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Review Article

Proximate Compositions of Aloe Vera (*Aloe barbadensis* Mill.) Jam Influenced by Different Ratios of Natural Sweeteners in Safety Aspects

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Abstract

Jam is defined as a product brought to a suitable consistency, made from whole fruit pieces or one or more kinds of fruit which is mixed with sweetening foodstuffs. Aloe vera is a rich source of nutrients and essential minerals including vitamins A, B-complex, C, and E, as well as folic acid and niacin, which may contribute to its succulent properties. This study was conducted at the Department of Food Science and Technology, Yezin Agricultural University, to assess the physicochemical attributes of aloe vera jam influenced by different ratios of sweeteners. The experiment was laid out in a randomized complete block design with three replications for seven treatments. They were control (without sweetener -T_1), 40% sugar (T_2), 40% jaggery (T_3), and the combination at the ratios of 35% sugar + 5% jaggery (T_4), 30% sugar + 10% jaggery (T_5), 25% sugar + 15% jaggery (T_6) and 20% sugar + 20% jagger (T_7), respectively. The proximate compositions of moisture, crude fiber, crude protein, crude fat and crude ash of the aloe vera jam were analyzed at day 0 (product day) and (15, 30 and 75) days after storage. In addition, the water activity (a_w), pH, total titratable acidity (TTA) % and total soluble solid (°Brix) were also measured at the product day. The browning index (BI) and storage life (days) of the jam were studied for 75 days under ambient conditions. The results showed that moisture, crude fat, and crude ash content of the aloe vera jam increased significantly during the storage period. There was a gradual increase in crude fat and crude ash content whereas crude fiber and crude protein contents decreased dramatically compared to the control. Among the treatments, the aloe vera jam with the combination of 20% sugar and 20% jaggery (T_7) was observed to be the most effective for nutrition. The aloe vera jam may be applied as a nutritional fortifier in jam making as it can enhance nutrient and mineral contents which is good for human health.

Keywords: Aloe Vera Jam; Sweeteners; Physicochemical; Proximate Composition

Introduction

Aloe vera, scientifically known as *Barbadensis* Miller, is a succulent plant belonging to the family Liliaceae. In Myanmar, aloe vera is abundant in central regions, but the commercial cultivation area remains limited due to the absence of demand for advanced processing techniques to create high-value added products. There are over 300 species aloe vera, *Aloe barbadensis* Mill is widely grown especially in arid regions of Africa, Asia, Europe, and America. According to [1], aloe vera cultivation areas cover about 24,000 hectares of land with the majority in America followed by Australasia and Africa. Aloe vera is globally recognized for its nourishing, anti-inflammatory, anti-allergenic and medicinal properties. The leaves include 95% water, 200 active compounds, 20 minerals, 18 amino acids, 12 vitamins and 92 enzymes. It

contains vitamins A, B_1, B_2, B_6, B_{12}, C, E, folic acid, niacin and more [2]. The aloe vera is an excellent source immune system for diseases and ailments of essential nutrients and minerals [3].

The conventional jam is typically defined as a semi-solid mixture of fruit pulp, sugar, pectin, and acid cooked with a specific consistency which replaces or complements the fruit-based gel from the aloe vera. Jam can be made from variety of plants far beyond the common fruits such as berries, apples, and grapes which are traditional favorites, almost any plant part with sufficient pectin, acid, sweetener and flavor can be used. It has been increased into drinks, jams, candies and other cosmetic products due to the biological and functional characteristics. Aloe vera jam is a unique functional food that bridges the gap between traditional and herbal medicine. The role of sweeteners in making jam is essential for taste which influences the product quality, safety, and texture of the final product. The natural sweeteners are sugar, honey, palm jaggery, sugarcane jaggery, coconut sugar, date sugar, molasses and so on. Among them, sugar and jaggery are the traditional sweetener and it attracts water molecules (it is hygroscopic). The sugar binds up the water and it lowers water activity (a_w) of the jam by preventing the microbes (bacteria, yeast and mold) that cannot survive. According to the U.S.A. Food, Drugs, and Cosmetics Act, the jams must include at least 45 parts fruit juice and 55 parts (w/w) of sugar or other sweetening agents. Too little sugar and the jam will remain a thin syrup. The weak organic acid and citric acid are generally added to jam to extend storage life. Citric acid is widely used in the food processing industry for multiple purposes, including as an acidulant, preservative, flavor enhancer and pH regulator. The maximum dose of citric acid in jam is 0.5-0.6% (5000-6000 ppm) per 100 grams [4]. It effectively inhibits the growth of spoilage-causing microorganisms [5]. In Myanmar, aloe vera jam has traditionally been produced at the household level or by local cottage industry vendors on a small scale. Despite it is traditional product, it has not been widely yet a commercial product, nor extensively explored in academic research. Thus, this study was carried out with these objectives; to evaluate the physicochemical attributes of aloe vera jam influenced by different ratios of natural sweeteners and to find out the suitable ratio of sweeteners for making aloe vera jam.

