Annals of Arid Zone 48(1): 71-73, 2009

Physico-chemical Qualities of Solar Dried Fruits of Karonda (*Carisa carandus* L.) as Affected by Blanching and Potassium Metabisulphite

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Abstract: The effect of blanching and potassium metabisulphite on physico-chemical qualities of solar dried fruits of karonda (*Carisa carandus* L.) for obtaining good quality dried produce was studied. Karonda fruits were subjected to different processing treatments viz., blanching, without blanching and potassium metabisulphite (0.5% and 1.0%) and dried in solar drier and their quality assessed. The fruits blanched for 5 minutes and sulphitation with + 0.5% KMS for 15 minutes exhibited maximum dry matter recovery (16.76%), reconstitution ratio (3.93), acidity (0.515%) and ascorbic acid (40.75 mg/100 g). The consumer acceptability of the fruits under this treatment was highest with maximum organoleptic score (8.04).

Key words: Karonda, *Carisa carandus*, blanching, potassium metabisulhpite, physico-chemical qualities

Karonda (*Carisa carandus* L.) has remained neglected as far as post-harvest management is concerned. Shelf life of karonda is short because of its soft flesh with high moisture content. Mature green and ripe fruits may be dried and the products like squash, syrup, jam, jelly, pickle and sweet chutney could be prepared from mature green fruits (Pawar, 1998). The main objective of drying is to dehydrate the fruits to the extent where microorganisms do not survive and reproduce. Thus, dehydration controls the biological and chemical reactions, which facilitate the preservation of fruits. Dehydrated fruits and vegetables are more concentrated than those in any other preserved form. They are less costly to produce, involve minimum labor and equipment for processing equipments are limited too. Dried product may be consumed in off-season and transported to remote areas. Sun drying of fruits and vegetables is practiced widely in arid and semi-arid regions, where there is plenty of sunshine and less or no rains during the drying season (Sagar, 1999). Karonda fruits often loose their green color during storage, which can be prevented by blanching and sulphitation. Thus, in the present investigation effectiveness of blanching and potassium metabisulphite independently or in combination on the quality of dried karonda fruits was studied.

Materials and Methods

The experiment was conducted at SKN College of Agriculture (Rajasthan Agricultural University), Jobner, during 2000-01 and 2001-02. Fully matured, but unripe fruits of karonda were cut into two halves and subjected to blanching and sulphitation treatments (viz., blanching for 5 min., blanching for 5 min. + 0.5% KMS (potassium metabisulphite), without blanching + 0.5% KMS, blanching for 5 min. + 1.0% KMS and without blanching + 1.0% KMS). For blanching, the fruits placed in muslin cloth were dipped into boiling water for 5 minutes and immediately dipped into cold water and given KMS treatment by placing them in 0.5 or 1.0% solution for 15 minutes and maintaining a ratio of 2:1 (fruit:solution). The fruits were dried for 5 days in solar dryer (35±5°C and 65±5% RH). Dry matter recovery, reconstitution ratio, acidity, vitamin C and organoleptic evaluations were recorded just after drying. The dry matter was calculated on the per cent basis of dried fruits to the fresh fruits. For reconstitution ratio, 10 g fruits were soaked in 100 ml of water at room temperature for 24 hours and surface water was removed with filter paper. Reconstitution ratio was calculated as the ratio of drained rehydrated fruits to initial weight of dried fruits. The acidity and ascorbic acid of fruits were determined following AOAC (1990). The organoleptic evaluation of the fruits was conducted by a panel of 5 judges on the basis of fruit color, texture, aroma and taste using Hedonic rating test (Amerine *et al.*, 1965). The experiment was laid out in CRD with four replications using 2.0 kg fruits per treatment and analysis of variance was done as suggested by Gomez and Gomez (1984).

