

**STUDIES ON PREPARATION OF GULKAND BURFI FROM BUFFALO MILK**S.V.Girase<sup>1</sup>, S.G. Gubbawar<sup>2</sup>, N.S. Borse<sup>3</sup> and S.M. Khupse<sup>4</sup>**ABSTRACT**

The present investigation entitled “Studies on preparation of gulkand burfi from buffalo milk” was carried out at Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during the year 2015-16. The objectives of present investigation were to find out the optimum level, to study the chemical, sensory qualities and cost structure of the products. Burfi was prepared with 30 per cent cane sugar and three different levels of gulkand viz., 2, 4 and 6 per cent on the basis of weighed khoa, besides that control sample which was prepared without addition of gulkand i.e with only 30 per cent cane sugar. The products were analyzed for chemical composition like fat, protein, total solids, moisture and ash content as well as for sensory attributes like flavour, body and texture, colour and appearance and overall acceptability. The data revealed that increased level of gulkand in burfi showed significantly decrease in the level of fat (22.66 to 20.01 per cent), protein (14.64 to 12.47 per cent), total solids (85.39 to 82.09 per cent) and ash (3.08 to 2.71 per cent), while moisture (14.61 to 17.91 per cent) increased with increase in the level of gulkand. The significantly highest score for flavour (42.54 out of 45), body and texture (33.06 out of 35), colour and appearance (18.98 out of 20) and overall acceptability (8.38 out of 9) were obtained in burfi containing 6 per cent of gulkand. The cost of prepared product under 0, 2, 4 and 6 per cent level of addition of gulkand were Rs. 270.42, Rs. 276.83, Rs. 283.50 and Rs.289.06 kg<sup>-1</sup> burfi, respectively.

(Key words: Buffalo milk, khoa, burfi, gulkand)

**INTRODUCTION**

Milk is regarded as a complete food in a human diet. Milk provides almost all the nutrients essential for the nourishment of the human body. Milk consumed as a whole or by converting it into various milk products such as fermented milk product, coagulated and concentrated milk product (Kamble *et al.*, 2010).

Burfi has been flavoured as one of the most popular khoa based sweets all over India. The unique adaptability of khoa in terms of its flavour, body and texture to blend with a wide range of food adjuncts is permitted in the development of an impressive array of burfi varieties. Among these, fruit, nut, chocolate, coconut, saffron and rawa burfi are popular. The artful ingenuity of the sweet maker in creating special qualities in burfi fetches the highest consumer price. The burfi is prepared with cashewnut as katli (a water thin slice), almond, pistachio, coconut, mango, orange, mud apple, bottle gourd and potato (Shelke *et al.*, 2008).

Gulkand is an Arabic word; Gul means Rose and Kand means Sugar. Gulkand is undoubtedly the most delicious ayurvedic preparation known to mankind. Traditionally it has been used as a cooling tonic to combat fatigue, lathery, muscular aches, biliousness itching, and heat-related conditions. It is naturally rich in calcium and also known as antioxidant and good blood purifier. It can be

used year round by person of all constitution, especially vata and pitta (Pendawale *et al.*, 2012).

**Chemical compositions (per cent) of buffalo milk khoa are as follows (Srivastva, 1993)**

Moisture	19.2 per cent	Lactose	22.1 per cent
Fat	37.1 per cent	Ash	3.6 per cent
Protein	17.8 per cent		

**Nutritional and medicinal compositions (per cent) of gulkand are as follows (Jogdevsingh, 2014)**

Total fat	0.0 per cent	Sugar	33.30 per cent
Cholesterol	0.0 per cent	Moisture	43.00 per cent
Carbohydrates	41.30 per cent	Protein	0.48 per cent
Dietary fiber	8.50 per cent		

Considering the flavour, nutritional and medicinal value of gulkand, it was considered worthwhile to blend it with sweetened khoa in different levels for testing nutritional value and overall acceptability.

**MATERIALS AND METHODS**

The present investigation entitled “Studies on preparation of gulkand burfi from buffalo milk” was carried out at Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during the year 2015-16. During the

1, 3 and 4 P.G. Students, Animal Husbandry and Dairy Science, College of Agriculture, Nagpur

2. Asstt. Professor, Animal Husbandry and Dairy Science, College of Agriculture, Nagpur

entire study whole, fresh and clean milk was obtained from market. For standardization milk was sterilized by boiling and cooling to room temperature.