Materials and Methods

Experimental site and Duration

This experiment was conducted at the Department of Food Science and Technology (FST), Yezin Agricultural University (YAU) from July, 2025 to March, 2026. The experiment was laid out in randomized complete block design with three replications. There were seven treatments; the control (without sweetener), 40% of sugar only and jaggery only, the combinations of sugar (35, 30, 25, and 20%) with jaggery (5, 10, 15, and 20%), respectively.

Procurement of aloe vera jam

The procedure of making aloe vera jam includes several steps to ensure quality. The fresh aloe vera from Vegetable and Fruit Development Center (VFDC), Department of Agriculture in Hlaing Ted, Thazi township. The sharp spines from aloe vera leaf margins were removed and washed and then cut into small slices of 3-4 mm in thickness and 4-5 cm in length. The fresh slices were blanched at 100 °C for 5-10 minutes as a pretreatment and then strained out the liquid. The blanched aloe vera slices were mixed with natural sweeteners of sugar and jaggery according to the respective treatment combination and then the mixture was heated at 100 °C for 20 - 30 minutes by adding 0.06% of the lemon juice and 0.5% of organic citric acid to enhance flavor and prolong shelf life. The heating process was done until the water activity level (a_w) was ≤ 0.7 to prevent the microbial contamination. Finally, the 100 g of finished aloe vera jam was allowed to cool for a while and then filled up into polyethylene terephthalate (PET) sterilized plastic bottle. They were stored at room temperature (28 - 32 °C) with relative humidity (RH) at ambient condition were daily recorded till the end of the experiment.

Data collection

The proximate compositions of moisture, crude fat, crude protein, total crude ash, and fiber content were analyzed at product day as well as 15, 30 and 75 days after storage according to [6] method. The physicochemical properties of water activity (a_w), pH, total soluble solid (°Brix) and total titratable acidity (TTA%) were also measured at the product day. The browning index (BI) was also collected at (0,15, 30, 45, 60 and 75) days after storage and the storage life (days) were also recorded. All data of aloe vera jam (without sweeteners) were collected at product day and up to 15 days while the jam treated with sugar only was collected till 30 days due to fungal spoilage.

Data analysis

All collected data were statistically subjected to analysis of variance (ANOVA) using Statistix 8.0 version software and treatment means were compared using least significant difference (LSD) test at 5% level of significance ($P < 0.05$).

Results and Discussion

Moisture content

The effect of different ratios of sweeteners on moisture content (%) of aloe vera jam on the product day (0 day) and during the storage period 75 days after storage is presented in Table 1. The moisture content in aloe vera jam showed significant differences among the treatments during the storage period. The moisture content of the sweetener added treatments was within the range of (27.15 to 32.51%). It was similar to the finding of [3], they found that the moisture content of aloe vera jam was within the range of (29.20 to 36.23%). At the product day, the control (without sweetener) showed the highest moisture content (65.22%), significantly greater than all sweetener treatments. The increase of moisture content in the control treatment over time is due to moisture absorption from the ambient environment as no sweetener was added to bind water. The lowest moisture content (27.15%) was observed in the treatment of jaggery only and followed by combination of 20% sugar and 20% jaggery by showing (28.18%) and 35% sugar and 5% jaggery (28.42%). Jaggery contains higher level of hygroscopic compounds such as minerals and invert sugars which more effectively bind water compared to refined sugar alone. A similar trend was observed at 30 days after storage where the control had the highest moisture content (66.35%) and the jaggery only treatment remained the lowest (29.20%). The combination of natural sweeteners of sugar and jaggery showed the acceptable moisture level which can regulate water holding capacity in the jam. Furthermore, [7] reported that the combination of natural sweeteners was crucial to the physicochemical stability of aloe vera jam during storage due to their hygroscopic properties and interactions with gel conditions which maintained structural integrity and prevent microbial growth.

