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Studies on preparation of *khajoor* (*Phoenix dactylifera*) burfi incorporated with honey

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Abstract

The present study was investigated to optimize the level of honey in *khajoor* (*Phoenix dactylifera*) burfi on the basis of organoleptic evaluation. The *khajoor* burfi formulated by using khoa and *khajoor* in proportion of 80:20 with incorporation of 2, 4 and 6 per cent honey and subjected for organoleptic evaluation and nutritional composition. The *khajoor* burfi incorporated with 4% honey scored highest in the sensory attributes. Hence on the basis of score of overall acceptability the 4% honey incorporated burfi was liked by panel members. The nutritional composition of all treatments showed that the fat and carbohydrate content of burfi was reduced with increased level of honey. The fat, protein, total sugar and reducing sugar of selected treatments were found to be 16.42, 14.80, 42.43 and 32.52 per cent respectively. Further it can be concluded that honey can be utilized in burfi up to 4 per cent.

Keywords: *khajoor*, Honey Burfi, Sensory evaluation, Chemical Composition, Mineral composition.

Introduction

The date palm (*Phoenix dactylifera*) belongs to the *Arecaceae* (or *palmae*) family and consists of three parts: flesh with thin crust, date pit, and cap. The word 'Date' to refer to the fleshy part of the fruit. Date, which is very sweet, comprises about 50–88% of the total weight according to cultivar, stage of ripening, and water content. Sugars make up about two thirds of date flesh with water about one fifth. The rest of date weight includes protein, fat, crude fibre, minerals, different vitamins (especially vitamin B), tannins, and many other components (Hashempoor 1999) [3]. Date has much nutritive value and can play an effective role in providing the nutritional needs of humans. Each kilogram of fresh date contains approximately 1570 calories of energy, whereas dry date contains more than 3000 calories per kg (Rohani, 1988) [16].

Phoenix dactylifera L., commonly known as the date palm is a primeval plant and has been cultivated for its edible fruit in the desert oasis of the Arab world for centuries. The fruits are a rich source of carbohydrates, dietary fibers, certain essential vitamins and minerals. The date pits are also an excellent source of dietary fiber and contain considerable amounts of minerals, lipids and protein. In addition to its dietary use the dates are of medicinal use and are used to treat a variety of ailments in the various traditional systems of medicine. Phytochemical investigations have revealed that the fruits contain anthocyanins, phenolics, sterols, carotenoids, procyanidins and flavonoids, compounds known to possess multiple beneficial effects. Preclinical studies have shown that the date fruits possess free radical scavenging, antioxidant, antimutagenic, antimicrobial, anti-inflammatory, gastroprotective, hepatoprotective, nephroprotective, anticancer and immunostimulant activities. (Manjeshwar, 2011) [7].

Several studies indicate that consumption of fruits and vegetables is associated with reduced risk of several chronic diseases (Kritchevsky, 1999; Nicoli, Anese, & Parpinel, 1999; Van Duyn & Pivonka, 2000; Willett, 1994) [5, 10, 19, 21]. Regarding dates, Vayalil (2002) [20], Mansouri, Embarek, Kokkalou, and Kefalas (2005) [8] indicate that this fruit has important antioxidant activity due to the presence of water-soluble compounds with potent free radical-scavenging effects, such as phenolic compounds (mainly cinnamic acids) and flavonoids (flavones, flavonols and flavanones).

Honey is natural supersaturated solution of sugars, mainly glucose, fructose and maltose. The sugar present in honey make honey hygroscopic (moisture absorbing) and viscous. The main use of honey is use as flavouring sweetener and energy source. The sweetness from the sugars, particularly fructose and flavour is created by wide variety of trace essences derived from plant esters, alcohols, aldehydes and other compounds. Other uses of honey are for the promotion of health and well-being. Some of these including aiding healing of wounds, healing of serious skin burn and healing gastric ulcer (Schmidt 1988) [17].