Method of preparation of burfi suggested by De (1982) was used with slight modification. The buffalo milk standardized to 6 per cent fat and concentrated to a pasty consistency by evaporating in open pan on gentle fire to prepare khoa. The sugar at the rate of 30 per cent was added and heated gently till pat formation. When the product started to leave the sides of Karahi (within 5 to 8 min) the gulkand was added and further heated on low flame till the product again started to leave the side of Karahi. The product was taken off the flame and transferred into a ghee smeared tray and was allowed to cool and cut into desirable size.

#### Treatment details:

T<sub>1</sub> = 100 parts of buffalo milk sweetened khoa by weight + 0 parts of gulkand

T<sub>2</sub> = 98 parts of buffalo milk sweetened khoa by weight + 2 parts of gulkand

T<sub>3</sub> = 96 parts of buffalo milk sweetened khoa by weight + 4 parts of gulkand

T<sub>4</sub> = 94 parts of buffalo milk sweetened khoa by weight + 6 parts of gulkand

#### Chemical analysis of burfi

##### Determination of fat

Fat content in burfi was determined by Mojonnier fat extraction apparatus method as prescribed in B.I.S. Handbook of food analysis IS: 3889 (Anonymous, 1977).

##### Determination of protein

The protein content in burfi was determined by estimating per cent nitrogen by microkjeldhal method. The nitrogen percentage was multiplied by 6.25 to get trade protein percentage as recommended in IS: 1479 (part II) (Anonymous, 1961).

##### Determination of total solids

The total solids content of burfi was determined gravimetric method as per the procedure IS: 1479 (Part II) (Anonymous, 1961).

##### Determination of moisture

Moisture content in burfi was determined by subtracting the total solids content from 100 in sample.

##### Determination of ash

The ash content in burfi was determined as per the method recommended in B.I.S. Handbook of food analysis IS: 1165 (Anonymous, 1967).

##### Sensory evaluation

The quality of burfi was judged by offering the sample to the panel of 5 judges in each trial separately. Score card method for sensory evaluation of burfi as suggested by Pal and Gupta (1985) was adopted as details below.

Characters	Perfect score
Flavour	45
Body and texture	35
Colour and appearance	20
Total	100

Overall acceptability was determined by a trained sensory panel (minimum of 5 members) on a 9-point hedonic scale as prescribed by Nelson and Trout (1964).

#### Hedonic rating

Sr. No.	Remarks	Score
1	Like extremely	9
2	Like very much	8
3	Like moderately	7
4	Like slightly	6
5	Neither like nor dislike	5
6	Dislike slightly	4
7	Dislike moderately	3
8	Dislike very much	2
9	Dislike extremely	1

**Note :** Score of 5.5 and above indicates acceptability within the score of 1 to 9.

#### Statistical analysis:

The experiment was laid out in CRD with 4 treatments and 5 replications. The data obtained were analyzed statistically according to method described by Snedecor and Cochran (1994).

## RESULTS AND DISCUSSION

Chemical quality of burfi was evaluated with respect to fat, protein, total solids, moisture and ash content and data are presented in table 1.

### 1) Fat

Fat content of burfi sample was significantly affected due to addition of different level of gulkand. Fat content in burfi under 0, 2, 4 and 6 per cent gulkand were 22.66, 21.59, 20.84 and 20.01 per cent, respectively. The highest (22.66 per cent) fat was observed in burfi prepared without addition of gulkand, while the lowest (20.01 per cent) with 6 per cent of gulkand. This might be due to no fat content in gulkand. This revelation is in agreement with the results obtained by Bankar *et al.* (2013), who reported the fat content in the range of 18.37 to 22.11 per cent in pineapple pulp burfi.

### 2) Protein

Protein content in burfi under treatment 0, 2, 4 and 6 per cent of gulkand were 14.64, 13.73, 13.12 and 12.47 per cent, respectively. Protein content was the highest (14.64 per cent) in burfi prepared without addition of gulkand, while the lowest (12.47 per cent) was observed with the addition of 6 per cent gulkand. It was noticed that protein

content in burfi was significantly decreased with the increase in the level of gulkand. This might be due to low protein content in gulkand (0.48 per cent). The findings are in closed agreement with Navale *et al.* (2014) and Pawar *et al.* (2015), who found the protein content in the range of 12.67 to 14.88 per cent and 13.20 to 15.00 per cent in wood apple and dried date burfi, respectively.

### 3) Total solids

The average total solids content of burfi in treatment 0, 2, 4 and 6 per cent gulkand were 85.39, 84.29, 83.19 and 82.09 per cent, respectively. Total solids content in burfi was significantly affected due to the addition of different levels of gulkand. The highest (85.39 per cent) level of total solids was noticed in control burfi and the lowest (82.09 per cent) level was observed in burfi prepared with 6 per cent gulkand. The findings are also in closed agreement with Bankar *et al.* (2013) in pineapple pulp burfi with total solids content in the range of 81.58 to 83.74 per cent.