Treatment	Moisture content (%)			
	Product day (0 day)	15 DAS	30 DAS	75 DAS
T_1	65.22 a	66.27 a	-	-
T_2	27.36 f	28.38 f	29.40 e	-
T_3	27.15 g	28.18 g	29.20 f	30.60 c
T_4	28.42 d	29.27 d	30.13 b	31.02 b
T_5	30.88 b	30.99 b	31.81 a	32.51 a
T_6	29.41 c	29.51 c	29.61 d	29.70 e
T_7	28.18 e	28.97 e	29.76 c	30.50 d
$LSD_{0.05}$	0.17	0.12	0.03	0.05
Pr>F	**	**	**	**
CV%	0.28	0.19	0.04	0.08

Table 1: Effect of different ratios of sweeteners on moisture content (%) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at $P<0.05$.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

Crude fiber

The effect of different ratios of sweeteners on crude fiber content (%) of aloe vera jam on the product day (0 day) and during the storage period 75 days is presented in Table 2. There were significant differences in crude fiber content of all treatments influenced by different ratios of sugar and jaggery. There was decreasing trend in crude fiber content during the storage. The crude fiber content of all treatment was within the range of (1.51 to 1.84%). According to [8], they observed that the crude fiber content of aloe vera based guava jam was within the range of (1.05 - 1.86%). At the product day, the crude fiber content was the highest value (1.84%) in the jaggery only treated aloe vera jam and followed by 20% of sugar and 20% jaggery treatment (1.82%) and the lowest crude fiber content in the control (without sweetener) treatment was observed (1.58%). These results suggested that combination of higher jaggery ratios and less sugar ratio efficiently improved the fiber content of the aloe vera jam during the storage [9].

Treatment	Crude Fiber (%)			
	Product day (0 day)	15 DAS	30 DAS	75 DAS
T_1	1.58 f	1.55 e	-	-
T_2	1.67 d	1.65 c	1.63 d	-
T_3	1.84 a	1.82 a	1.80 a	1.75 a
T_4	1.62 e	1.59 d	1.56 e	1.51 c
T_5	1.73 c	1.71 b	1.69 c	1.64 b
T_6	1.77 b	1.73 b	1.69 c	1.64 b
T_7	1.82 a	1.80 a	1.78 b	1.73 a
$LSD_{0.05}$	0.02	0.02	0.02	0.04
Pr>F	**	**	**	**
CV%	0.76	0.80	0.58	1.22

Table 2: Effect of different ratios of sweeteners on crude fiber (%) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at $P < 0.05$.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5 = 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

Crude ash content

The effect of different ratios of sweeteners on crude ash content (%) of aloe vera jam on the product day (0 day) and during the storage period of 75 days is presented in Table 3. The crude ash content of aloe vera jam was significantly differences among the treatments at the product day and during the storage. The highest crude ash content of jaggery only treatment was (0.45- 0.46%) while the lowest ash content was control (without sweeteners) (0.29%) at the product day and 15 days after storage. The crude ash content of all treatments was within the range of (0.29 to 0.51%). According to [3], they observed that the ash content of aloe vera based jam within the range of ash content was (0.37 to 0.53%). Similarly, the sugar and jaggery combination treatments slightly increased in crude ash content during the storage period. It might be the higher mineral content of jaggery and the gradual degradation of organic components. The combination of jaggery as a natural sweetener in aloe vera jam contributed to a higher mineral content, indicating that natural sweeteners enhanced the nutritional profile of fruit-based products [10].

