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Study of Chemical Analysis of burfi prepared by using honey as a Sweetening Agent

G.D.Deshmukh[1], G.K. Londe[1], D.D.Thorat[2], A.P.Naik[2]*

[1]*Department of Animal Husbandry and Dairy Science,*
VNMKV, Parbhani-431 402. India.

[2]*Department of Dairy Science. Toshniwal ACS college Sengaon, Dist: Hingoli (MS)*

Abstract

The objective of the present study investigation was to investigate the chemical composition of burfi prepared by using three level of honey on the basis khoa. Chemical composition of Mositure, Fat, Protein, Lactose, Total solid and Ash was study. It was observed that the moisture ranged from 14.05 to 21.02 per cent. The moisture content was found higher in honey burfi contain 80 % Khoa + 20% honey. It was also observed that moisture per cent increases with increasing the level of honey. This might be due to the higher moisture content in honey.However, opposite results was observed with respect to fat, protein, lactose, total solids and ash content of honey *burfi*. As the level of honey increases the constituents like fat, protein, lactose, total solids and ash get decreased. This might be due to the higher moisture percent in honey and lower total solids.

Keywords: Burfi, Honey, Protein, Lactose, and Total solid and Ash

Introduction

Burfi is popular milk based sweet in India and is mostly like to attain global status. Sugar is added in different proportion and other ingredients incorporated according to demand by consumer. A more variation can be observed in physical attributes of market samples. Good quality *burfi*, however, is characterized by moderately soft, sweet taste, and smooth texture and slightly greasy body with very fine grains. A Colour of chocolate *burfi*, should be slightly yellowish or white. Milk and milk products occupy a very important place in the food sector and economy of India which has obtained the distinction of becoming the largest milk producing country in the world. In India about 50-55 per cent of the India's total milk production is converted into a variety of traditional milk products by the unorganized sector (*Halwais*) employing various unit operations such as desiccation,coagulation (heat and /or acid) and fermentation (Banerjee, 1997). Honey is natural sweetener, having medicinal qualities. This makes the use of honey less harmful than sugar.

Material and Methods

The present investigation was carried out in the Department of Animal Husbandry and Dairy Science, College of Agriculture Latur, Marathwada Agricultural University Parbhani. Buffalo milk was brought from the local market. Milk was standardized to 6.0 per cent fat and 9.0 per cent SNF. Honey used as a Sweetening agent for preparation of *Burfi* was manufactured by DABUR INDIA LTD.

Treatment details

A preliminary trial was conducted to decide the levels of honey on the basis of *khoa*. It is decided that honey is acceptable at the level of 10-20 per cent on the basis of *khoa*. For further study, *burfi* was prepared by using there-levels of honey on the basis of *khoa*. The details of treatments were as follows.

T_0 *Khoa* + recommended level of sugar (25 %)

