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Studies on estimation of cost of date seed (*Phoenix dactylifera* L.) powder incorporated burfi

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Abstract

Burfi, is a *Khoa* based popular confection in India. It is highly nutritious and most popular because of their delicious taste and wide acceptance among consumers. The value of *khoa* produced annually in India becomes almost double on its conversion into *khoa* based sweets. This underlines the significance of *khoa* based sweets to national economy. In addition, sweets have great social, cultural and religious significance in our country. For preparation of burfi, DSP levels (1, 2 and 3 percent), fat level in milk (4.5 percent), Carboxymethyl cellulose (1 percent) along with sugar (28 percent) and 0.5 percent cocoa powder were used to prepare burfi and one control T₀ and an experimental sample were designated as, T₁, T₂ and T₃. The production cost per kg of control and DSP incorporated burfi samples was calculated to be Rs. 205.90 (T₀), Rs. 221.30 (T₁), Rs. 220.05 (T₂) and Rs. 218.52 (T₃).

Keywords: Cost analysis, date seed powder, carboxymethyl cellulose, *khoa*, burfi

Introduction

India has ranked first among the world's milk-producing nations since 1998. Milk production in the country increased from 198.4 million tonnes in 2019-20 to 210 million tonnes in 2020-21. The per capita availability of milk in the country also increased to 427 grams per day in 2020-21, compared to 406 grams per day in 2019-20 (source: www.nddb.coop)^[3]. The Ministry of Fisheries, Animal Husbandry and Dairying reported that in 2021-22, India produced 221.06 million metric tons of milk, accounting for approximately 23 percent of global milk production. Milk can be consumed as whole or through transformed into various dairy products such as concentrates, coagulated, fermented, fat-rich and frozen milk products. These products include *ghee* (clarified butter), *curd* (yogurt), *khoa* (a concentrated form of milk), *paneer* (cottage cheese), *butter*, *channa* and cheese. These traditional dairy products have been an integral part of Indian cuisine and are used in various culinary preparations. Out of the total milk production in India, 46 percent of milk is consumed as liquid milk and 54 percent is utilized for conversion into different dairy products. It is estimated that about 7 percent of total milk in India is converted into heat and acid-coagulated milk products among which burfi is one of the products (Rao and Pagote, 2018)^[5].

The Date seed (*Phoenix dactylifera* L.) belongs to family - *Arecaceae*. It is one of the oldest fruit plants that identical with people's lives in the Middle East including the Kingdom of Saudi Arabia since ancient times. In India is one of the largest producers of dates in the world, with major date-growing regions including Maharashtra, Gujarat, Rajasthan, and Punjab. Dates are mostly grown in India on an area of 12493 hectares in the Gujarati district of Kutchh, where 85351 tonnes of dates are produced annually (Al-Khalili *et al.*, 2023)^[2]. Date seeds are rich source of potentially valuable, nutritional and medicinal health promoting properties such as; Protein 5.92 percent, carbohydrates 58.62 percent, fat 7.5 percent and fiber content 21.25 percent and natural antioxidants 55.47 percent respectively (Sriharsha *et al.*, 2021)^[4]. It also contain many dietary minerals such as magnesium 58.4, calcium 38.8, iron 2.21 and lead; the potassium levels were reported to be high (229–293 mg/100 g) (Alharbi *et al.*, 2021)^[1].

Materials and Methods

The present investigation was aimed at estimation of cost of production in development of Date Seed Powder incorporated burfi. The work carried out in the Department of Dairy Technology, Dairy Science & Food Technology College, D.S.V.C.K.V., Raipur (CG). For preparation of DSP incorporated burfi prepared by using ingredients like full fat milk (fat 6% & SNF 9%), standardized milk (fat 4.5% & SNF 8.5%), Sodium Carboxymethyl Cellulose

(CMC) was of 'Butterfly' company, sugar and cocoa powder were purchased from the local market. The control burfi, sample was prepared as per the procedure given by Kamble, (2010) [6] and the DSP incorporated burfi was prepared as per the procedure standardized by Kamble, (2010) [6] with slight modifications. The burfi prepared with DSP was prepared by

using a fore mentioned ingredient as per the proportion given in Table 1. DSP incorporated burfi contains a significant amount of important constituents like protein, dietary fibre and antioxidant activity, which makes it a highly nutritious product.