### 4) Moisture

Moisture content of burfi under treatment 0, 2, 4 and 6 per cent were 14.61, 15.71, 16.81 and 17.91 per cent, respectively. The lowest (14.61 per cent) moisture content was noticed in burfi without addition of gulkand and the highest (17.91 per cent) moisture was observed with 6 per cent addition of gulkand. The moisture content in burfi was significantly increased with the increase the level of gulkand. The above results are agreement with the results obtained by Borse (2011), who reported the moisture content in gulkand burfi in the range of 15.49 to 19.35 per cent.

### 5) Ash

Ash content of burfi sample was significantly affected due to addition of different level of gulkand. Ash content in burfi under 0, 2, 4 and 6 per cent gulkand were 3.08, 2.94, 2.81 and 2.71 per cent, respectively. The highest (3.08 per cent) ash was observed in burfi prepared without addition of gulkand, while the lowest (2.71 per cent) was observed with 6 per cent of gulkand. It indicated that as the level of gulkand increased ash content of burfi decreased. Above results are in agreement with the results obtained by Bankar *et al.* (2013), who observed the ash content in pineapple pulp burfi was in the range of 2.71 to 3.03 per cent and reported that the ash content in burfi was decreased with the increase the level of pineapple pulp.

## Sensory evaluation of burfi

The data with respect to sensory evaluation of burfi are presented in table 2.

### 1) Flavour

Significantly highest score (42.54 out of 45) was obtained by burfi prepared with 6 per cent of gulkand as compared to other treatments. Hence, it indicated that 6 per cent level of gulkand resulted in better flavour of burfi.

### 2) Body and texture

So far as body and texture was concerned (out of 35) the highest score of 33.06 was obtained in burfi prepared with 6 per cent of gulkand and the lowest score of 29.94 was obtained without addition of gulkand. From the data obtained, it is revealed that as the levels of gulkand increased, the score for body and texture of burfi also increased proportionately.

### 3) Colour and appearance

The highest colour and appearance score (18.98 out of 20) of burfi prepared with addition of 6 per cent of gulkand was superior over rest of the treatments. From the data obtained, it was revealed that as the levels of gulkand increased, the score for colour and appearance of burfi also increased proportionately.

### 4) Overall acceptability based on 9 point hedonic scale

The score for overall acceptability of burfi were 5.79, 6.58, 7.48 and 8.38 under the treatments 0, 2, 4 and 6 per cent, respectively. The significantly highest score (8.38 out of 9) was observed by burfi prepared with 6 per cent of gulkand. Thus, overall acceptability score of burfi with 6 per cent gulkand was more superior over rest of the treatments.

### Cost of production

Cost of production of 1 kg burfi prepared under various treatments i.e 0, 2, 4 and 6 per cent was Rs.270.42, Rs.276.83, Rs. 283.50 and Rs. 289.06, respectively. The cost of production increased with the increase in levels of gulkand. The lowest cost (Rs. 270.42) of production was recorded in case of burfi prepared without addition of gulkand. However, the burfi prepared with 6 per cent gulkand obtained maximum score for sensory evaluation/ acceptability costing Rs. 289.06 kg<sup>-1</sup> which was more than control but can be compensated with value addition of gulkand in burfi.

**Table 1. Chemical composition of gulkand burfi**

Treatments	Constituents (per cent)				
	Fat	Protein	Total solids	Moisture	Ash
T <sub>1</sub> = 100 parts of buffalo milk khoa by weight + 0 parts of gulkand	22.66 <sup>a</sup>	14.64 <sup>a</sup>	85.39 <sup>a</sup>	14.61 <sup>d</sup>	3.08 <sup>a</sup>
T <sub>2</sub> = 98 parts of buffalo milk khoa by weight + 2 parts of gulkand	21.59 <sup>b</sup>	13.73 <sup>b</sup>	84.29 <sup>b</sup>	15.71 <sup>c</sup>	2.94 <sup>b</sup>
T <sub>3</sub> = 96 parts of buffalo milk khoa by weight + 4 parts of gulkand	20.84 <sup>c</sup>	13.12 <sup>c</sup>	83.19 <sup>c</sup>	16.81 <sup>b</sup>	2.81 <sup>c</sup>
T <sub>4</sub> = 94 parts of buffalo milk khoa by weight + 6 parts of gulkand	20.01 <sup>d</sup>	12.47 <sup>d</sup>	82.09 <sup>d</sup>	17.91 <sup>a</sup>	2.71 <sup>d</sup>
..	0.095	0.061	0.180	0.180	0.027
CD at 5%	0.286	0.183	0.541	0.541	0.083