T_1 *Khoa* + honey @ 10 % of *khoa*

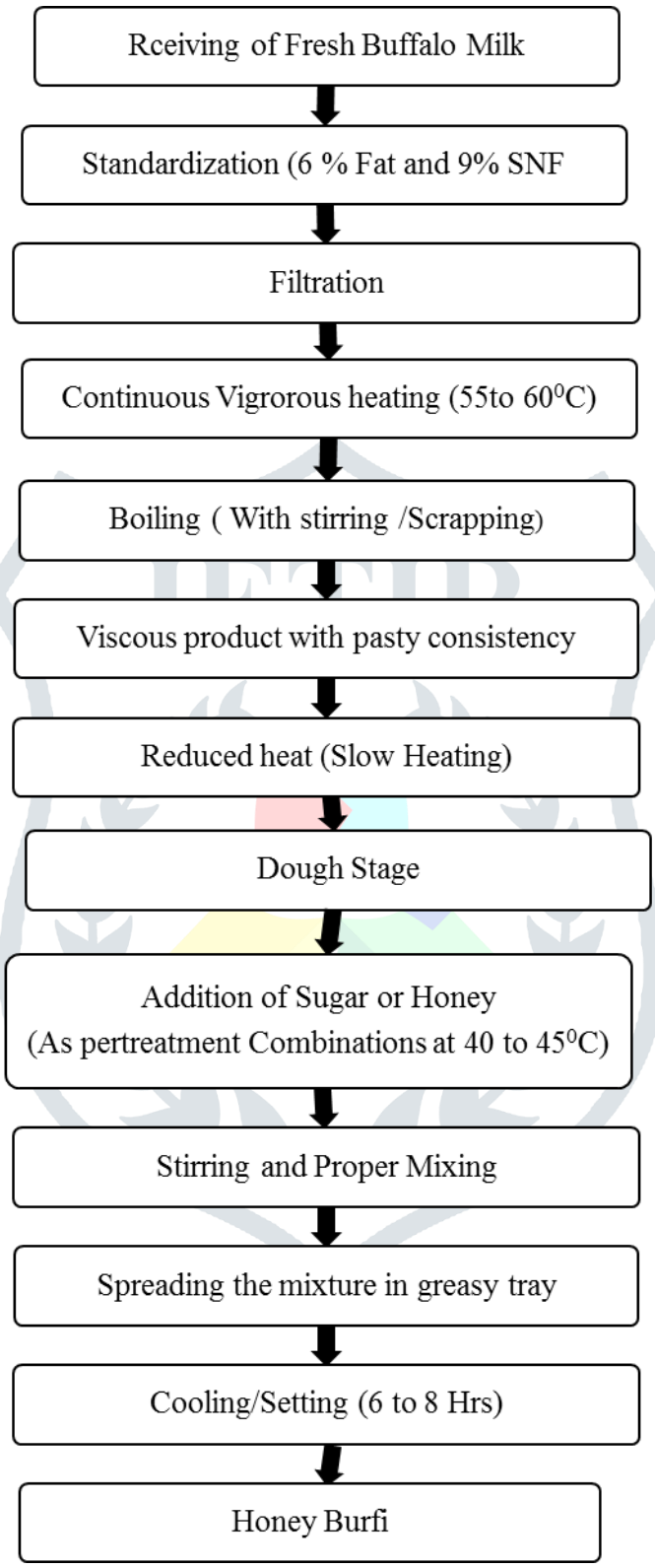
T_2 *Khoa* + honey @ 15 % of *khoa*

T_3 *Khoa* + honey @ 20 % of *khoa*

Preparation of Burfi using honey as a sweetening agent.

The standardized buffalo milk was concentrated to a dough stage by evaporating in a iron Karahi on a gentle fire. At this stage the honey was added and mixed properly. The product was taken out and spread into a stainless steel tray and was allow to cool and cut into desirable size. A schematic diagram for preparation of burfi using honey as a sweetening agent is given in fig 1.

Fig. 1 : Manufacture of honey *burfi* (flow chart)



Chemical analysis

The brief description of different methods used to examine the chemical properties of honey *burfi* is given here.

Moisture

Majonnier method as described in IS:2785 (1964) for determination of moisture in cheese was used for honey *burfi* with slight modifications.

About 20 g of previously washed and dried sand was weighed into an aluminium dish, allowed to dry further in an oven at 100°C and weighed to the nearest of 1 mg constant weight. Five g of honey *burfi* was transferred in dish and 5 ml of distilled water was added to it. The contents were mixed thoroughly in form of a paste with the help of glass rod. The dishes were then transferred to thermostatically controlled water bath at 100°C + 1°C for 30 min and later transferred to a hot air oven maintained at 100°C ± 1°C. The drying was continued to be light brown and difference between the two successive weighings was not more than 1 mg. The result was expressed on the basis of 100 g of honey *burfi* as follows.

$$\text{Moisture \%} = \frac{W_1 - W_2}{W_0} \times 100$$

Where,

W_1= weight of sample along with dish etc. before drying (g)

W_2= Weight of sample along with dish etc. after drying (g)

W_0= Weight of sample taken (g)

Fat

Fat in honey *burfi* sample was determined by Rose Gottlieb method for milk as described in SP:18 (Part XI), 1981 with some modifications.

Five g of honey *burfi* sample was accurately weighed into a small beaker and made to paste with an equal amount of warm (65°C) distilled water. Two ml of concentrated ammonia solution (specific gravity 0.88) and 9 ml of distilled water were added. The contents were swirled gently, cooled and 10 ml ethyl alcohol (95 % v/v) was added.

