

Studies on Utilization of Date Palm Fruits for Preparation of Delicious Drink

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ABSTRACT : Date palm (*Phoenix dactylifera* L.) is a nutritious fruit having high calorific value in the form of sugar, minerals and vitamins with high market potential. The ripe fruits (*doka* or *khalal*) are used for fresh consumption and value addition. Date fruit pulp is used for flavouring the bakery products. In India, date palm fruits are harvested during mid-June to July at *doka* or *khalal* stage (hard ripe yellow, red or dark red colour) of maturity because of early rains. Besides, it is spoiled due to poor shelf life. In India, limited work has been carried out on post-harvest management for proper utilization of fruits. Keeping in view, an attempt was made to utilize *doka* stage date palm fruits for preparation of delicious drink. The small size fruits, which are astringent in taste, unfit for dry date and *pind khajoor* preparation could be successfully utilized for the preparation of delicious drink. Organoleptic score revealed that squash could be prepared from *doka* stage fruits and utilized up to 30 days of storage under refrigerator. However, it fermented after 4-5 days of storage under room temperature condition.

Key words : Date palm, *Phoenix dactylifera*, value addition, fruit quality, squash, storage

Date palm (*Phoenix dactylifera* L.) is a potential fruit tree for semi-arid and hot arid regions of the country. Date fruit is a highly nutritious and favourite fruit throughout the country. Besides fresh consumption, several value added products viz., dry dates (*chhuhara*), soft date (*pind khajoor*), jam, beverages, biscuit, chutney, pickle, etc. are prepared from fruits (8). This fruit can supplement the dietary needs of the desert people, where very less nutritious food is available. Dates are cured as dry dates and soft dates, which have great demand and market in the country. Date fruits provide abundant quantities of sugar, iron, potassium, calcium and nicotinic acid. Small amounts of protein, copper, magnesium, chlorine, sulphur, vitamins A, B₁ and B₂ are also present in date pulp. Fresh 100 g date fruit contains 59.2 g moisture, 1.2 g protein, 0.4 g fat, 1.7 g minerals, 3.7 g fiber, 33.8 g carbohydrates, 22.0 mg calcium, 38.0 mg phosphorus and other elements (2). Date fruit pulp is used for flavouring the bakery products. In India, date palm fruits are harvested during mid-June to July at *doka* or *khalal* stage (hard ripe yellow, red or dark red colour) of maturity because of early rains. If fruits are left on the trees beyond July to attain full ripening (*pind* stage), these may get spoiled due to monsoon rains and high humidity. The storage life of fruit is less and fresh fruit has to be utilized immediately. In our country, maximum area of date palm 16,688 ha is under cultivation in the coastal belts of Kachchh, Gujarat with annual fruit production of 1,23490 t, where maximum fruits are harvested at *doka* stage (4). The fruits of small size, astringent in taste, unfit for dry date and *pind khajoor* preparation can be successfully utilized by the preparation of ready to serve delicious drink. In recent times, to make better

use of fruits there has been a renewed interest in the date palm as a component for food preparation like sweet confectionery, health food, alcoholic beverages, delicious drink, etc. Seed kernel is also used in the preparation of cattle feed. In date growing countries, a number of value added products, drinks, wine, etc. are prepared from *doka* fruits, however, in India, limited work has been carried out on post harvest management for proper utilization of fruits. Keeping this in view, an attempt was made to utilize *doka* stage fruits for preparation of delicious drink.

MATERIALS AND METHODS

The experiment was carried out in Post Harvest Laboratory, CIAH, Bikaner during the year 2010-11. The freshly harvested fruits of cultivar Sedami, yellow in colour and astringent in taste at *doka* stage (*khalal*) were taken for preparation of delicious drink. Morphological and physico-chemical parameters of fruits were also recorded before extraction of juice. Fruits were washed in water after sorting green, over ripe and infected berries and then they were cut into halves for removal of seed and extraction of juice. Seeds were removed manually. The fruit pieces were boiled with water in pressure cooker for 6-8 min and filtered the cooked material by muslin cloth. Sugar 300 g per litre of extracted juice was added to maintain TSS (38 °Brix). The squash was prepared during last week of July and filled in clean sterilized bottle and kept in lab for organoleptic testing. A total of three treatments viz., T₁-Date squash, T₂-Squash added with 5 g of ginger extract per litre of juice and T₃-Added with preservative KMS (500 ppm) were made for further sensory evaluation. All the bottles of three

treatments were kept under refrigerator conditions. One set of 100 ml was kept under room temperature to see the storage life. TSS and acidity were estimated as per standard procedure described by Rangana (6). The artificial colour was not mixed because the drink retained the natural yellowish colour.

