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Utilization of Date Palm Fruits for Making Delicious Biscuits

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Abstract: The ripe fruits of date palm (*doka* or khalal) are used for fresh consumption and processing. Date fruit pulp is used for flavoring the bakery products. In India, limited work has been carried out on post harvest management for proper utilization of date fruits. Keeping this in view, an attempt was made to utilize *doka* stage fruits for preparation of nutritious biscuits. The small size, astringent in taste, unfit for dry date and *pind khajoor* these can be utilized to prepare biscuits. The fruits were cut in to pieces, after removing seeds, for drying and grinding to make powder. Biscuits were prepared in bakery by adding date pulp powder in ratio of 10, 20 and 30% in wheat flour and other ingredients like sugar, milk and ghee. In control biscuits date pulp powder was not mixed. The study indicated that date biscuits prepared by adding of 10 or 20% pulp powder were suitable on organoleptic score basis for taste, flavor, appearance and acceptability as well as rich in sugars and protein from nutrition point of view.

Key words: Date palm, *Phoenix dactylifera*, *doka* stage fruits, value addition, biscuits.

Date palm (*Phoenix dactylifera* L.) is an important fruit tree for semi-arid and hot arid regions of the country. Dates are highly nutritious and favorite fruit throughout the country. Besides fresh consumption, several value-added products viz., dry dates (*chhuhara)*, soft date (*pind khajoor*), jam, syrup, chutney, beverages, pickle (Singh and Dhandar, 2007), mouth freshener (Rathore *et al*., 2013), etc. are prepared from fruits. This fruit can supplement the dietary needs of the desert people where limited nutritious food is available. Date fruits provide abundant quantities of sugar, iron, potassium, calcium and nicotinic acid and small amounts of protein, copper, magnesium, chlorine, sulphur, vitamins. The pulp of mature date fruits contains about 80% sugars on dry weight basis, which being easily digestive, provide a ready source of energy to the human body. Such fruits provide about 3,150 calories per kg.

In India, date palm fruits are harvested from mid-June to August at *doka* or khalal stage (hard ripe yellow, red or dark red color) because of lack of early maturing varieties. If fruits are harvested after full ripening (pind stage) these may get spoiled due to monsoon rains and high humidity. Due to short shelf life, fresh fruits have to be utilized immediately after harvest. In our country, Kachchh region of Gujarat has maximum area under this crop (1668 ha) with annual production of 1,23,490 tons, where maximum fruits are harvested at *doka* stage (Muralidharan *et al.,* 2008).

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The limited consumer's preference for fresh date of doka stage is one of the important constraints in area expansion and date palm cultivation in arid region and isoclimatic conditions of other parts of the country.

In date growing countries of the world, a number of value added products, wine, syrup, etc. are prepared from *doka* fruits, however, in India, very limited work has been done on post harvest utilization of date fruits (Chandra *et al*., 1992). The small size, astringent in taste, unfit for dry date and *pind khajoor* preparation can be utilized to make tasty and delicious biscuits. An attempt was therefore, made to make better use of *doka* stage fruits of date palm for preparation of high value, nutritive and delicious biscuits.

Materials and Methods

The study was conducted at post harvest laboratory of Central Institute for Arid Horticulture (CIAH), Bikaner, during the year 2011-12. The freshly harvested fruits of *doka* (khalal) stage, yellow in color and sweet-astringent in taste were used for preparation of delicious biscuits. Morphological characters of fruits were also observed before drying of pulp for making powder.

Fruits were washed in water after discarding green, over ripe and infected berries and then they were cut in to halves for removal of seed and drying. The fruit pieces were dried in oven and ground to make powder. The biscuits were prepared in local bakery during the month of December and stored in clean jar and kept in laboratory under normal room temperature conditions (mean maximum temperature 23.26°C, mean minimum temperature 7.18°C) for organoleptic testing. For preparation of biscuits, three treatments viz., date pulp powder T_1 - 10%, T_2 - 20% and T_3 - 30% was added in to wheat flour along with other ingredients i.e. sugar, ghee, milk and T_4 - control (without pulp powder) were taken for evaluation. One kg fruit was taken for each treatment in three replications. Two kilogramme biscuits were prepared for each treatment. No artificial color was added because the biscuits retain the natural brownish attractive color. The date biscuits were analyzed in lab for sugar and protein content. Total sugars in biscuit were determined by anthrone method and after color development the optical density was recorded at 630 nm as per standard procedure (Hegde and Hofreiter, 1962). Protein content was estimated by Lowry's method (Lowry *et al.*, 1951).

