

Study on Manufacture of Chhana From Buffalo Milk

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ABSTRACT

Chhana was prepared from buffalo milk to study three different factors namely (a) strength of coagulant (1%, 1.5 & 2%) (b) fat level of milk (4% & 5%) and (c) Temperature of coagulation (60° C & 70° C). Twelve treatments in a replication of five each were taken to study the yield and acceptability of the product. The yields were found to be highest at 1% level and lowest at 1.5% level of strength of coagulant. 2% level gave intermediate yields. Acceptability of the product decreased with the increase in coagulant strength from 1% to 2%. 5% fat milk gave more yield than 4% fat milk. Similarly the yields were more at 60° C coagulation temperature than at 70° C temperature. However, the acceptability of the product prepared at 70° C was better than that prepared at 60° C temperature. All the individual treatments were found highly significant. The combination of 1% coagulant strength, 5% fat level and 70° C temperature of coagulation found to be more effective.

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INTRODUCTION

Chhana is the indigenous milk product prepared by acid coagulation of milk at about its boiling point and subsequent drainage of whey. The coagulant mostly used are sour chhana (whey from a previous run), lactic acid, citric acid and juices of citrous fruits.

Chhana forms an important base for preparation of milk sweets such as Rasogolla, Sandesh and Pantooah, throughout India. Chhana making is one of the important consideration to utilize surplus milk when it is in a small amount.

Chhana should not contain any ingredient foreign to milk. Chhana should

be free from any signs of fat or water seepage or both. The surface of chhana should not appear 'dry'.

Standardization of the technique of manufacture of chhana, especially from cow milk was first reported by De & Ray (1954), Ganguli (1969) summarized differences between cow and buffalo milk proteins and indicated that these differences are likely to influence the quality of the products made from these two types of milk. De & Kundu (1972) studied the effect of different factors on the physical quality of chhana from buffalo milk and recommended a standardized method of chhana making from buffalo milk as follows: Freshly produced buffalo

milk, preferably standardized to 5.0 per cent fat, should be brought to boil and promptly cooled down to 70° C. Coagulation should be rapidly affected by addition of 1.0 per cent citric acid solution to a pH 5.7 and chhana separated from whey by delayed straining technique with a muslin cloth.

In view of the paucity of information of chhana making specially from buffalo milk, the present study was undertaken.

MATERIALS AND METHODS

Raw, standardized buffalo milk with 5% fat and 14.5% total solid, with titratable acidity 0.15 to 0.16% was used for the preparation of chhana.

The method used was essentially the one followed by De & Kundu (1972). One kg of milk was heated in the stainless steel vessel with slow stirring to avoid burning and to prevent skin formation. After boiling the vessel with its content was removed from the burner, cooled to the required temperature and the hot milk was then coagulated.

The method of "delayed straining" was adopted. The mixture of chhana solids and whey was transferred to a piece of muslin cloth and without any application of pressure tied together. After about one minute of straining as above the whole mass was immersed in sufficient amount of tap water and kept in that condition till it had cooled down. Chhana was then hung till all

drippings stopped. The total time taken was 45 to 60 minutes.

For sampling of milk, the method described in IS-1479 (pt II) — (1961) was followed and for sampling of chhana the method prescribed in IS-5162 (1969) was adopted.

Fat content of milk was determined by the Gerber method as per IS-1224 (1958); total solids as per procedure stated in Laboratory manual (1959) and the titratable acidity was determined as per IS:1479 (pt I) (1960). While the moisture content in chhana was determined as per IS-5162 (1969). The physical examination of chhana was done by a panel of 5 judges (Dairy Technologist) on an 9-point (arbitrary) scale. e.g. 9, denoted "like extremely" and 1 represented "dislike extremely" etc.

RESULTS AND DISCUSSION

The effect of the following factors on the physical quality and yield of chhana were studied.

- A. Strength of coagulant
- B. Fat level of milk and
- C. Temperature of coagulation.

The results have been presented in Table 1 representing the average of 5 replications each.

(A) *Strength of Coagulant*: The average results of strength of coagulant 1%, 1.5% and 2% were presented in Table 1,

TABLE 1

Effect of strength of coagulant, fat levels of milk and temperature of coagulation on yield, moisture and acceptability of chhana.