Organoleptic testing was carried out at weekly interval with a panel of 10 judges on score basis (maximum 10 marks). The squash was diluted by mixing water in ratio of 30 : 70 for sensory evaluation. Hedonic scale method was used for the organoleptic evaluation of drink for colour, flavour, acceptability, taste and appearance at 0, 7, 15 and 30 days storage period. The mean data of score were assessed for sensory evaluation of ready-to-serve drink of date palm fruits.

RESULTS AND DISCUSSION

The morphological character of fruits was observed in terms of average weight (8.41 g), berry size (2.3 x 0.8 cm), stone size (2.3 x 0.8 cm), stone weight (1.2 g) and pulp : stone ratio (5 : 8). The TSS (18°Brix) and acidity (0.4%) of fresh fruit were observed. It was clear from the data that quality of fruit was good except taste character of fruits, which was astringent at hard, yellow ripen doka stage.

The data on organoleptic testing of squash are given in Table 1. The sensory evaluation revealed that ready-to-serve drink mixed with 30 : 70 ratio water was acceptable by the panel of judges. The score of acceptability and taste characters indicated that the squash was a better product of doka stage fruits for proper utilization.

The colour of product is an important character of any value added product. The initial colour of product was yellowish and attractive. The maximum score (8.00) for colour was observed when it was fresh in all the treatments. The colour of product was very good up to 30 days of storage under T_2 (5.50) then it declined to 4.90 under T_1 followed by 4.80 under T_3 . Storage

had an effect on colour perception of drink. As the storage period increased, fermentation started in squash. The gradual loss in colour over the entire period was due to action of different kinds of acids present in the drink. The minimum score was obtained at 30 days of storage i. e. 4.80 which showed the decrease in quality of squash. However, flavour and colour of squash were good having 5.50 score for colour under T_2 . The TSS was observed higher in ginger blended squash at 30 days of storage than that of T_1 and T_3 . The change in colour during storage of beverage was reported by Jain *et al.* (3).

The maximum score of squash was obtained for acceptability followed by flavour character. In sensory evaluation, taste is very important factor after colour and flavour. The highest score (7.50) was ranked for taste character at seven days followed by 15 days of storage and thereafter it was slightly decreased after 30 days of storage of squash. The minimum score (3.10) was given by tasters at 30 days of storage, which may possibly be due to poor taste sensation and beginning of fermentation of product under T_1 and T_3 treatments. The finding is similar with the earlier results on sensory evaluation of ready-to-serve drink prepared from date juice (1).

The appearance of product was attractive in packed glass bottle at fresh and then it declined gradually during storage period. The appearance of squash was yellowish getting maximum score (7.66). A decreasing trend in score was recorded with increasing the period of storage. The minimum score (3.70) was recorded at 30 days of storage and discarded. Acceptability character of drink also noted the similar trend of score of appearance. The appearance, taste and flavour of ginger blended date squash were good even after 30 days of storage in comparison to other treatments. Similar trend was also observed in ginger-kinnow blended beverage by Nath and Yadav (5).

The acceptability of drink gradually declined with the increasing period of storage because of taste sensation.