The contents were then completely transferred to the Majonnier fat extraction tube and shaken for 2 min. Twenty five ml each of diethyl ether (Sp. gr. 0.721, peroxide free) and petroleum ether (40 – 60 ° C boiling point) were added and the tube was closed with a wet cork and shaken vigorously for 1 min. The tube was centrifuged for 1 min to separate the ethereal layer from the aqueous layer and the supernatant liquid was decanted in clean, dry previously weighed aluminium dish. Extractions were repeated twice using 15 ml of diethyl and petroleum ethers each time. The solvents were distilled off and the dish heated in the oven at 98°C – 100°C, cooled and weighed. Heating and weighing were repeated till weighing did not show a loss in weight by more than 1 mg. Percentage of fat by weight in the sample was calculated as follows.

$$\text{Fat \%} = \frac{\text{Weight of fat extracted}}{\text{Weight of sample}} \times 100$$

Protein

The protein content of honey *burfi* was determined by micro Kjeldhal method (Menefee and Overman, 1940).

Accurately weighed 200 mg of honey *burfi* sample was transferred to a Kjeltac digestion tube and digested after adding one digestion tablet (1.5 g K_2SO_4 and 0.0075 g Se) and 5 ml concentrated H_2SO_4 till the contents became clear. The contents of the flask were cooled and then distilled in the distillation apparatus. About 25 ml of saturated boric acid solution containing 4 drops mixed indicator (prepared by dissolving 100 mg methyl red and 30 mg methylene blue in 60 ml of 95 % ethyl alcohol and then making up the volume to 100 ml with distilled water) was taken in a 100 ml conical flask.

Approximately 65 to 70 ml of distillate were collected in a 100 ml conical flask. The contents of the flask were titrated against 0.02 N HCl. A blank determination using distilled water in place of sample was also carried out. The total nitrogen and per cent protein were calculated as follows.

$$\text{Total nitrogen \%} = \frac{(X-Y)\ N \times 14.007 \times 100}{W}$$

Where,

X = ml of HCl required for sample

Y = ml of HCl required for blank

N = Normality of HCl used, and

W = Weight of the sample in mg

Per cent Total Protein = Per cent Total Nitrogen x 6.38.

Lactose

Lactose were estimated as per the procedure described in (BIS SP Part-XI, 1981) for *burfi* with slight modification.

Weighed accurately 40 g sample of honey *burfi* in a 100 ml beaker. Added 50 ml of hot water at 80-90^oC to it and mixed and transferred the contents to a 250 ml volumetric flask and rinsed the beaker with hot water to make the volume to about 120-150 ml. The contents in the volumetric flask were mixed and cooled to room temperature followed by addition of 5 ml of 10 % dilute ammonia and it was allowed to stand for 15 min. The exact equivalent of 5 ml of 10 % dilute acetic acid was added to neutralize the ammonia added. This was added 12.5 ml of zinc acetate solution followed by 12.5 ml of potassium ferrocyanide solution and mixed again. The contents were made upto 250 ml mark using distilled water and allowed to settle and it was filtered through Whatman filter paper No. 1. The filtrate was marked as B_1 from B_1 50 ml was taken into a 100 ml volumetric flask and 5 ml of concentrated HCl was added followed by heating at 68^oC for 5 minutes. It was cooled and neutralize with 50 % NaOH and made upto 100 ml with distilled water and was marked as A_1. The solution marked as A_1 was diluted 20 times (5 ml made upto 100 ml) while B_1 was diluted 4 times (25 ml made upto 100 ml) and were marked as A_2 and B_2 respectively. Both the solutions were taken into a burette and titrated against the mixture of 5 ml each

of Fehling 1 and Fehling 2 solutions added with a mixed indicator. Similarly, standard lactose were taken and titrated.

The lactose contents in the honey *burfi* samples were calculated as follows.

$$\text{Lactose (\%)} = \frac{\text{Titre value for standard lactose} \times 5 \times 2}{\text{Titre value for } B_2}$$

Total ash

About 2 g of the product was weighed accurately in a silica dish and ignited on a laboratory Bunsen burner with final incineration in a muffle furnace at 550°C for 2 hr (AOAC, 1975). Constant weight of ash was considered to have reached when the difference in the two consecutive weighings after repeated ignition was less than 0.2 mg. Ash content was expressed as per cent of the gross product.

RESULTS AND DISCUSSION

Sample of honey burfi prepared by standardized method is described in fig. 1. The product was prepared by using 15% honey on the basis of khoa. Hence Cheminal Analysis of Moisture, Fat, Protein, Lactose, Total Solid and Ash was study.

