



BROWNING ANALYSIS OF DIFFERENT KARONDA PROCESSED PRODUCTS DURING STORAGE

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Abstract

The Karonda products (jelly, jam, candy and squash) are consumed and liked by everyone whether a child, an old, a poor or a rich man. The commercial candy, jelly and squash in our country is quite expensive. This gave an idea to standardize the unconventional jelly, jam, candy and squash making by using karonda fruits and to assess their physico-chemical and organoleptic qualities during storage. An experiment was carried out at Post-harvest Technology Laboratory of Department of Horticulture, Allahabad Agricultural Institute-Deemed University, Allahabad (U.P.), India. In this experiment, maximum browning were studied in processed products. Results showed that the maximum browning was recorded in candy and minimum in jelly and squash. It was clear from the experiment that the trend of browning was decreasing in storage.

Key words : Karonda fruits, kitchen garden, climate, fencing bush, completely randomized design (CRD).

Introduction

Karonda is an indigenous fruit of India and belongs to the family Apocynaceae. Karonda is a very hardy evergreen bush growing well even on marginal and inferior land when most other fruits either fail to grow or give poor performance. It is found in Africa, Australia and Tropical Asia, particularly in Western Peninsula and dry tracts of India, Sri Lanka and Malaysia mainly in wild form. In India, it was cultivated by the Europeans in kitchen garden to get fruit for jelly preparation. Karonda is evergreen thorny Bushes, which thrive well throughout tropical and sub-tropical climate (Singh and Singh, 1992). Almost every part of plant is used for one purpose or other. Karonda fruit is rich source of minerals especially iron and calcium. It is also rich in pectin. Its vitamin C content is higher than apple and banana. The fruit has a potential for processing. Fruit is used for preparation of jelly, pickle and preserve (Singh 1984). The ripe fruit having anti-scorbutic properties is reported to be cooling, acidic and useful in bilious (Watt, 1972). Fruit is slightly sour and astringent in taste, therefore its cultivation is only confined as a fencing bush and it is not popular as desert fruit.

Materials and Methods

The present investigation was carried out at Post-harvest Technology Laboratory, Department of Horticulture, Allahabad Agricultural Institute-Deemed University, Allahabad (U.P.), India to evaluate the consumers acceptability of karonda fruit (*Carissa carandas* L.) products prepared by various recipes. Analysis of browning of the products were done in Biochemistry Laboratory of Department of Biochemistry, A.A.I.-D.U., Allahabad. Glass bottles were used as packaging material for storage of jelly, jam, candy and squash. The data of the experiment was statistically analyzed by using C.R.D. (Completely Randomized Design) with three replications.

Method of determination of browning content

The samples were centrifused for 15 minutes at 4000 rpm. Take 20 ml of centrifugate, 30 ml of alcohol was added and kept for half an hour. Thereafter it was filtered through Watman filter paper no. 1 and colour of clear extract was measured at 440 nm by spectonic-20 using 60% aqueous alcohol as drink. The increase in absorbance of sample extract at 440 nm is taken as measure of non-enzymatic browning (Rangana, 1977).

Table 1 : Organoleptic quality of different recipes of karonda jelly.

Recipe no.	Juice and sugar ratio	Tss (°Brix)	Acidity (%)	Organoleptic quality	
				Score	Rating
1	1:1	68.00	0.30	7.43	Like moderately
2	1:1.2	68.50	0.30	7.28	Like moderately
3	1:1.5	69.00	0.32	7.30	Like moderately
4	1:1.6	72.00	0.32	8.26	Like very much
5	1:1.7	71.00	0.33	8.19	Like very much
6	1:1.8	70.00	0.33	7.44	Like moderately
S.Ed.		1.00	0.03	0.16	-
C.D. at 5%		2.17	0.06	0.34	

Table 2 : Organoleptic quality of different recipes of karonda jam.

Recipe no.	Pulp and sugar ratio	Tss (°Brix)	Acidity (%)	Organoleptic quality	
				Score	Rating
1	Pulp mixed with 700 g of sugar	73.00	0.20	7.22	Like moderately
2	Pulp mixed with 750 g of sugar	73.00	0.21	7.33	Like moderately
3	Pulp mixed with 800 g of sugar	74.00	0.21	7.58	Like moderately
4	Pulp mixed with 850 g of sugar	74.00	0.20	7.75	Like very much
5	Pulp mixed with 950 g of sugar	76.00	0.20	7.40	Like very much
6	Pulp of apple and karonda mixed with equal proportion of sugar	80.00	0.22	7.65	Like moderately
S.Ed.		1.00	0.03	0.16	-
C.D. at 5%		2.17	0.06	0.34	

Standardization of technique for processing

Jelly

Data on formulation of recipes and organoleptic quality of karonda jelly are furnished in table 1. Juice extract and sugar ratio of 1:1.6 with 0.32 per cent acidity was recorded as an ideal recipe for making jelly from karonda fruits. The score of this recipe differed significantly from all other recipes used for making jelly.