Honey is a natural sweetener, having medicinal properties. This makes the use of honey less harmful than sugar. If we replace sugar with honey in the sweets and deserts, it will certainly help to overcome various health problems and would provide the sweetmeat with therapeutic value. It is used as laxative, blood purifier, a preventive against cold, cough and fever, curative for sores, eye ailments and ulcers on tongue, sore throat and burns (Srivastava, 1996) [18].

Burfi is one of the highly nutritious khoa based indigenous milk products prepared from cow or buffalo milk, as it contains a considerable amount of milk solids. Sugar is added in different proportions and other ingredients were incorporated according to the demand of consumers. Several varieties of Burfi were sold in the market, depending upon the additives present, and viz., Mawa Burfi, Pista Burfi, Chocolate Burfi, Coconut Burfi and Rava Burfi. Good quality Burfi is characterized by moderately sweet taste, soft and slightly greasy body and smooth texture with very fine grains (Pal, 2000).

Materials and Methods

Materials

The raw materials utilized during present investigation like *khajoor*, khoa, honey and ghee were procured from local market of Parbhani, Maharashtra.

Equipment's and machineries

Equipment's like weighing balance, Mixer, Hand refractometer, thermometer, hot air oven, muffle furnace and other utensils required were used from the Department of Food Science and Technology, VNMKV, Parbhani.

Chemicals and Glasswares

The chemicals and glasswares required for analysis purpose were taken from the Department of Food Science and Technology, VNMKV, Parbhani.

Packaging material

Packaging material i.e. PET bottles, HDPE, LDPE were purchased from local market of Parbhani.

Methods

Formulation of for preparation of *khajoor* Burfi

Standardization of recipe for *Khajoor* Burfi

The formulation of *Khajoor* burfi was done in laboratory by using khoa, *khajoor* and honey. For preparation of *khajoor* burfi the level of honey were standardized. The product was standardized based on sensory score.

Table 1: Formulation of *khajoor* burfi with different levels of honey

Sample Code	Ingredients		
	Khoa (g)	<i>Khajoor</i> (g)	Honey (%)
B ₀	100	20	-
B ₁	80	20	2
B ₂	80	20	4
B ₃	80	20	6

Preparation of *khajoor* Paste

To prepare *khajoor* paste the seeds were removed from *khajoor* manually. The seedless *Khajoor* were then crushed in mixer cum grinder to obtain *khajoor* paste.

Preparation of *khajoor* Burfi with honey

The khoa was prepared using method given by Patil *et al.*,

(2015) [13]; Mete *et al.*, (2017) [9] Buffalo milk was filtered by passing through muslin cloth and was standardized at 6% fat and 9% SNF. The milk was concentrated by evaporating in open pan on gentle fire with continuous stirring-cum-scraping until pasty consistency obtained. The calculated amount of *khajoor* paste as per treatment and honey were added. The mixture was then further heated with continuous stirring with wooden ladle up to desirable solid mass stage attained. The product was then transferred into greasy tray and was allowed to cool. The final product was cut into rectangular pieces of desirable sizes.

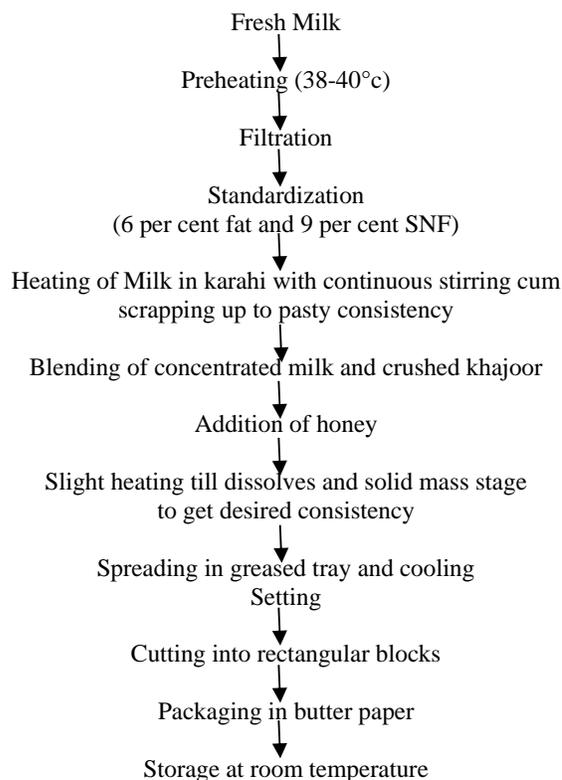


Fig 1: Flow sheet for the preparation of *khajoor* burfi incorporated with honey

Proximate composition of burfi

Chemical constituents like moisture, protein, fat, and ash content of *khajoor* burfi were determined by AOAC, (2003) [1]. Reducing and non-reducing sugar were determined as per methods given by (Ranganna 1995) [15].