Sr. No.	Strength of coagulant	Fat level of milk	Temp. of coagulation	% yield kg.	% Moisture	Average score of acceptability out of 9
1.	1%	4%	60° C	18.2	58.3	7.2
2.	1%	5%	60° C	19.6	57.3	7.2
3.	1%	4%	70° C	17.7	57.9	7.6
4.	1%	5%	70° C	19.0	57.0	7.8
5.	1.5%	4%	60° C	16.9	58.2	7.2
6.	1.5%	5%	60° C	18.2	57.2	7.0
7.	1.5%	4%	70° C	16.6	58.0	6.8
8.	1.5%	5%	70° C	17.6	57.0	7.4
9.	2%	4%	60° C	17.8	56.8	6.2
10.	2%	5%	60° C	18.6	57.0	6.4
11.	2%	4%	70° C	17.4	56.4	6.8
12.	2%	5%	70° C	18.2	56.8	6.8

The yield of chhana was highest at 1% level which was followed by 2% level and was lowest at 1.5% level as stated in Table 1. Although no appreciable difference in the moisture content of chhana was observed at all the 3 different levels of coagulant that were tried in the experiment. However 2% level showed less moisture content in comparison to 1% and 1.5% strength of coagulant.

The acceptability of the product decreased with the increased strength of coagulant from 1% to 2%. It was maximum at 1% level and minimum at 2% level.

The present observations on yield of chhana differ from that observed by De & Kundu (1972) and De & Ray

(1954), who reported a slightly higher yield of chhana produced from buffalo milk.

But the observations on the acceptability or physical quality i.e. body and texture of chhana were in agreement with those reported by De & Kundu (1972) and De & Ray (1954).

(B) *Effect of Fat Level of Milk:* It can be seen from Table 1 that at 5% fat level the yield was more than that of at 4% fat level. There was no marked difference in the moisture content of the product at the two fat levels. It was only slightly higher at 4% level.

Further there was no significant difference in the acceptability of the

product with two levels of fat tried i.e. 4% and 5% fat.

The present observations are in agreement with those observed by De & Kundu (1972) and De & Ray (1954).

(C) *Temperature of Coagulation*: The yield of chhana was more at 60° C than that prepared at 70° C temperature as can be observed from Table 1. The moisture content was also higher for samples coagulated at 60° C than at 70° C and the increase in yield can be attributed to the increase in moisture content of chhana produced at lower temperature in 60° C.

However the acceptability of the chhana was better when it was prepared at 70° C than at 60° C.

The present observation on yield of chhana coagulated at two different

temperature were not in agreement with that observed by De & Kundu (1972). They reported that the yield of chhana was more at 70° C than that prepared at 60° C, however, the observations on acceptability of the chhana were fully comply with the present observations.

Statistical analysis of the observations were made and presented in the analysis of variance (A. V.) Table 2.

The analysis of variance showed that the replications had no effect on the yield and quality of chhana. But it can be revealed from the table that the individual treatments were highly significant at 1% level. However all the interactions among the three different factors which were tried were non-significant even at 5% level which has indicated that the factors are independent of each other.

TABLE 2

A. V. Table

Source	d.f.	S.S.	M.S.	C.F.	T.F.	
					at 5%	at 1%
Replication	4	1.33	0.335	1.72 ^{ns}	2.58	
Treatments	11	39.37	3.579	18.26**	2.01	2.68
Strength of coagulant	2	16.92	8.46	43.16**	3.21	5.12
Fat level	1	18.60	18.60	94.89**	4.06	7.24
Temp. of coagulation	1	2.82	2.82	14.38**	4.06	7.24
C.F.	2	0.85	0.425	2.17 ^{ns}	3.21	
C.T.	2	0.09	0.045	0.23 ^{ns}	3.21	
F.T.	1	0.05	0.05	0.26 ^{ns}	4.06	
C.F.T.	2	0.04	0.02	0.12 ^{ns}	3.21	
Error	44	8.62	0.196			
Total	59	49.32				

**highly significant.

n.s. = non-significant at 5% level.

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