Hedonic scale (0-10 marks) method was used for the organoleptic evaluation of biscuits for color, flavor, taste, appearance and acceptability at 0, 15 and 30 days storage by a panel of 10 judges. The mean data of score were assessed for sensory evaluation of biscuits.

Results and Discussion

The biscuits baked in bakery were evaluated for their acceptance, taste and quality characters. The data presented in Table 1 on organoleptic testing revealed that biscuits prepared with addition of 10 and 20% pulp powder were more acceptable by the panel of judges. The score of acceptability and taste characters indicated that the biscuits are the good value added product of *doka* stage fruits for income generation from post harvest utilization.

The appearance of product was attractive in packed glass jar/bottle at fresh stage and then it declined gradually during storage period. The appearance of biscuits with 10% date powder secured maximum score upto 30 days of storage, but the score decreased from 8.70 at inital stage to 7.40 after 30 days of storage. Irrespective of treatments a decreasing trend in score, with increase in duration of storage, was recorded.

The color is an important quality character of any value added product. The initial color of product was greyish and it was common in all type of biscuits. The biscuits scored maximum for this parameter with T4 treatment upto 15 days of storage. In all other treatments, the color was acceptable upto 15 days of storage thereafter it declined. A similar study (Rathore *et al.*, 2013) also reported that mouth freshener, a value added product of date fruit was 8.4-8.6 being highly acceptable on nine point hedonic rating scale

The appearance, taste and flavor of biscuits under T1 and T2 were good even after 30 days of storage in comparison to other treatments. The acceptability of biscuits gradually decreased with increasing period of storage because of taste sensation after one month period. This may possibly be due to the chemical reactions in carbohydrates and fats of the products. During storage, changes in physico-chemical characters are common in any value added product. The finding is similar with the results reported by Singh and Dhandar (2007).

In sensory evaluation, taste is another important factor after color and flavor. The

Table 1. Organoleptic test of biscuits prepared from date fruit pulp powder on score basis.

Characters	0 day (Initial stage)				15 days of storage				30 days of storage			
	T_1	T_2	T_3	T_4	T_1	T_2	T_3	T_4	T_1	T_2	T_3	T_4
Appearance	8.7	8.7	7.2	8.5	7.6	7.3	7.1	8.7	7.4	6.3	6.4	6.7
Taste	8.7	7.0	7.5	8.5	8.0	7.8	7.8	8.6	7.1	6.4	6.1	6.3
Flavor	8.5	6.7	7.5	8.5	6.3	6.0	7.0	7.0	7.8	6.6	5.6	6.5
Sweetness	8.0	6.7	7.0	8.0	7.1	7.0	7.0	7.3	7.3	6.8	6.3	6.6
Color	7.5	6.7	7.5	8.2	7.6	7.0	8.2	8.8	7.0	6.3	5.5	6.4
Acceptability	8.5	6.5	7.0	8.6	7.8	7.4	6.8	8.5	7.1	6.6	5.6	6.1

Table 2. Nutritive value of date biscuit

Treatments	Total sugars (mg g^{-1})	Protein content (mg g^{-1})
T_1	283.4	30.16
T_2	340.6	74.23
T_3	445.2	120.00
T_4	220.4	33.68

score of taste ranged from 7.8 to 8.0 at 15 days of testing of biscuits and it was acceptable on the basis of good hedonic rating scale. Score for taste slightly decreased as storage period increased upto 30 days. The finding is similar with the earlier results on sensory evaluation of biscuits prepared from khejri pods flour (Anon., 2002).

Since, the dry date fruit powder is rich in carbohydrate and protein, therefore an attempt was made to assess biscuit for protein and carbohydrate content. The results presented in Table 2 reveal that the protein content of the biscuits increased with the increase in supplementation of date powder from 33.68 mg g^{-1} in control to 74.23 mg g^{-1} and 120 mg g^{-1} with 20% and 30% date powder, respectively. Similarly, the total sugar content of biscuits also increased from 220.4 mg g^{-1} in control to 445.2 mg g^{-1} with 30% date fruit powder.

On the basis of the study, it can be concluded that protein rich biscuits can be prepared by adding date pulp powder. Hence, value addition in doka stage fruits provides an ample scope to date growers and bakery for utilization of the available raw material for preparation of nutritious sweet biscuits.

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