



FORMULATION OF ALOE BASED FRUIT SQUASHES

Home Science

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ABSTRACT

Aloe vera juice has a unique texture, taste and flavour which are not preferred by many but yet consumed for its medicinal properties. Keeping its medicinal properties intact by avoiding heat treatment it is essential to process it into a product having good consumer appeal. Thus research work was undertaken to process aloe vera into squash along with different fruits and tomato. Fresh aloe juice prepared from aloe gel without any preservative added to it. This juice mixed with fruit juices like lime, pineapple, papaya and grapes and made into squashes. The squashes stored in glass bottles. These squashes were analyzed for chemical changes, microbial load and organoleptic characteristics during the storage period of 90 days. The aloe fruit squashes were kept in a refrigerator for conducting storage study. This study has shown that it is possible to prepare aloe fruit squash with good acceptability and possessing both medicinal properties and having good nutritional properties and keeping quality.

KEYWORDS:

INTRODUCTION

The herb aloe vera is as old as human civilization. All the ancient civilizations like Indus valley, Egyptian etc. present documented evidences of utilizing aloe's versatile properties for various purposes. The popularity of aloe stands unabated till date as people all over the world are still using aloe's unparalleled healing power to their benefits. Aloe can be used in raw or in processed forms. It can be used both externally and internally (Bradshaw, 1996) Aloe vera juice has a unique texture, taste and flavour which are not preferred by many but yet consumed for its medicinal properties. Keeping its medicinal properties intact by avoiding heat treatment it is essential to process it into a product having good consumer appeal. Thus research work was undertaken to process aloe vera into squash along with different fruits.

MATERIALS AND METHODS

Fresh aloe juice, without any preservative added to it, was procured in bottles of 500 ml capacity from an aloe processing unit at Kottampatti in Madurai district. According to the producers, it is safe to store aloe juice for one month in refrigerated condition. Good, ripe, firm lime (*Citrus aurantifolia*), pineapple (*Ananas comosus*), papaya (*Carcia papaya*), grapes (*Vitis vinifera*), sugar and preservatives were purchased from local market. Aloe fruit squashes were stored in glass bottles of 700 ml capacity with plastic caps. The aloe fruit squashes were kept in a refrigerator for conducting storage study.

Method

To study the keeping quality of aloe juice (A) 600ppm of potassium metabisulphite was added to one bottle of aloe juice and kept for storage study in refrigerated condition. To arrive at the right proportion of aloe vera fruit juice suitable for squash preparation, aloe vera juice and fruit juices were mixed in different proportions such as 3:1, 2:1, 1:1 to find out the ratio suitable for squash preparation. It was found that 1:1 proportion was the most acceptable. Hence all the squashes were prepared with 1:1 ratio of aloe vera and fruit juice.

Chemical analysis

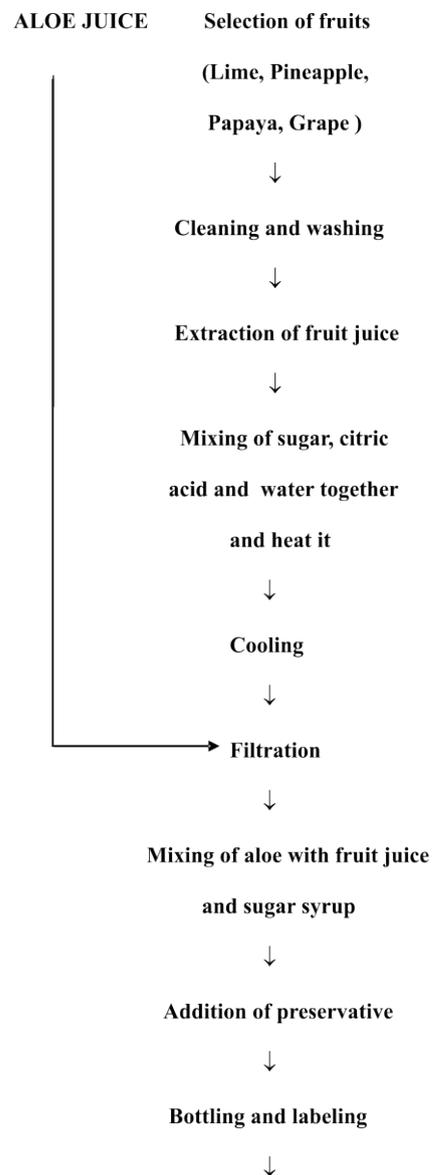
Appropriate procedures were followed to analyze the changes in various chemical constituents of the products during storage. The parameters studied were pH (Hart and Ficher 1971), Total Soluble Solids (TSS) (Ranganna, 1995), acidity (Ranganna 1995), reducing and total sugar, vitamin C (Madhavan and Sridhar 1986), -carotene (Ranganna 1995), and antioxidant activity (AOA) (Emmons et al., 1999). The stored squashes were analyzed for chemical changes, microbial load and organoleptic characteristics during the storage period of 90 days.

