

Production & Quality Evaluation of Rasogolla Prepared from Milk with Different Levels of Fat

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Abstract—The aim of study to prepare Rasogolla from milk sample having four different levels milk fat percentage with an aim for lowering the cost of production. And study the chemical and sensory characteristics of Rasogolla. Before making chhana, milk samples were analyzed in the laboratory to know their fat content by using Gerber method. It was found that milk contains 1.5%, 2.0%, 2.5% and 3.0 % fat respectively. Rasogolla was prepared from four milk samples. The T2 sample having 2% milk fat had desirable results having the physicochemical test while T2 & T4 samples were as per in the organoleptic test. The production cost of Rasogolla prepared from the fat content of 1.5%, 2%, 2.5%, 3% and cow milk was also estimated and estimated production cost differences showed that 1772.5, 1475, 928.71 and 714.30. Hence when compared with production cost differences of other Rasogolla, the Rasogolla prepared from 1.5% and 2% fat contained milk showed the less cost of production when compare with the control (cow milk). So that it was concluded that the Rasogolla prepared from the milk contained fat content of 2.0% showed good acceptance by means of chemical, sensory and cost of production.

Key words -- Cow Milk, Rasagolla, Chhana, Fat Content, Cost Difference.

1 Introduction

Rasogolla is delicious Indian sweet preparation. It is a product made out from fresh cow's milk and crystallized sugar. Besides being delicious, rasogolla is nutritious also. Rasogolla is made from ball shaped dumplings of chhana (an Indian cottage cheese) and semolina dough, cooked in light syrup made of sugar. This is done until the syrup permeates the dumplings.

The primary types of milk sold in stores are: whole milk, reduced-fat milk (2%), low-fat milk (1%), and fat-free milk. The percentages included in the names of the milk indicate how much fat is in the milk by weight. Whole milk is

3.5% milk fat and is the closest to the way it comes from the cow before processing. Consumers that want to cut calories and fat have multiple options; reduced-fat milk contains 2% milk fat and low-fat milk contains 1% milk fat. Decades of scientific research have substantiated the many health benefits associated with milk, including increasing bone health, lowering blood pressure and boosting immunity.

Scientists have studied this issue of protein intake and bone health for years. Indeed, it was once thought that higher protein diets caused the body to lose calcium. However, newer research

has found that high protein intake also increases intestinal calcium absorption, offsetting its effect on calcium excretion. The Indian space agency, ISRO is developing dehydrated rasogollas and other dishes for Indian astronauts in its planned manned mission in 2016. The average chemical composition of chhana are Moisture-55.37 %; Fat-23.52 %; Protein-17.26 %; Lactose- 2.21 %; Ash-1.66 %; and Sucrose-29.86 %. Various other studies have shown that bone mineral density may actually benefit from high-protein diets if the diet meets the recommended dietary allowance of calcium and vitamin D. In oth-

er words, eating foods rich in calcium offsets a possible protein-calcium loss relationship.

Keeping these in view, investigations were conducted to prepare rasogolla from milk with different levels of fat to study the chemical and sensory characteristics of prepared Rasogolla.

2 Materials and Methods

2.1 Raw materials

For this study, four types milk were chosen from the local market as same brand. One sample from each has taken and replications were made for each sample at laboratory level. Before making chhana, milk samples were analyzed in the laboratory to know their fat content by using Gerber method. It was found that milk contains 1.5%, 2.0%, 2.5% and 3.0 % fat respectively.

2.1 Methods of analysis

Fat was measured Gerber method. Moisture was measured by hot air oven method. Protein estimation by Kjeldhal method, and Ash Content by Muffle Furnace.

2.2 Sensory analysis

To judge the physical parameter flavour score, Body and texture, colour, appearance, Taste score and overall acceptance score were carried out by the panel team of warner school of food and dairy technology.

3 Results and Discussion

Chhana outputs of the control and experiments

This trial has been taken to find out the chhana yield. For making chhana 4 different types of milk having 1.5%, 2.0%, 2.5% and 3.0% fat and whole cow milk has taken. The chhana output from the milk having 2.0% fat has become more than the other trails. Table: 4.1 showing the results of increased chhana output from the milk having 2.0% fat is 18.6%, 15.8%, 15.25% & 13.72% in trial1, trial2, trial3 and trial 4 respectively than other trails. The chhana variations may happen, because chhana has been prepared by different periods and squeezing may differ at each time.

