

Short Communication

Shelf life of Karonda jams (*Carissa carandas* L.) under ambient temperature

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The studies were based on variations of sugar and to find out the best treatment for maximum storage period. The experiment comprised of 5 levels of addition of sugar and data obtained was analyzed by completely randomized design. Results obtained from study showed that Treatment 4 (1000 g pulp + 1150 g sugar) possessed an ideal value of total soluble solids (TSS), pH, acidity, moisture, ascorbic acid, iron, and overall acceptability at 0, 20, 40 and 80 days of storage. These seven parameters show that the quality of Karonda jam obtained by incorporating 1150 g of sugar was of good texture and quality. Based on the experimental study it was concluded that among all the treatments, treatment 4 was the best with regard to physical, chemical and sensory parameters of jam.

Key words: Karonda jams, sugar concentrations, preservation, shelf life.

INTRODUCTION

Fruits are amongst the first food items known consumed prehistorically by human beings. Fruits whether fresh, dried or processed have always formed a part of the staple diet of human beings because they are rich in nutrients and provide some of the essential minerals, vitamins, and the like, apart from that, they also help in curing a number of diseases. Preservation is a way to keep fruits for longer duration as it prevents the food from decay and spoilage. Karonda is a fruit of dry areas containing fair amount of vitamin C and minerals. The Karonda fruit is an astringent, antiscorbutic and as a remedy for biliousness and useful for cure of anemia. In traditional medicine the fruit is used to improve female libido and to remove worms from the intestinal tract. The fruits have anti-microbial and antifungal properties and its juice used to clean old wounds which have become infected. The fruit have an analgesic action as well as an anti-inflammatory one. The juice can be applied to the skin to relieve any skin problems. Fruits are generally harvested at immature stage for vegetable purpose, fully ripen fruits are consumed fresh or processed. Traditional

healers of Chhattisgarh, India have expertise in treatment of different types of cancer from Karonda.

Carissa Carandas Linn. (Karonda) is a widely used medicinal plant by tribals throughout India and popular in various indigenous system of medicine like ayurveda, unani and homoeopathy. Karonda is good appetizer. Usually the fruit is pickled before it gets ripened. Ripe Karonda fruit contains high amount of pectin therefore it is also used in making jelly, jam, squash, syrup, tarts and chutney which are of great demand in international market. According to FPO specifications, a jam should contain a minimum of 68% TSS in the final product and the fruit content in the final product should not be more than 45% (w/w).

Preservation of Karonda jam in glass jars, which cannot be hermetically sealed is rather difficult, as the surface of the jam in the jar is susceptible to mould growth and after moisture evaporation from the jam resulting in surface graining and also shrinkage of jam. Developing countries are being encouraged to diversify their food exports by developing new products and adding more value to

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Table 1. Chemical parameters of Karonda jam during storage at room temperature.

Treatment	pH Days after storage			Total soluble solids (%) days after storage			Acidity (%) days after storage			Moisture (%) days after storage			Ascorbic acid (mg/100 g) days after storage			Iron content (mg/100 g) days after storage		
	0	40	80	0	40	80	0	40	80	0	40	80	0	40	80	0	40	80
T1	3.6	3.5	3.4	64	67	68	0.76	0.79	0.80	20	17	14.5	3.6	3.4	3.1	36.7	35.2	32.6
T2	3.6	3.5	3.6	66	68	70	0.75	0.77	0.79	21	19	18	3.5	3.2	2.9	36.0	35.3	32.7
T3	3.7	3.6	3.6	66	68	70	0.75	0.77	0.79	21	19	18	3.5	3.2	2.9	36.0	35.3	32.7
T4	3.7	3.6	3.5	67	68	70	0.75	0.77	0.79	22	21	19	4.0	3.7	3.5	37.0	35.4	30.8
T5	3.8	3.6	3.5	69	71	73	0.72	0.75	0.77	23	22	20	3.8	3.5	3.4	37.0	35.4	32.7
SEM ±	0.08	0.06	0.12	1.31	1.23	0.65	0.01	0.01	0.01	0.63	0.60	0.75	0.10	0.06	0.09	0.07	0.20	0.11
CD at 5%	0.20	0.15	0.28	3.03	2.85	1.51	0.02	0.02	0.27	1.45	1.39	1.73	0.24	0.14	0.21	0.17	0.20	0.11

existing products. High concentration of sugar facilitates storage (Tarr and Baker, 1985; Bhandari, 2004) as such it was suggested to determine the best treatment of sugar variation in Karonda jam for maximum storage.

MATERIALS AND METHODS

The experimental work was conducted in the laboratory of Horticulture Department, SHIATS Allahabad during 2008 to 2009. There were five treatment combinations and experiment was laid out in completely randomized block design with three replications. The fruits selected for processing purpose were crushed in Karonda Grater and the pulp collected was subjected to boiling and concentrated by adding sugar till the end point was judged through drop test, TSS (68 to 70%) and by sheet test.

Different concentrations of sugar like 850, 950, 1050, 1150 and 1250 g were added to 1.0 Kg of fruit pulp as 1, 2, 3, 4 and Treatment 5, respectively. The observations were recorded on physical characteristics like pH, TSS, acidity, moisture, ascorbic acid, iron content and physical parameters like texture, flavor, color, appearance, taste, after taste and over all acceptability.