Sensory evaluation of *khajoor* burfi

The honey incorporated *Khajoor* burfi were evaluated for sensory characteristics like colour and appearance, flavour, texture, taste and overall acceptability using 9 point hedonic rating by 10 semi-trained panel members comprised of academic staff members of the Department of Food Science and Technology, College of Food Technology, VNMKV, Parbhani.

Statistical analysis

The obtained data in the present investigation was statistically analysed. The analysis of variance of the data obtained was done by using Completely Randomized Design (CRD). The analysis of variance revealed at significant of $P < 0.05$ level, S.E. and C.D. at 5% level were mentioned whenever required.

Results and discussion

Sensory evaluation of *khajoor* burfi incorporated with different levels of Honey for replacement of sugar.

The study was undertaken to evaluate the effect of incorporation of honey as a sweetening agent in place of sugar in *khajoor* burfi. The *khajoor* Burfi was prepared by adding various levels of honey replacing sugar as per the formulation depicted in Table 1 and the sensory score obtained for the present study is depicted in Table 9.

Table 2: Sensory evaluation of *khajoor* burfi incorporated with different levels of honey.

Samples Code	Sensory attributes				
	Color/ Appearance	Taste	Flavor	Texture	Overall acceptability
B ₀	7.00	7.5	7.5	7.50	7.50
B ₁	7.52	8.12	8.18	8.06	7.98
B ₂	8.02	8.58	8.44	8.46	8.5
B ₃	7.6	8.06	7.42	7.94	7.94
S.E±	0.0349	0.0341	0.0349	0.0302	0.0402
CD at 5%	0.105	0.1025	0.1049	0.0909	0.121

*Each value represents the average of three determinations

B₀= control, B₂= 4 % honey,
B₁= 2 % honey, B₃= 6 % honey.

Taste

It is clearly observed that the taste of *khajoor* burfi was significantly affected by addition of honey on taste of *khajoor* burfi. The sample B₂ obtained highest sensory score (8.58) among all the samples whereas the sample B₁ and B₃ showed more score than control sample.

Flavor

The flavour of *khajoor* burfi was significantly improved with addition of honey up to 4% level. However higher level of honey adversely affected the flavour.

Texture

The texture of product was greatly improved with progressive increase in honey. The sample showed maximum at 4% honey level. However higher level of honey did not improve the texture. The improvement in textural qualities of *khajoor* burfi with addition of honey may be due to conditioning effect of honey on burfi, which impart softening and realistic action on burfi.

Overall Acceptability

By addition of honey most of the parameters such as color, flavour, taste and texture were improved greatly. Hence the

Color and appearance

Color and appearance of *khajoor* burfi was significantly affected by addition of honey at different level. The addition of honey at 4% level in *khajoor* burfi showed (8.02) as compared to control (7.00). However, higher addition of honey up to 6% was not found desirable as showed decreased drastically.

overall acceptability of sample B₂ was greatly improved hence scored maximum (8.5). The control sample scored least due to absence of honey (7.50). Thus addition of honey is highly essential from quality and sugar base level. Statistically it was revealed that B₁ and B₃ found to be at par with each other whereas sample B₂ was significant.

Chemical composition of *Khajoor* burfi added with honey

After standardizing the *khajoor* level in burfi i.e. at 20% as per the finalized product based on sensory panel member was selected for addition of honey in place of sugar. Different levels to prepare a *khajoor* burfi with honey. The honey was added at 2, 4, and 6 per cent level of khoa with complete replacement of sugar *khajoor* burfi

The *Khajoor* burfi incorporated with different levels of honey were selected for further studies and different physicochemical properties viz., moisture, fat, protein, carbohydrate, total solids, and ash content were determined and the results are summarized in Table 3. The data revealed that addition of honey in burfi resulted in increase in various parameters, the percent moisture, carbohydrate, ash, total sugar and reducing sugar found to be increased marginally with increase the level of honey in the burfi.