The microbial load of the samples was enumerated by the method described by Istawan Kiss (1984). Organoleptic evaluation was conducted once in 15 days for all the squashes by a panel of ten judges using a score card with 9-point hedonic scale rating (Watts et al, 1989). Preparation of squash

The flow chart for preparation of aloe-fruit squash is given in Fig-1.

FIG-1

FLOW CHART FOR PREPARATION OF SQUASH



RESULTS AND DISCUSSION

Fresh aloe juice is known to have a keeping quality of 30 days in refrigerated condition. To enhance the keeping quality of aloe juice a storage study was carried out with the addition of potassium metabisulphite.

Table. Changes in mean pH of aloe - fruit squashes during storage

Number of days	AL	AP	APa	AG
0	4.00	5.50	5.98	5.01
45	3.93	5.06	4.77	4.23
90	3.85	5.03	3.96	4.73
Percent change	3.75	8.54	33.78	5.59

The percentage change of pH was found to be more (2.02) in Aloe-papaya when compared to other type of squashes. The changes in pH may be due to increase in acidity of squashes.

Table2. Changes in mean TSS (°Bx) of aloe- fruit squashes during storage

Number of days	AL	AP	APa	AG
0	45.3	45.4	45.2	45.0
45	46.2	46.5	46.5	46.5
90	47.6	48.0	47.3	47.9
Percent change	5.08	5.73	4.65	6.44

The percentage change of TSS was found to be minimum in aloe-tomato squash when compared to other type of squashes. Hence the amount of sugar was minimum in aloe-papaya, aloe-lime, aloe-pineapple and aloe-grape.

Table 3. Changes in mean acidity of aloe –fruit squashes during storage (g %)

Number of days	AL	AP	APa	AG
0	1.10	1.05	1.14	1.30
45	1.17	1.15	1.24	1.38
90	1.23	1.23	1.33	1.48
Percent change	11.82	17.14	16.67	13.85

The percentage increase in acidity was found similar in aloe-pineapple, aloe-papaya squashes. The percentage increase in acidity of aloe-lime, aloe-grape squashes were 11.82 and 13.85.

Table 4. Changes in mean reducing sugar of aloe-fruit squashes during storage (g%)

Number of days	AL	AP	APa	AG
0	1.34	4.26	9.88	11.98
45	1.35	4.28	9.91	12.17
90	1.39	4.33	9.96	12.95
Percent change	3.73	1.64	0.81	8.10

The mean reducing sugar in all the samples of aloe-lime, aloe-pineapple, aloe-papaya, aloe-grape and aloe-tomato squashes increased during the storage. The percentage increase of reducing sugar in aloe – grape was the highest when compared to other squashes. It may be due to break down of total sugars into simple sugars.

Changes observed in the total sugar of aloe- lime, aloe- pineapple, aloe- papaya, aloe –grape are presented in table⁶.