Results and Discussion

Dry matter recovery and reconstitution ratio were affected significantly by blanching and

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sulphitation treatments. The fruits in treatment blanching for 5 minutes + 0.5% KMS exhibited maximum dry matter recovery (16.76%) and reconstitution ratio (3.93%) in comparison to other treatments (Table 1). The higher reconstitution ratio might be due to soft texture, appropriate porosity and more surface area per unit weight, which facilitated more water absorption. Increase in rehydration ratio due to blanching was also reported by Lal and Dhaka (2005) in ker. The importance of surface area in rehydration ratio was reported earlier by Pawar *et al.* (1985) in pumpkin.

Table 1. Effect of blanching and sulphitation on dry matter recovery and reconstitution ratio of dried fruits of karonda

Treatments	Dry matter recovery (%)			Reconstitution ratio		
	2000-01	2001-02	Mean	2000-01	2001-02	Mean
Blanching (5 min.)	15.00	14.50	14.75	2.75	2.78	2.76
Blanching (5 min.) + 0.5% KMS	17.20	16.33	16.76	3.92	3.94	3.93
Without blanching + 0.5% KMS	13.87	13.48	13.67	2.15	2.20	2.17
Blanching (5 min.) + 1.0% KMS	16.37	15.41	15.89	3.15	3.14	3.14
Without blanching + 1.0% KMS	14.37	13.65	14.01	2.35	2.30	2.32
SEm±	9.37	0.42		0.14	0.03	
CD (P=0.05)	1.12	1.27		0.41	0.08	

Blanching and sulphitation also significantly affected the acidity and ascorbic acid content of dried fruits of karonda. The maximum acidity (0.515%) and ascorbic acid contents (40.75 mg/100 g) were recovered in the fruits subjected to blanching for 5 minutes + 0.5% KMS treatment as compared to other treatments (Table 2). Blanching with sulphitaton reduced the ascorbic acid loss to a great extent. This might be attributed to inactivation of oxidases responsible for degradation of ascorbic acid. Lal *et al.* (2004) and Sethi (1986) reported similar results in kachari and aonla, respectively. In guava, exposing the pulp to sulphur fumes after lye peeling and seed removal before dehydration resulted in very good quality dried powder (Khurdia and Roy, 1974).

Fruits subjected to blanching for 5 minutes and 0.5% KMS treatment proved superior in terms of organoleptic quality with maximum score (8.04) of dried produce. Blanching is essential to inactivate the enzymes that cause discoloration and changes in flavor and aroma. Lal and Dhaka (2005) also reported a role of blanching in retaining the color of ker fruits. KMS treatment of fruits prior to drying prevented browning and retained flavor better. Similar results were also reported in dehydrated cauliflower (Kaur and Singh, 1981) and in Ker fruits (Nair *et al.*, 1990).

Table 2. Effect of blanching and sulphitation on acidity, ascorbic acid and organoleptic acceptance of dried fruits of karonda

Treatments	Acidity (%)			Ascorbic acid (mg/100 g pulp)			Organoleptic score (out of 10 marks)		
	2000-01	2001-02	Mean	2000-01	2001-02	Mean	2000-01	2001-02	Mean
Blanching (5 min.)	0.415	0.422	0.418	35.57	32.62	34.09	5.12	6.21	5.66
Blanching (5 min.) + 0.5% KMS	0.517	0.514	0.515	41.50	40.00	40.75	8.00	8.09	8.04
Without blanching + 0.5% KMS	0.370	0.357	0.363	30.42	29.07	29.74	3.75	3.81	3.78
Blanching (5 min.) + 1.0% KMS	0.477	0.463	0.470	37.12	35.37	36.24	7.42	7.44	7.43
Without blanching + 1.0% KMS	0.381	0.383	0.382	32.50	30.62	31.56	4.62	4.22	4.42
SEm±	0.11	0.006		0.36	0.40		0.26	0.12	
CD (P=0.05)	0.34	0.018		1.10	1.22		0.80	0.38	

It can, therefore be inferred that the post-harvest treatment of blanching for 5 minutes in boiling water and then dipping the fruits in 0.5% KMS solution for 15 minutes was most effective in enhancing the quality of solar-dried karonda fruits.

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