**Table 2. Sensory evaluation of burfi as affected by different levels of gulkand**

Treatments	Sensory score			
	Flavour (Out of 45)	Body and texture (Out of 35)	Colour and appearance (Out of 20)	Overall acceptability (Out of 9)
T <sub>1</sub> = 100 parts of buffalo milk khoa by weight + 0 parts of gulkand	39.36 <sup>d</sup>	29.94 <sup>d</sup>	16.08 <sup>d</sup>	5.79 <sup>d</sup>
T <sub>2</sub> = 98 parts of buffalo milk khoa by weight + 2 parts of gulkand	40.28 <sup>c</sup>	30.46 <sup>c</sup>	17.20 <sup>c</sup>	6.58 <sup>c</sup>
T <sub>3</sub> = 96 parts of buffalo milk khoa by weight + 4 parts of gulkand	41.46 <sup>b</sup>	31.52 <sup>b</sup>	18.22 <sup>b</sup>	7.48 <sup>b</sup>
T <sub>4</sub> = 94 parts of buffalo milk khoa by weight + 6 parts of gulkand	42.54 <sup>a</sup>	33.06 <sup>a</sup>	18.98 <sup>a</sup>	8.38 <sup>a</sup>
SE±	0.214	0.156	0.117	0.116
CD at 5%	0.643	0.469	0.352	0.349

## REFERENCES

- Anonymous, 1961. Method of test for dairy industry: Chemical analysis of milk (IS: 1479) Part-II. Bureau of Indian Standard, Manak Bhavan, New Delhi, India.
- Anonymous, 1967. Indian standard specifications for milk powder (whole and skim) (IS: 1165). Bureau of Indian Standard, Manak Bhavan, New Delhi.
- Anonymous, 1977. Milk and milk products- Determination of fat content by Mojonnier-type fat extraction flasks (IS: 3889), Bureau of Indian Standard, Manak Bhavan, New Delhi.
- Bankar, S. N., R. P. Barbind, R. L. Korake, S. V. Gaikwad and S. S. Bhutkar, 2013. Studies on preparation of pineapple burfi. *Asian J. Dairy and Food Res.* **32** (1): 40-45.
- Borse, N. 2011. Effect of different levels of gulkand on the quality of burfi prepared from cow milk. Unpublished M.Sc. (Agriculture) Thesis Dr. P.D.K.V., Akola.
- De, S. 1982. *Outline of Dairy Technology*. 2<sup>nd</sup> Ed. Oxford University Press, New Delhi: pp. 9, 385, 392, 399 and 516.
- Jagdev Singh, 2014. Nutritional composition of gulkand. [www.ayurtimes.com](http://www.ayurtimes.com) > gulkand
- Kamble, K., P. A. Kahate, S. D. Chavan and V. M. Thakare, 2010. Utilization of pineapple pulp in the preparation of burfi. *Veterinary World*, **3** (7): 329-331.
- Navale, A. S., B. R. Deshmukh, R. I. Korake, S. G. Narwade, and P. R. Mule, 2014. Production profile, proximate composition, sensory evaluation and cost configuration of wood apple burfi. *Animal Science Reporter*, **8**(3): 114-120.
- Nelson, J. A. and G. M. Trout, 1964. *Judging dairy products*. 4<sup>th</sup> edition. The Olesen Publishing Co. Milwaukee Official Methods of Analysis Chemists, Washington.
- Pal, D. and S. K. Gupta, 1985. Sensory evaluation of Indian milk products. *Indian Dairyman*, **37** (10): 465-474.
- Pawar, S. B., S. G. Narwade, R. L. Korake and S. S. Bhutkar, 2015. Studies on preparation of burfi blended with dried date. *J. Soils and Crops*. **25** (2): 306-309.
- Pendawale N. T., V. G. Atkare, R. M. Zinjarde, Rohini Narote and S. S. Shirke, 2015. Utilization of gulkand in the preparation of shrikhand. *J. Soils and Crops*. **25** (1): 168-172.
- Shelke, C. Y., S. V. Baswade, B. C. Andhare, R. S. Mule and S. B. Adangale, 2008. Economics of preparation of mango burfi. *J. Dairying, Foods and H.S.*, **27**(3/4):196-198.
- Snedecor, G. W. and W. G. Cochran, 1994. *Statistical method*, 8<sup>th</sup> edition, Oxford and IBH publishing company, Calcutta.
- Srivastva, S. M. 1993. *Milk and its products*. Kalyani publ. New Delhi. pp. 151.

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