Treatment	Crude ash content (%)			
	Product day (0 day)	15 DAS	30 DAS	75 DAS
T_1	0.29 f	0.29 f	-	-
T_2	0.32 e	0.32 e	0.32 e	-
T_3	0.45 a	0.46 a	0.47 a	0.51 a
T_4	0.36 d	0.38 d	0.40 d	0.45 c
T_5	0.39 c	0.41 c	0.43 c	0.48 b
T_6	0.42 b	0.43 bc	0.44 bc	0.47 bc
T_7	0.43 ab	0.44 b	0.45 b	0.48 b
$LSD_{0.05}$	0.03	0.02	0.02	0.02
Pr>F	**	**	**	**
CV%	4.22	2.88	2.47	2.56

Table 3: Effect of different ratios of sweeteners on crude ash content (%) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at $P < 0.05$.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

Crude fat

The effect of different ratios of sweeteners on crude fat (%) content of aloe vera jam on the product day (0 day) and during the storage period of 75 days is presented in Table 4. The crude fat content of aloe vera jam was significantly differences among the treatments at product day and during the storage. The highest crude fat content was observed in the jaggery only treatment (0.17%) followed by the sugar only treatment (0.16%) while the control (without sweeteners) showed the lowest fat content (0.07%). The jaggery only treatment maintained the highest fat content of (0.18%) and the lowest one (0.07%) was control (without sweeteners) during the storage. The crude fat content of all treatments was within the range of (0.07 to 0.22%). According to [3], they observed that the crude fat content was within the range of (0.1 to 0.5%). Among the treatments, the combination of sugar and jaggery retained the slightly increased crude fat content during the storage. The aloe vera jam treated with jaggery only treatment was higher fat content than that of sugar only treatment. According to [11], the previous research indicated that natural sweeteners such as jaggery affected the lipid content and overall proximate composition of fruit-based jams.

Treatment	Crude Fat (%)			
	Product day (0 day)	15 DAS	30 DAS	75 DAS
T_1	0.07 f	0.07 f	-	-
T_2	0.16 ab	0.17 ab	0.18 ab	-
T_3	0.17 a	0.18 a	0.19 a	0.22 a

T_4	0.15 bc	0.16 bc	0.17 bc	0.20 ab
T_5	0.14 cd	0.15 cd	0.16 c	0.19 b
T_6	0.13 d	0.14 d	0.15 c	0.18 b
T_7	0.11 e	0.11 e	0.11 d	0.11 c
$LSD_{0.05}$	0.01	0.01	0.02	0.03
Pr>F	**	**	**	**
CV%	5.69	4.56	6.58	7.27

Table 4: Effect of different ratios of sweeteners on crude fat (%) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at P<0.05.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

Crude protein

The effect of different ratios of sweeteners on crude protein (%) content of aloe vera jam on the product day (0 day) and during the storage period of 75 days is presented in Table 5. At the product day, the control treatment (without sweeteners) protein content was observed (0.74%), the jaggery only treatment showed that (0.88%) and the combination of 20% sugar and 20% jaggery treatment was (0.87%). The crude protein content of all treatments was within the range of (0.62 to 0.88%). According to [12], they observed that the range of crude protein content in the aloe vera jam was (0.61 to 0.88%). The jam treated with jaggery-only was higher protein content than the control (without sweeteners) and sugar treated jam among the treatments.

Treatment	Crude Protein (%)			
	Product day (0 day)	15 DAS	30 DAS	75 DAS
T_1	0.74 e	0.70 d	-	-
T_2	0.82 c	0.79 b	0.76 b	-
T_3	0.88 a	0.86 a	0.83 a	0.75 a
T_4	0.78 d	0.75 c	0.71 c	0.63 c
T_5	0.75 e	0.72 d	0.68 d	0.62 c
T_6	0.86 b	0.81 b	0.76 b	0.67 b
T_7	0.87 a	0.85 a	0.83 a	0.75 a
$LSD_{0.05}$	0.01	0.03	0.03	0.03
Pr>F	**	**	**	**
CV%	0.74	1.80	1.98	2.66

Table 5: Effect of different ratios of sweeteners on crude protein (%) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at P < 0.05.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

The combination of 20% sugar and 20% jaggery was the highest crude protein (0.85%) and the lowest content (0.70%) was observed as control (without sweeteners). There was decreasing trend in crude protein among the treatments during the storage. The reason might be protein denaturation or interactions with sugars.