RESULTS AND DISCUSSION

All the treatments in the present investigation had significant impact for all observed traits. However,

treatments differed significantly from one another at various time intervals (Tables 1 and 2). Among the chemical parameters observed pH, moisture content, ascorbic acid content and iron showed a gradual decline where as total soluble solids, total acidity registered a subsequent increase. Similar results were also obtained by Karhasushenko (1998) and Pino et al. (2004). pH of all the treatments underwent a decrease during preservation because of an increase in overall acidity of jam during preservation. All the treatments showed better values of pH during storage but the Treatment 4 showed an ideal value of pH during storage thus indicating 1150 g of sugar may be recommended for 1 kg of Karonda pulp as jam at this pH possesses a good setting property. The hydrogen ion concentration indicates strength of jam. There was a regular decrease of pH value of all the treatments during storage. Similar findings were also obtained by some other scientists Baker (1989); Joseph (1994); Lal et al. (1998) and Dheeraj et al. (2008). TSS of all treatments underwent an increase because of breakdown of complex sugar in to simple sugar during the period of preservation. TSS of Treatment 4 was found to be ideal during the period of storage (Table 1). Jam at this TSS possesses a firm texture, excellent body and sweet taste. Observations showed a

subsequent increase in TSS values for all the treatments during storage.

Ashraf (1987) and Manivasagan et al. (2006) also reported similar results in different studies. Total titrable acidity determines the strength of jam and there was a subsequent increase in total acidity of jam during preservation and acidity of Treatment 4 was found in accurate range (see Table 1). Jam at this titrable acidity possesses a firm texture and good setting property. Similar results were reported by Wang (1999) and Singh and Kumar (2000). Moisture content of all the treatments decreased during preservation and increased with enhancement of sugar concentration in Karonda pulp. All the treatments registered better water activity values and the best water activity values were recorded for 4 and 5 Treatment. The water content of jam directly controls chemical reaction rates and microbial activity. These findings are supported by different research works reported by Gordon et al. (2000) and Nayak et al. (2011).

Ascorbic acid content showed a gradual decrease during preservation because of breakdown of ascorbic acid by anti ascorbic acid compounds. The maximum ascorbic acid content was found in Treatment 4 as shown in Table 1 indicating ideal sugar concentration. Similar results were obtained

Table 2. Sensory parameters (storage period marks according to 9 point Hedonic scale) of Karonda jam during storage at room temperature.

Treatment	Texture says after storage			Flavor says after storage			Color and appearance says after storage			Taste days after storage			After taste days after storage			Overall acceptability days after storage		
	0	40	80	0	40	80	0	40	80	0	40	80	0	40	80	0	40	80
T1	6.0	7.33	7.33	6.33	6.66	7.33	7.00	7.33	7.00	8.33	6.00	6.66	6.66	6.66	7.00	5	6	7
T2	6.83	7.00	7.00	6.33	7.00	7.33	7.66	6.66	7.33	6.33	7.00	7.66	5.66	6.66	7.33	5	5	7
T3	6.33	6.66	6.66	7.00	7.66	7.33	6.00	7.33	7.66	7.33	7.66	7.33	6.33	6.66	7.66	6	7	8
T4	6.66	7.66	8.66	7.66	8.33	9.00	8.33	9.00	9.00	7.33	8.33	9.00	7.33	8.00	9.00	7	8	9
T5	6.00	5.33	6.00	5.00	6.00	5.66	7.33	6.66	6.33	5.00	5.66	6.33	5.66	5.33	5.66	4	5	5
SEM ±	0.53	0.34	0.59	0.50	0.39	0.59	0.59	0.93	0.34	0.55	0.39	0.42	0.36	0.42	0.39	0.51	0.65	0.60
CD at 5%	0.23	0.80	1.37	1.16	0.90	1.05	1.37	1.02	0.80	1.28	0.90	0.02	0.84	0.97	0.90	1.19	1.51	1.39

by Upasana and Bhatia, (1985) and Joshi et al., (1986). There was regular decrease in the iron content (mg/100g) of all the treatments and an ideal value of iron content (mg/100g) was shown by Treatment 4. Similar results were reported by Nayak et al (2011) and Gordon et al (2000).

The sensory parameters like texture, color, flavor, appearance, taste, after taste and overall acceptability showed significant increase during preservation. All the treatments were awarded better score by a panel of 7 judges but the Treatment 4 got the best score (see Table 2). The score card is based on the 9 point Hedonic Scale. Thus the sensory quality of the jam increased during the period of storage. Overall acceptability of jam incorporated with 1150 g of sugar was found to be liked extremely on Hedonic scale in comparison to other treatments during preservation. Similar results were reported by Pino et al (2004); Shashi and Badiyala, (2002); Singh et al (2005) and Tandon et al (2003).

Conclusion

From the present findings it is concluded that Karonda, which is the minor fruit of India can be

utilized for making jam and this jam can be stored for at least three months without undergoing any deterioration and evidently Treatment 4 (1.0 kg Karonda pulp + 1150 g sugar) showed the best results with regard to physical, chemical and sensory parameters of jam.

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