Chemical analysis of honey *burfi*

Moisture

The average moisture content in T_0, T_1, T_2 and T_3 treatments was 19.05%, 20.38%, 20.94% and 20.10%, respectively. The highest level of moisture content was noticed in 20 % honey *burfi* (T_3) and the lowest level in control *burfi* (T_0). This may be due to the higher moisture content in the honey as compare to sugar. As the level of honey increases the moisture content in the *burfi* is also increases and variation due to treatment was significant at $P < 0.01$(ANOVA). All the treatments valid significantly for each other. Average values of moisture content in *burfi* are more or less similar to the figures reported by Kolhe (2003), Shelke (2007) and Sakate (2000) (14.13%, 18.17%, 16.32%, 17.72% and 14.09 – 19.70%).

Table 1. Effect of different levels of honey on moisture content (%) of honey *burfi*

Treatments/ Replications	Moisture content (%)					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	19.20	19.06	18.90	19.04	19.05	**19.05**
T_1	20.10	20.30	20.38	20.46	20.66	**20.38**
T_2	21.14	21.10	20.74	20.94	20.80	**20.94**
T_3	20.00	21.05	21.22	21.33	21.50	**21.02**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.3368	0.0917			
Treatments	3	12.46	4.154	36.10	3.49	**
Error	12	1.38	0.115			
Total	19					
		SE ±	0.151		CD at 5%	0.466

** P < 0.01.

Fat

The data relating to fat content of *burfi* by different levels of honey are presented in Table 2.

The mean fat content in *burfi* was 24.26%, 23.62%, 22.84% and 22.21% for T_0, T_1, T_2 and T_3 respectively. The statistical analysis showed that the level of honey had significant effect on per cent fat of honey *burfi* (ANOVA). It was observed from Table 4.6 that maximum fat content was in control *burfi* (T_0) since it was prepared without honey and sugar level (25 %) and minimum fat (22.29%) in the product prepared by addition of highest level (20 %) honey (T_3). The above observations indicate that the increase in level of honey content decreased the fat content significantly. The decrease in level of fat content might be due to less fat percentage in honey. The findings are in agreement with the results reported by Garg and Mandkot (1987) and Shelke (2007).

Table 2. Effect of different levels of honey on fat content (%) of honey *burfi*

Treatments/ Replications	Fat content (%)					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	24.06	24.15	24.26	24.46	24.37	**24.26**
T_1	23.50	23.55	23.74	23.62	23.69	**23.62**
T_2	22.80	22.70	22.88	22.84	22.98	**22.84**
T_3	22.10	22.29	22.48	22.35	22.23	**22.29**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.165	0.0414			
Treatments	3	11.23	3.744	45.41	3.49	**
Error	12	0.0984	0.0082			
Total	19					
		SE ±	0.040		CD at 5%	0.124

** P < 0.01.

Protein

The protein content in treatment T_0, T_1, T_2 and T_3 was found 14.74%, 13.88%, 13.24% and 12.78% (T_4). The differences were statistically significant among the various treatments. As the level of honey increases the protein content level of the product decreases due to less protein content in honey.

Table3. Effect of different levels of honey on protein content (%) of honey *burfi*

Treatments/ Replications	Protein content (%)					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	14.82	14.74	14.66	14.69	14.79	**14.74**
T_1	13.96	14.06	13.88	13.70	13.80	**13.88**
T_2	13.34	13.17	13.30	13.24	13.17	**13.24**
T_3	12.86	12.79	12.90	12.70	12.66	**12.78**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.0708	0.0177			
Treatments	3	10.79	3.597	483.3	3.49	**
Error	12	0.0888	0.0074			
Total	19					

SE ± 0.038 CD at 5% 0.118

** P < 0.01.

These findings are in agreement with Ghodekar *et al*. (1974), reported that protein content of *burfi* in the range of 12.10 – 20.80 per cent and also in agreement with Kolhe (2003) and Gargade (2004), however, they use papaya pulp and orange concentrate in the preparation of *burfi* respectively.

Lactose

Table 4. showed that lactose per cent in treatment T_3 was lowest (14.47 %) where, higher lactose content was found in treatment T_0 (16.35 %). This indicated that, as addition of honey level increases the lactose content decreases significantly. It is worthwhile to explain that the initial of T_0 (control) was due to the presence of lactose. The typical trend noticed with in the combination may be contributed to the fat that the honey contains very less lactose. There seems to be a linear decrease with the higher levels of honey addition.