Water activity (aw)

The effect of different ratios of sweeteners on water activity (a_w) of aloe vera jam on the product day (at 0 day) is presented in Table 6. The water activity (a_w) of aloe vera jam was non-significant affected by different ratios of sweeteners at product day. The water activity of all treatments was within the range of (0.746 - 0.753). Water activity (a_w) was closely related to the amount of unbound water available for microbial growth rather than the total moisture content. Therefore, although the sweetener ratios varied, the amount of free water available in the aloe vera jam remained relatively constant among the treatments. This finding was in agreement with [13], they reported that the water activity of fruit jams generally ranges from 0.60 to 0.85. Within this range, fruit jams are less favorable for bacterial growth and were more susceptible to spoilage by yeasts and molds than by bacteria.

pH

The effect of different ratios of sweeteners on pH value of aloe vera jam on the product day (at 0 day) is presented in Table 6. The pH of aloe vera jam was significantly affected by different ratios of sweeteners. The pH of control treatment (3.63) was significantly higher than that of other treatments jam at 0 day. Among the treatments, the lowest pH value was observed in the combination of 20% sugar and 20% jaggery (2.23) and the highest value was (3.63) as the control (without sweeteners) treatment. The pH range of aloe vera jam was within the range of (3.23 to 3.62). The result was similar with [9], they reported that the pH of aloe vera based guava jam was in the range of (3.09 to 3.65). The acidic nature of aloe vera jam throughout the storage period was desirable because low pH values contribute to product stability by inhibiting the growth of spoilage microorganisms and improving shelf life.

Total titratable solid (TTA) %

The effect of different ratios of sweeteners on total titratable acidity TTA% of aloe vera jam on the product day (at 0 day) is presented in Table 6. The significantly difference was observed in the total titratable acidity of aloe vera jam affected by different ratios of sweeteners. Among the treatment, the highest total titratable acidity (0.56%) was observed in the jaggery-only treatment, and the lowest (0.28%) as control (without sweetener) treatment. The total titratable acidity of aloe vera jam was observed within the range of (0.56 - 0.28%). According to [9], they found that the TTA% of aloe vera based guava jam was in the range of (0.57-0.78%). The higher ratios of jaggery containing treatments generally exhibited greater acidity than those containing sugar alone, possibly due to the natural acidic constituents present in jaggery. The total titratable acidity of the aloe vera jam contributed positively to product preservation by inhibiting microbial growth and enhanced shelf stability. Therefore, the increase in TTA observed throughout storage indicated the maintenance of desirable preservation characteristics in the jam.

Total soluble solids (TSS) °Brix

The effect of different ratios of sweeteners on total soluble solids TSS (°Brix) of aloe vera jam on the product day (at 0 day) is shown in Table 6. Different ratios of sweeteners and all treatments had a highly significant influenced on the total soluble solids of aloe vera jam. The total soluble solids of sugar-treated jam were significantly higher than those of jaggery-only-treated and combined sugar and jaggery treated jam at product day (0 day). Among the treatments, the highest TSS value was observed in the sugar treatment (60.67 °Brix), while the lowest TSS value was (13.00 °Brix) as the control (no sweeteners) treatment. The total soluble solids value of the control was significantly lower than that of all the sweeteners used in other jam treatments, which may be attributed to the absence of any added sweetener. The total soluble solids of aloe vera jam with sweetener treatments ranged from (48.33 to 60.67) °Brix on the product day. Similar finding [14], they observed that the TSS value of tomato jam was within the range of (39.79 - 66.42) °Brix. The combination of sugar and jaggery maintained soluble solid that improved product stability.