1 Chemical Parameters

Moisture content

The average amount of moisture of rasogolla samples control, Trial 1 and Trial 2 were 58.09%, 49.73 % and 59.45 % respectively. Statistically there were significant differences between the moisture of different sources of rasogolla (Table 11). Higher moisture content was noticed in laboratory made rasogolla whereas Control rasogolla samples noticed lesser amount of moisture. Bhattacharya and Raj (1980) reported that acceptable quality rasogolla contain 49.85 to 53.80% moisture. The higher amount of moisture indicates good quality rasogolla and sometimes it may give good flavour. Tewari and Sachdeva (1991) observed good flavour in the products whereas chhana containing 62.5 and 63.5% moisture.

a) Protein content

Protein contents of different sources of rasogolla are presented in Table 4.11. From this table it was found the mean protein content of rasogolla samples were 32.87, 33.16, 34, 23.88 and 26.71 Control, Trial 1, Trial 2, Trial 3 and Trial 4 respectively. Statistical analysis showed that protein content of rasogolla samples varies significantly. As per the Indian Standard (IS, 4079-196) specification of minimum protein content of rasogolla should be 5%. Higher protein percent increase the quality of rasogolla. Sur *et.al.*, (2000) stated that protein percent 6.62 and Desai *et.al.*, (1993) also observed 6.7 % protein in better quality of spongy rasogolla.

b) Fat content

The amount of mean fat contents of control, trial1 trial2 trial3 and trial4 sources rasogolla sample were 26.35 %, 14.99 %, 18.38, 21.43 and 24.11 % respectively which are demonstrated in Table 4.11. Differences were highly varies among

those mean values (Table 4.11). From this result it was observed that laboratory made rasogolla had significantly lowest amount of fat and control rasogolla had the highest amount of fat (Table 11). Quality of rasogolla mainly influences by the quality of milk Bhattacharya and Raj (1980) reported in a study that use of high fat milk leads to a higher fat content in the rasogolla which softens the body and improve the texture.

c) Ash content

The ash content percentage of different sources of rasogolla samples are shown in (Table 4.11). It was found that the average acidity for Control, Trial 1, Trial 2, Trial 3, and Trial 4 sources rasogolla were 2.96, 2.72, 2.20, 3.10 and 2.98 respectively. Statistically there were no significant differences between the ash content of different sources of rasogolla. So the results were within the accepted level.

2 Sensory Evaluation

This trial has been conducted to check how chhana output varies and also to find out the quality of experimented rasogollas of four different fat levels of milk (ie; 1.5, 2.0, 2.5, & 3.0%) with comparison of control. Here again the sensory evaluation has conducted by the panel team. The milk having 2.0% (T2) fat rasogolla has been more accepted by the member's panel team. Finally in this trial milk having 2.0% (T2) rasogolla got more acceptance than controlled rasogolla. The texture has more improved because of less fat content the syrup absorption may happen effectively and texture improvement increased 7.8 to 8.6

Parameters	1.5% fat in Milk	2.0% fat in Milk	2.5% fat in Milk	3.0% fat in Milk	Cow Milk
Colour	8.8	9.0	8.0	7.6	7.8
Flavour	7.6	8.6	7.2	8.4	8.2
Body & Texture	7.8	8.8	7.2	7.6	8.0
Taste	7.8	9.0	7.8	7.6	8.2
Overall Acceptability	8.2	9.0	7.6	7.7	8.0
Parameters	1.5% fat in Milk	2.0% fat in Milk	2.5% fat in Milk	3.0% fat in Milk	Cow Milk
Overall Acceptability	8.2	9.0	7.6	7.7	8.0

4 Costing comparison between experimental and existing Rasogolla

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S. No	Parameters	1.5% fat in Milk	2.0% fat in Milk	2.5% fat in Milk	3.0% fat in Milk	Cow Milk
1	No. of chhana balls/1 tin	19	19	19	19	19
2	Individual ball weight(g)	8	8	8	8	8
3	Total Chhana ball weight (g)	150	150	150	150	150
4	Milk required/150 grams of chhana	0.632	0.606	0.642	0.610	0.565
5	Cost of milk (Rs.)	28	30	32.5	35	40
6	Milk quantity/1 batch	150	150	150	150	150
7	Chhana output from 200 liters milk (kg)	23.70	24.8	24.1	24.6	26.5
8	No. Tins/1 batch	158	165	161	164	176
9	Cost of single tin (Rs.)	26.54	27.27	31.29	32.02	33.90
10	Cost per batch (Rs.)	4193.9	4491.3	5037.69	5252.10	5966.4

From the above table the cost has been reduced effectively 1475.14 Rs. Per batch. Hence it had concluded that the milk contained 2% fat showed good acceptance from the panel members.

Conclusion

Rasogolla was prepared from four milk samples. The T2 sample having 2% milk fat had desirable results having the physicochemical test while T2 & T4 samples were as per in the organoleptic test.

The production cost of rasogolla prepared from the fat content of 1.5%, 2%, 2.5%, 3% and cow milk was also estimated and estimated production cost differences showed that 1772.5, 1475, 928.71 and 714.30. Hence when compared with production cost differences of other rasogolla, the rasogolla prepared from 1.5% and 2% fat contained milk showed the less cost of production when compare with the control (cow milk).

So that it was concluded that the rasogolla prepared from the milk contained fat content of 2.0% showed good acceptance by means of chemical, sensory and cost of production.

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