Jam

Data on formulation of recipes and organoleptic quality of karonda jam are furnished in table 2. Karonda pulp 500 g and sugar 850 g with 0.20 per cent acidity was recorded as an ideal recipe for making jam from karonda fruits. The score of this recipe differed significantly from all other recipes used for making jam.

Candy

Data furnished in table 3 show the organoleptic quality of karonda candy, prepared using the recipe of 78.88 per

cent or ° brix total soluble solids and 0.41 per cent acidity was best among all the recipes. The score of this recipe differed significantly from all other recipes used for making jelly.

Squash

Data on formulation of recipes and organoleptic quality of karonda squash are furnished in table 4. Results indicate that the recipe containing juice and sugar ratio 1:1.5 with the 0.20 per cent acidity was found to be the best followed by recipe containing juice and sugar ratio 1:1.2 with 0.21 per cent acidity.

Results

Mean score of browning of the various karonda products prepared by ideal recipe is given in table 5 with S.E. and C.D. values at the bottom. Maximum mean scoring of browning 0.53 was observed in 90 and 120 days of storage period and scoring was minimum to 0.39 O.D. in freshly prepared products. An increasing trend

Table 3 : Organoleptic quality of different recipes of karonda candy.

Recipe no.	Recipes of karonda candy	Tss (° brix)	Acidity (%)	Organoleptic quality	
				Score	Rating
1.	Whole fruit without pectin coating	74.21	0.40	7.46	Like moderately
2.	Segmented fruit without pectin coating	75.73	0.40	7.35	Like moderately
3.	Whole fruit with pectin coating	78.88	0.41	7.56	Like moderately
4.	Segmented fruit with pectin coating	77.64	0.41	7.22	Like very much
5.	Fruits without coating i.e. control	78.90	0.40	7.25	Like very much
S.Ed.		1.15	0.03	0.04	-
C.D. at 5%		2.55	0.06	0.03	

Table 4 : Organoleptic quality of different recipes of karonda squash.

Recipe no.	Juice and sugar ratio	Tss (° brix)	Acidity (%)	Organoleptic quality	
				Score	Rating
1	1:1	44.33	0.21	7.30	Like moderately
2	1:1.2	49.66	0.21	7.35	Like moderately
3	1:1.5	50.33	0.20	7.55	Like moderately
4	1:1.6	52.33	0.21	7.26	Like very much
5	1:1.7	54.66	0.21	7.25	Like very much
S.Ed.		0.78	0.02	0.08	-
C.D. at 5%		1.73	0.04	0.17	

Table 5 : Changes in Browning (O.D.) during storage of Karonda products.

Products (A)	Storage period (B)					Mean
	0 Days	30 Days	60 Days	90 Days	120 Days	
Jelly	0.15	0.17	0.19	0.20	0.20	0.18
Jam	0.59	0.62	0.63	0.65	0.63	0.63
Candy	0.73	0.74	0.75	0.77	0.77	0.76
Squash	0.04	0.06	0.09	0.11	0.12	0.08
Mean	0.39	0.44	0.46	0.53	0.50	

Comparison	S.E.	C.D. at 5%	F-test
Difference between two product means A	0.002	0.004	S
Difference between two storage period means B	0.002	0.004	S
Difference between two product mean and two storage period means AB	0.004	0.009	S

was recorded up to 120 days of storage as compared to scoring of the fresh products. It is clear from the data given in the table that the browning of the various products (jelly, jam, candy and squash) in different storage periods were significant and the interaction between products and storage periods were also significant. The highest mean score of browning was recorded in candy *i.e.* 0.76 O.D followed by jam *i.e.* 0.63 O.D., jelly 0.18 O.D. and squash 0.08 O.D.

Discussion

Browning of the karonda products increased gradually with storage period in present findings. This could be mainly due to the non-enzymatic reactions of organic acids with sugars. Kapoor *et al.* reported that oxalic acid and pyruvic acid caused maximum browning with fructose sugar. Stadman reported that decline in ascorbic acid content of fruit products might be one of the possible reason for browning of the products. The present findings also supported the contention that reduction in ascorbic acid content during storage of karonda products corresponding an increase in browning. An increase in browning was also reported in bael products (Roy and Singh, 1979), intermediate aonla preserve (Sethi, 1980), phalsa beverages (Khurdia and Anand, 1981), guava jelly (Kalra *et al.*, 1983), jamun squash and jelly (Ashraf, 1987), aonla jam and candy (Pathak, 1988 and Deen, 1992), date palm jelly (Ali *et al.*, 1990), papaya jam and candy (Kumar, 1990) and litchi squash (Singh and Singh, 1994).

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