Table 1. Sensory evaluation of squash prepared from date fruits on score basis

Character	0 day (initial stage)			7 days of storage			15 days of storage			30 days of storage		
	T_1	T_2	T_3	T_1	T_2	T_3	T_1	T_2	T_3	T_1	T_2	T_3
Appearance	7.66	7.50	8.16	7.62	7.56	7.50	6.91	7.16	6.66	3.70	4.50	3.60
Taste	7.00	6.83	8.32	7.50	7.25	7.12	6.91	7.16	5.50	3.10	4.20	3.40
Flavour	7.50	7.00	8.50	7.62	7.00	6.37	6.08	6.66	5.83	2.40	4.60	3.50
Acceptability	7.16	7.50	8.50	7.37	6.50	7.12	6.75	6.66	4.50	3.00	4.50	3.70
Colour	8.00	8.00	8.30	7.25	7.00	6.87	6.75	6.66	6.66	4.90	5.50	4.80
T. S. S. (°Brix)	38.00	39.02	38.2	28.60	28.20	26.60	27.20	30.6	27.6	24.4	29.20	26.80

This may possibly be due to the chemical reactions between carbohydrates and different types of acids. During storage, physico-chemical changes are common in any value added products. The finding is similar with the results reported by Jain *et al.* (3) and Singh *et al.* (7).

TSS of squash was monitored periodically but there was a marginal decrease in TSS of squash during storage period, which may possibly be due to fermentation of squash. Moreover, flavour and colour of squash were better having 5.50 score under T_2 . The TSS was acceptable in ginger blended squash at 30 days of storage than that of T_1 and T_3 treatments. The sensory evaluation was indicative of high acceptance of product. By this way, date palm fruits of doka (Khalal) stage particularly small size and of astringent taste can be utilized for making delicious drink. Further, it can be stored up to 30 days without major changes in quality of product under refrigerator. However, fast fermentation in squash was observed under storage at room temperature. This technique provides the date growers an ample scope to utilize their produce profitability in arid region.

LITERATURE CITED

1. Godara, N. R. and Pareek, O. P. 1985. Effect of temperature on storage life of ready to serve date juice beverage. *Ind. J. agric. Sci.* **55** : 347-349.
2. Gopalan, C., Ramasastri, B. V. and Balasubramaniam, S. C. 1985. *Nutritive Value of Indian Foods*. National Institute of Nutrition, ICMR, Hyderabad. p. 87.
3. Jain, S., Sankhla, A. P. K., Dashora, A. and Sankhla, A. K. 2003. Physico-chemical and sensory qualities of orange drinks. *J. Food Sci. Tech.* **40** : 656-659.
4. Muralidharan, C. M., Tikka, S. B. S. and Verma, Piyush. 2008. Date palm cultivation in Kachchh. *Tech. Bull.* 2. Date Palm Research Station, SDAU, Mundra. p. 36.
5. Nath, A. and Yadav, D. 2002. Standardization of ginger-kinnow blended beverage from Kinnow mandarin juice. *Indian J. Citriculture* **1** : 181-192.
6. Rangana, S. 2003. *Handbook of Analysis and Quality Control for Fruits and Vegetable Products*. Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Singh, A. K., Sharma, H. P., Singh, J. and Kumar, V. 2007. Evaluation of physico-chemical and sensory qualities of mixed fruit squash. *Environ. and Ecol.* **25** : 1040-1045.
8. Singh, R. S. and Dhandar, D. G. 2007. *Khajoor Ki Kheti (in Hindi)*. Directorate of Extension, Ministry of Agric., Govt. of India, New Delhi. p. 22.

MATERIALS AND METHODS

The experiment was carried out in Post Harvest Laboratory, CIARI, Ahmednagar from 2010-11. The fruits harvested from the orchard of date palm were taken for preparation of date juice. Morphological and physico-chemical parameters of fruits were recorded before extraction of juice. Fruits were washed in water after taking away outer ripe and infested berries and then they were cut into halves for removal of seed and extraction of juice. Seeds were removed manually. The fruit pieces were broken with water in processor model No. 6-2 with and ground the cooked material by machine chaff. Sugar 500 gm/litre of extracted juice was added to maintain 15-18 (34° Brix). The mixture was prepared during last week of July and filled in clean sterilized bottles and kept in lab for organoleptic analysis. A total of three treatments viz. T_1 -Date squash, T_2 -Squash blended with 5 g of ginger extract per litre of juice and T_3 -Added with preservative KMS 150 ppm were made for further sensory evaluation. All the bottles of three