Browning index (BI)

The effect of different sweetener ratios on the browning index (BI) of aloe vera jam on the product day (day 0) and during 75 days is presented in Table 7. The browning index was significantly affected by the treatments. Among all treatments, the jam prepared with 40% jaggery (T_3) showed the highest BI throughout the

Treatment	Product day			
	Water activity	pH	TTA	TSS
T_1	0.753	3.63 a	0.28 f	13.00 f
T_2	0.750	3.53 b	0.33 e	60.67 a
T_3	0.750	3.43 c	0.56 a	48.33 e
T_4	0.750	3.47 bc	0.34 e	56.00 b
T_5	0.746	3.43 c	0.40 d	53.67 bc
T_6	0.747	3.33 d	0.45 c	52.00 cd
T_7	0.747	3.23 e	0.52 b	49.00 de
Pr>F	ns	**	**	**
$LSD_{0.05}$	0.007	0.07	0.02	3.10
CV%	0.58	1.19	2.92	3.67

Table 6: Effect of different ratios of sweeteners on physicochemical properties of aloe vera jam at the product day (0 day).

In a column, means followed by the same letters are not significantly different at $P < 0.05$.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

storage increasing from 45.72 to 48.16 indicating greater non-enzymatic browning reactions over time. In contrast, the jam with 40% sugar (T_2) had the lowest BI among the sweetener treatments with color stability. These results suggest that jaggery contributed more browning color due to the presence of reducing sugars and minerals while sugar maintained a lighter color in aloe vera jam during storage. Among the combination of sugar and jaggery treatments, 20% of sugar and 20% of jaggery maintained relatively stable browning values during storage while the increasing of jaggery ratio resulted in more browning color. According to previous findings [15], the increase in browning during storage is attributed to the presence of reducing sugars, which enhanced Maillard reactions and caramelization leading to increased formation of brown pigments.

Treatment	Browning index (BI)					
	Days after storage					
	0	15	30	45	60	75
T_1	38.15 g	38.48 f	-	-	-	-
T_2	39.27 f	39.52 e	40.09 e	-	-	-
T_3	45.72 a	46.20 a	46.30 a	46.89 a	47.08 a	47.71
T_4	40.26 e	41.12 d	41.76 d	42.86 c	43.94 c	44.66
T_5	41.11 d	42.30 c	42.31 c	42.67 c	43.85 c	43.98
T_6	44.16 c	44.67 b	45.10 b	44.41 b	45.26 b	43.91
T_7	44.61 b	44.74 b	45.07 b	45.17 b	45.36 b	45.84
Pr>F	**	**	**	**	**	ns
$LSD_{0.05}$	0.11	0.08	0.15	0.75	0.98	1.48
CV%	0.14	0.11	0.19	0.9	1.15	1.74

Table 7: Effect of different ratios of sweeteners on Browning index (BI) of aloe vera jam till 75 days.

In a column, means followed by the same letters are not significantly different at $P < 0.05$.

** = significant at 1% level; T_1= Control; T_2 = 40% Sugar; T_3 = 40% Jaggery; T_4 = 35% Sugar +5% Jaggery; T_5= 30% Sugar +10% Jaggery; T_6 = 25% Sugar +15% Jaggery; T_7 = 20% Sugar +20% Jaggery product day = 10 hrs. after product.

Conclusion

Aloe vera is a rich source of nutrients and essential minerals. The aloe vera jam making process plays an important role in medicinal purpose by creating value-added products and enhancing human health. Aloe vera jam prepared with two sweeteners of sugar and jaggery by with 40% of different sweeteners (sugar and jaggery) by respectively different combination ratios such as (35+5, 30+10, 25+15 and 20+20%) significantly affected the physicochemical attributes of the aloe vera jam during the room temperature storage. Among the treatments, aloe vera jam treated with any ratio of jaggery showed significantly higher in crude fiber, crude protein, crude fat, crude ash and properties of high total titratable acidity with lower in total soluble solids and moderate pH value were observed. The combination sugar and jaggery (20+20%), showed the second highest content in fiber, protein and ash; however, it was lower in fat content and pH value than that of only jaggery treatment, while it was high in total soluble solids. The combination (25+15%) of sugar and jaggery retained the moderate level of crude fiber among the other treatments. The aloe vera jam treated by the combination (20+20%) of sugar and jaggery had more in fiber and protein content with longer storage life. The jaggery had its higher mineral and nitrogenous compound content compared to refined sugar contributed to improved nutritional composition in fruit-based jam. The higher jaggery ratio of aloe vera jam resulted in higher value of browning index. However, jaggery should be used for homemade consumption and the combination should be the same ratio of sugar and jaggery.

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