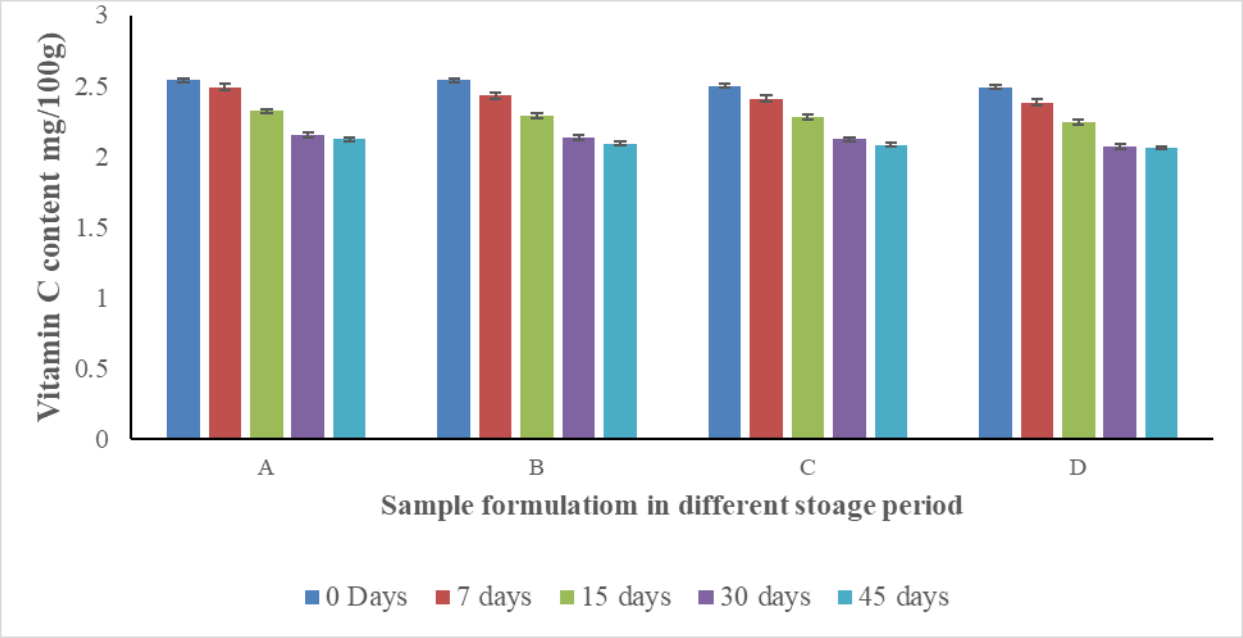

Figure 1: Vitamin C content of ready to drink Aloe vera juice of different formulations at different storage period at room temperature

A = 30% water + 200 PPM KMS; B = 35% water + 300 PPM KMS; C = 30% water + 300 PPM KMS; D = 35% water + 200 PPM KMS.

4.3 Sensory evaluation

A two-way analysis of variance indicated that all the sensory attributes of different aloe vera juice sample were significantly different at level (p = 0.05) of statistical significance. The color of juice sample A was most preferred than other juice formulation. (Talib, 2016) also found a similar result for color of different formulation aloe vera juice that is 6.85-7.08. Flavor preferences among the samples, showed that the flavor of juice sample A obtained the highest score (6.641) and was significantly different from the other sample B and D secured the score 6.158, and 6.386 respectively. This research is in line with the findings of (Talib, 2016) who reported 6.77-7.01 score out 9 for flavor of different formulation of aloe vera juice. For texture purpose, there is no significant deference (P=0.05) in texture acceptability. Sample A secured the highest score (7.237) and the sample C and D secured the lowest score (6.693) during the storage period. From the results of ANOVA, it was apparent that there was significant (P=0.05) difference in overall acceptability among the developed juice. A and C were significantly different from other two sample B and D. The juice sample A was statistically acceptable with ranked as like very much and secured the highest score (7.07) among the juice sample. Similar score also found by (Talib, 2016) and reported overall acceptability ranges from 6.87-6.99.

4. CONCLUSION

It has been shown that fresh aloe vera juice contained moisture content 95.7%. TSS 1.56%, pH 4.36, total sugar 0.82%, reducing sugar 0.26%, non-reducing sugar 0.56%, ash 0.36%, acidity 1.68%, and ascorbic acid 2.56 mg per 100g. The samples A and B showed the minimum total viable count of bacteria. No fungal growth was observed up to 15 days of storage. After 45 days whitish structure was observed at the surface of the juices. Except for vitamin C, there were very few changes in the prepared juices' composition over the course of storage. Remarkable decrease of vitamin C was found in the samples during storage period and TSS increased slightly and acidity decreased slightly. A statistical analysis of the score response by the taste testing panelists on the sensory attributes on juices revealed that all the products were accepted by the panelists and score were between 6.15 to 7.61. The chemical analysis of the products was done and the results were found satisfactory. Only vitamin-C of the formulated juices was very lower than the fresh aloe vera. Sedimentation was observed in the bottles during storage period. The preservative (KMS) was effective against microbial growth to prevent spoilage of the bottled juices. The use of CMC decreases the cloudiness of different formulations. Citric acid was used to lower the pH. More research work would be needed to avoid fading of color and sedimentation and to minimize the loss of vitamin-C content to prepare juice under different storage period. Every year in Bangladesh a large amount of aloe vera is spoiled during peak season due to inadequate processing and preservation facilities. The study was carried out to affect the preservatives on aloe vera juice. Thus, by processing and preserving aloe vera as juice may encourage more production of Aloe vera which will provide better nutrition to the people of Bangladesh.

CONSENT (WHERE EVER APPLICABLE)

No manuscripts will be peer-reviewed if a statement of patient consent is not presented during submission (wherever applicable).

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

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