Table 4.Effect of different levels of honey on lactose content (%) of honey *burfi*

Treatments/ Replications	Lactose content (%)					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	16.50	16.20	16.36	16.42	16.30	**16.35**
T_1	15.85	15.70	15.80	15.67	15.60	**15.72**
T_2	15.10	15.00	14.85	15.06	15.15	**15.03**
T_3	14.61	14.54	14.32	14.49	14.40	**14.47**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.164	0.041			
Treatments	3	3	10.79	3.49	3.49	**
Error	12	0.115	0.0096			
Total	19					

SE ± 0.043 CD at 5% 0.134

** P < 0.01.

These findings are in agreement with Kathalkar (1995) reported that the carbohydrate in the range of 51.52 to 63.94 in various combination of *Khoa* and honey in *burfi*. Similarly Ghorpade in 2004 found that the carbohydrate contains in *peda* was in the ragne of 44.10 to 55.62 per cent.

Total solids

The mean total solids contain was found highest in treatment T_0 (80.95 %) and significantly lowest in treatment T_3 (78.78 %) (Table 6). The differences were statistically significant among various treatments. As the addition of honey level increases the total solid content level of honey *burfi* decreases. This might be due to high moisture content in honey.

Table 6. Effect of different levels of honey on total solids (%) of honey *burfi*

Treatments/ Replications	Total solids					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	81.05	80.95	80.90	81.00	80.85	**80.95**
T_1	79.75	79.64	79.70	79.62	79.05	**79.64**
T_2	79.06	78.95	79.15	79.10	79.00	**79.05**
T_3	78.88	78.75	78.82	78.78	78.70	**78.78**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.0708	0.0177			
Treatments	3	13.932	4.644	167.23	3.49	**
Error	12	0.0234	0.0027			
Total	19					
		SE ± 0.023			CD at 5%	0.072

** P < 0.01.

These finding are in close agreement with the result reported by Sakate (2000), Kolhe (2003) and Gargade (2004) that the increasing level of wood apple, papaya pulp and orange concentrate was inversely proportional to total solid content in the *burfi*.

Ash

It may be registered from Table 7. that the ash content in T_0 was found (2.92 %) and in treatment T_3 (1.9 %). The differences were statistically significant among the various treatment. As honey level increase the ash content level of the product decreased. Above findings are in agreement with Kolhe (2003) reported that ash content in *burfi* was inversely proportional to increased level of honey.

Table 7. Effect of different levels of honey on ash content (%) of honey *burfi*

Treatments/ Replications	Ash content					
	R-I	R-II	R-III	R-IV	R-V	Mean
T_0	3.05	2.93	2.80	3.00	2.86	**2.92**
T_1	2.64	2.45	2.54	2.60	2.50	**2.54**
T_2	2.30	2.18	2.25	2.00	2.05	**2.15**
T_3	2.05	1.88	1.95	2.00	1.80	**1.90**

ANOVA

SV	d.f.	SS	MSS	Cal 'F'	't' value	Result
Replication	4	0.092	0.0230			
Treatments	3	2.873	0.9577	150.12	3.49	**
Error	12	0.0756	0.0063			
Total	19					
		SE ± 0.035			CD at 5%	0.109

** P < 0.01.

Mean chemical composition of honey *burfi*

It may be apparent from Table 8. that honey *burfi* recorded the mean chemical composition. The moisture content ranged from 14.05 to 21.02 per cent. The moisture content was found higher in honey *burfi* containing 80 % *khoa* + 20 % honey. Moisture per cent increases with increasing the honey level.

Table 8. Effect of different levels of honey on mean chemical composition of honey *burfi*

Chemical constituents	T0	T1	T2	T3
Moisture	14.05	20.38	20.94	21.02
Fat	24.26	23.62	22.84	22.29
Protein	14.74	13.88	13.24	12.78
Lactose	16.35	15.72	15.03	14.47
Total solid	80.95	79.64	79.05	78.78
Ash	2.92	2.54	2.15	1.90

Contrary results were obtained with respect to fat, protein, lactose, Total solids and Ash content of honey *burfi*. As the level of honey increases these were decreases significantly. The changes in chemical composition of honey *burfi* is depicited in Fig. 1.

Conclusion

During present investigation *burfi* was prepared with different levels of honey. Results obtained indicates that the mean moisture content was found as 19.05, 20.38, 20.94 and 21.02 per cent in treatments T_0, T_1, T_2 and T_3, respectively. The moisture content of honey *burfi* increases with increasing the level of honey. This might be due to the higher moisture content in honey.

However, opposite results were observed with respect to fat, protein, lactose, total solids and ash content of honey *burfi*. As the level of honey increases the constituents like fat, protein, lactose, total solids and ash get decreased. This might be due to the higher moisture percent in honey and lower total solids.

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