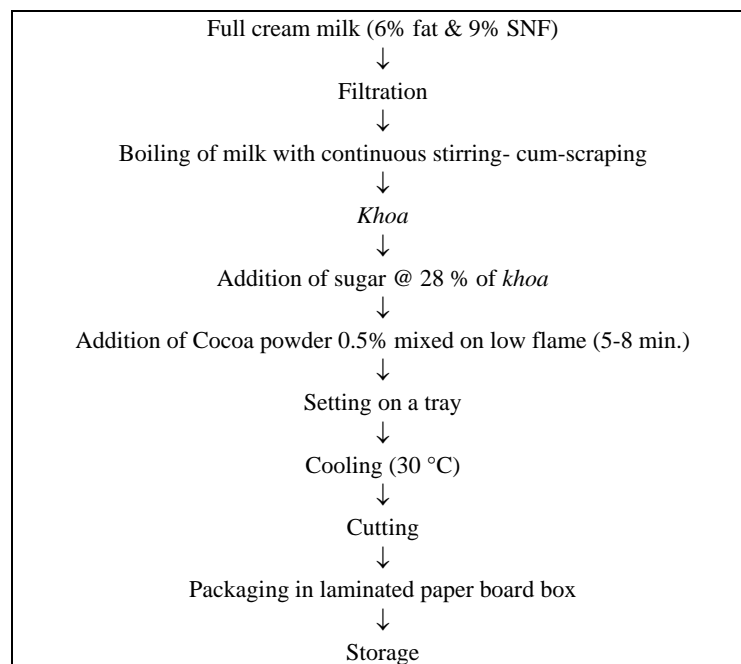


Fig 1: Flow diagram for preparation of control burfi

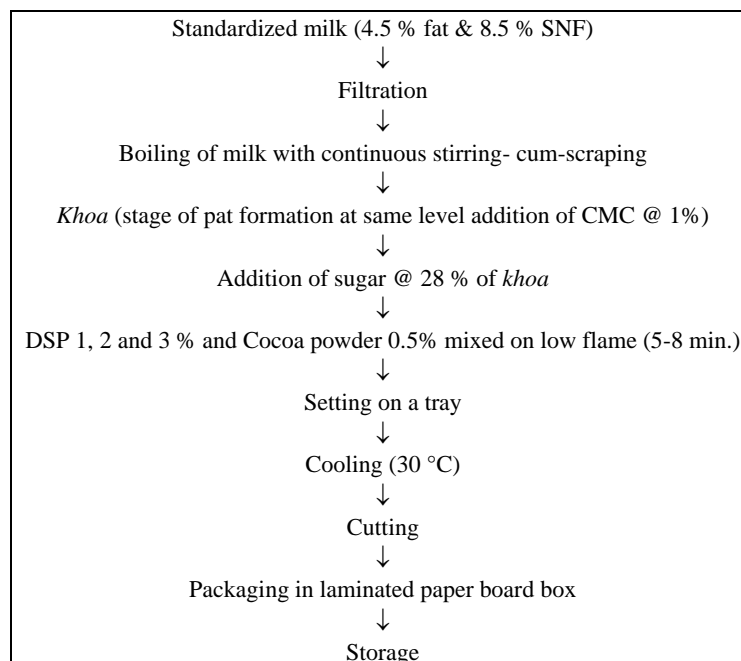


Fig 2: Flow chart for preparation of DSP incorporated burfi

Initially standardized milk (4.5 percent milk fat and 8.5 percent MSNF) was taken and filtered through muslin cloth, then transferred in open pan/karahi over a brisk fire. The milk was stirred continuously and side of karahi was also scrapped to avoid any scorching or charring of milk solids at the bottom of karahi. Vigorous stirring with the help of stirrer was accomplished by scrapping process till the product reached pasty consistency, then temperature was lowered. As the product reached pat formation stage (i.e. leaving the sides

of karahi), the CMC (Carboxymethyl Cellulose) was added @ 1 percent of *khoa*, respectively. After that as soon as the Date Seed Powder @ 1, 2 and 3 percent sugar 28 percent and cocoa powder 0.5 percent of *khoa* was added at the final stage and the contents were properly mixed and worked on gentle heat for about 5 to 8 minutes to get desired consistency. Immediately, the hot mass was then transferred to a stainless steel tray and kept in a cool dry place for 4-5 h for setting. The product was given to the panel of judges.

Table 1: Ingredients (g/100 g product) used in preparation of the product

Treatment/ Ingredients	g/100 g of products			
	T ₀	T ₁	T ₂	T ₃
<i>Khoa</i>	71.50	69.50	68.50	67.50
Sugar	28	28	28	28
Date Seed Powder	0	1	2	3
Carboxymethyl Cellulose (CMC)	0	1	1	1
Cocoa powder	0.5	0.5	0.5	0.5
Total	100	100	100	100

Table 2: Studies on estimation of cost of Date Seed (*Phoenix dactylifera* L.) Powder incorporated Burfi

Particular	Cost Rs./Kg	T ₀		T ₁		T ₂		T ₃	
		Qty. (g)	Amt. (Rs)	Qty. (g)	Amt. (Rs)	Qty. (g)	Amt. (Rs)	Qty. (g)	Amt. (Rs)
<i>Khoa</i>	248 (C)	715.0	177.32	695.0	175.23	685.0	172.71	675.0	170.18
	232 (T)								
CMC	1460	-	-	10.0	14.6	10.0	14.6	10.0	14.6
DSP	100	-	-	10.0	1.0	20.0	2.0	30.0	3.0
Sugar	51	280.0	14.28	280.0	14.28	280.0	14.28	280.0	14.28
Cocoa powder	700	5	3.5	5	3.5	5	3.5	5	3.5
Utility (LPG)	90	120.0	10.80	141.0	12.69	141.0	12.69	141.0	12.69
Total			205.90		221.30		220.05		218.52

*C- control, T- Treatment

Results and Discussion

The cost calculation for Date Seed (*Phoenix dactylifera* L.) Powder incorporated burfi on account of raw materials used i.e. cost of milk, DSP, CMC, Sugar and cocoa powder was estimated simply by considering the price of each ingredients and the utilities. The cost estimated includes the raw materials, fuel and miscellaneous charges their cost incurred in the preparation of 1 kg of final product are displayed in the Table 2. The production cost per kg of control and DSP incorporated burfi samples was calculated to be Rs. 205.90 (T₀), Rs. 221.30 (T₁), Rs. 220.05 (T₂) and Rs. 218.52 (T₃).

Conclusion

It can be concluded that the burfi containing 1 percent DSP along with 4.5 percent milk fat, 1 percent CMC, 28 percent sugar and 0.5 percent cocoa powder per kg of the product was found to be the most acceptable. This formulation could be used to prepare burfi without adversely affecting the chemical, sensory microbial quality. The cost of more acceptable burfi prepared from incorporation of 1 percent DSP was Rs. 221.30 Rs. per kg.

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