Table 3: Chemical composition of honey incorporated burfi

Chemical parameters (%)	Samples					
	B ₀	B ₁	B ₂	B ₃	SE±	CD at 5%
Moisture	21.33	26.24	26.35	26.87	0.0058	0.0174
Fat	15.19	16.45	16.42	16.39	0.0061	0.0184
Protein	12.37	14.80	14.76	14.71	0.0104	0.0278
Ash	3.04	3.10	3.14	3.19	0.0122	0.0369
Carbohydrate	47.55	38.89	38.81	38.32	0.0061	0.0184
Total sugar	47.03	42.43	43.87	45.31	0.0024	0.0071
Reducing Sugar	31.20	32.52	33.88	35.24	0.0349	0.1049
Crude Fibre	0.52	0.52	0.52	0.52	0.0105	0.0317

*Each value represents the average of three determinations

Data also revealed that the moisture content of burfi was varied significantly from 21.33 to 26.87 percent compared to control sample of burfi. The increase in moisture content of honey based *khajoor* burfi may be due to hygroscopic nature of honey, which acts a conditioning agent and keeps moisture

impact above in burfi. The results are in agreement with finding with Ramanna *et al.*, (1983)^[14] and Pal and Gupta (1985)^[12].

It also showed the increase in ash from 3.04 to 3.19 per cent and reducing sugar from 31.20 to 35.24 per cent. It also

showed that honey added burfi decrease in fat and protein content. The decrease in these constituents may be due to corresponding lower percent of replacement of 30% sugar from recipe. As in *khajoor* burfi 30% sugar was added in all incorporation levels. The results are in good agreement with Jose *et al.*, (2014) [4].

Mineral composition of *khajoor* burfi incorporated with honey

The data showed that the honey blended burfi sample was found to be rich in mineral content. The table further revealed that the manganese and iron content of burfi sample found to be significantly increased with increased level of honey in burfi. The mineral content of control sample was found to be less in mineral value as compare to other treatment samples. The khoa main ingredient was quite high in calcium content and it improves the nutritional value of khoa based products.

Table 4: Mineral composition of prepared *khajoor* burfi blended with honey

Parameters (mg/100g)	Sample					
	B ₀	B ₁	B ₂	B ₃	SE	CD at 5 %
Potassium	14.26	14.26	14.26	14.26	0.0075	0.0224
Calcium	971	971	971	971	0.8819	0.0265
Manganese	0.05	0.058	0.126	0.194	0.0096	0.0289
Iron	0.16	0.128	0.169	0.254	0.0117	0.0352
Magnesium	12.8	12.8	12.8	12.8	0.1074	0.3232
Copper	0.048	0.048	0.048	0.048	0.0011	0.0032

*Each value represents the average of three determinations

It is very clearly observed that manganese was increased from 0.05mg/100g to 0.194mg/100g. The increase in manganese content was about 3.88%. It is also interesting to note that iron content which an essential element for maintenance of hemoglobin in females was found to be increased significantly over control. Iron content was increases from 0.16mg/100g to 0.254mg/100g which about to be 1.58% as compare to control. The similar results were reported by Kumar and Shrinivasan (1982) [6] and Eman (2015) [2] Schmidt (1988) [17].

Conclusion

It may concluded that the superior quality of *khajoor* burfi incorporated with honey can be prepared by addition of 20 part of *khajoor* and 80 of Khoa and 4% of honey as the overall acceptance for treatment combination B₂ was highest in all the parameters. The dates possess diverse medicinal uses including antihyperlipidemic, anticancer, gastroprotective, hepatoprotective and nephroprotective activities and thereby serving as an important healthy food in the human diet. The observed pharmacological properties may be attributed to the presence of a high concentration of minerals in date.

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