Table 5. Changes in mean total sugars of aloe- fruit squashes during storage (g%)

Number of days	AL	AP	APa	AG
0	4.06	12.21	11.71	14.24
45	3.97	12.17	11.60	14.20
90	3.75	12.00	10.95	13.24
Percent change	7.63	1.72	6.49	7.02

The percentage change of total sugars was found to be similar in aloe-lime and aloe-grape squashes. The decrease in percentage of total sugar was observed in aloe-pineapple squashes. The decrease in total sugars is due to its hydrolysis into simple sugars.

Table 6. Changes in mean vitamin C content of aloe- fruit squashes during storage (mg %)

Number of days	AL	AP	APa	AG
0	25.00	24.00	33.35	12.03
45	24.53	23.30	32.00	11.53
90	23.22	21.22	30.98	10.21
Percent change	7.12	11.58	7.11	15.13

It was found that aloe – papaya squash had the highest vitamin C content when compared to other type of squashes. The highest reduction was observed in aloe-papaya and aloe-lime squashes. Such reduction may be due to denaturation of vitamin C and carotene by light and heat.

Table 7. Changes in mean - carotene and lycopene content of aloe-fruit squashes during storage (g/100g)

Number of days	AP	APa	AG	β- carotene
0	9.00	333.00	1.50	175.5
45	8.62	255.46	1.20	170.0
90	8.19	207.92	1.15	165.0
Percent change	9.00	37.56	23.33	5.98

It was observed that aloe-papaya had the highest of -carotene content. This is due to the high amount of -carotene in papaya. Similarly aloe-tomato squash also had the next highest -carotene level. Aloe–grape squash had the least -carotene. Since tomato has a good amount of lycopene which also possess beneficial properties like that of -carotene.

Table 8. Mean sensory evaluation scores (overall acceptability) obtained for aloe – fruit squashes by using 9-1 hedonic scale.

Number of days	AL	AP	APa	AG
0	9.0	9.0	7.5	8.0
45	9.0	8.5	7.0	8.0
90	9.0	8.0	7.0	7.0
Percent change	0	11.11	6.66	12.5

It was found that the aloe-lime and aloe-pineapple squashes had go the highest score of 9.0 indicating good preference by the judges. Aloe-grape squash was the next preferred followed by aloe-papaya. There was a general reduction in preference, but to various extents. However, aloe-lime squash was as acceptable at the end of the storage as it was at the beginning. There were only negligible reductions in the scores for overall acceptability for other aloe-fruit squashes.

Table 9. Change in mean antioxidant activity of aloe squashes during storage (%)

Number of days	AL	AP	APa	AG
0	77.16	91.06	55.58	66.66
45	69.33	90.17	51.11	65.30
90	61.22	85.02	43.72	60.82
Percent change	20.65	6.63	21.34	8.76

The percentage change of antioxidant activity was found to be same and more in aloe-lime and aloe – papaya squash when compared to other squashes. Antioxidant activity of aloe juice was more when compared to other type of squashes. This reduction may be due to denaturation of vitamin C and carotene.

Table 10. Bacterial, Yeast and Fungal count of aloe – fruit squashes during storage period (10⁵, 10³ X 10³ cfu/g)

Types of Squash	Bacteria X105			Yeast X 103			Fungi X 103		
	Initial	45 th days	90 th day	Initial	45 th day	90 th day	Initial	45 th day	90 th day
AL	BDL*	1	2	0	2	3	1	3	3
AP	BDL	1	1	0	2	3	2	2	3
APa	BDL	2	2	1	2	4	0	1	2
AG	BDL	1	3	2	3	4	0	1	2

*- Below Detectable Level

The presence of microbial at initial level was below detectable level and the final level of microbial load of aloe-lime, aloe-pineapple, aloe-

papaya, aloe-grape, aloe-tomato were 2, 1, 2, 3 and 1 X 10⁵ cfu/g respectively

CONCLUSION

This study has shown that it is possible to prepare aloe fruit squash with good acceptability and possessing both medicinal properties and having good nutritional properties and keeping quality. Therefore aloe fruit squashes can be popularized as health drinks to consumers. Inclusion of fruit juice to aloe vera increased the level of antioxidant activity of all the aloe vera- fruit squashes. Aloe-lime and aloe-pineapple squashes are more acceptable.

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