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Manufacture of Rossomalai and It's Quality Attribute: An Indigenous Milk Sweetmeat of Bangladesh

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Abstract: Rossomalai is a delicious and famous sweetmeat of Bangladesh. But till now the product lies at its infantile stage. Like many other Bangladeshi sweetmeats the technology of Rossomalai manufacture is also confined in the grip of a few sweetmeat traders who did not disclosed the technology to making the product to others. That is why, the product was not yet taken in to consideration by the dairy and food researchers. As a result no research information is available on the product. In this experiment Rossomalai was manufactured at Milk Vita dairy plant and compare the quality of Milk vita Rossomalai with that of product collected from the three famous sweetmeat shops. The quality of the product was matured by some physical, chemical and microbiological examination. Significant deference ($P<0.01$) was found in case of Rossomalai in terns of physical characteristics. It was observed from result that total solid, moisture, fat, protein, carbohydrate and ash content of Milkvita and market Rossomalai samples were 46.47 and 39.80-45.90; 53.52 and 54.09-60.19; 7.91 and 6.26-6.40; 8.29 and 5.55 - 7.03; 29.15 and 25.68-32.65 and 1.10 and 0.81-1.01 percent, respectively. Total variable bacteria differ significantly among the treatment but coliform bacteria were not significantly differing among the treatments. Physical, chemical and bacteriological examinations revealed that market Rossomalai was inferior to Milkvita Rossomalai.
Key words: Rossomalai, quality attribute, indigenous, milk sweetmeat

Introduction

The sweetmeat are delicious, wholesome, nutritious and very fame item in Bangladesh (Mannan *et al*., 1994). There is no such ceremony and festival, which goes without sweetmeats (Chourasia, 1983). Among this sweetmeat Rossomalai is the most popular on accounts of its high palatability and spongy syrup texture. Rossomalai is one of the varieties of Chhana based sweetmeat. Chhana is highly recommended for diabetic patient on accounts of its high protein and low sugar content as stated by De (1988). The various Chhana based sweetmeats are available in the markets. Rossomalai is being produced traditionally throughout the country. It consists of mainly three components namely small ball which is made by the freshly prepared Chhana, sugar syrup where balls are put gently to heating, and malai which is prepared from raw milk by boiled up to light brown color.

There is no legal standard and standardization to produce high quality of Rossomalai in the country as well as no sanitary measures are adopted from the hygienic point of view. Moreover no research work has yet been done on the manufacture of Rossomalai and it's quality attributes with the compare of market Rossomalai. For this reason an attempt was taken to produce uniform product for consumer. With this idea the following objectives were undertaken:

To observe the manufacture procedure of Rossomalai.
To study the comparison of the physical, chemical and microbiological characteristics of market Rossomalai.

Materials and Methods

Backilogramround of the Experiment: The experiment was conducted at Dairy laboratory of Bangladesh Agricultural University, Mymensingh and Dairy plant of Milkvita, Dhaka. Rossomalai sample was prepared at Dairy plant of Milkvita, Dhaka. At the same time the samples of Rossomalai were collected from three famous sweetmeat shops in Dhaka and Comilla district of Bangladesh. These were Bhagabati Pera Bhander, Comilla (B), Alauddin Sweatmeat, Dhaka (C) and Islamia Mistanna Bhandar, Dhaka (D), respectively. A strand for milk vita dairy Plants.

Manufacture of Rossomalai: The technology of Rossomalai making until today is confined in the hands of a few artisans who consider it more of an art than science and do not want to divulge the technology to others. In this way they have maintained their monopoly in the business. Apart from this, it appears that any dairy or food scientists to standardize the technology of Rossomalai production have initiated no work so far. Some how or the other the product escaped their attention. As a result of this, little is known about its detailed method of preparation, however little information the author could collect has been stated here.

One hundred eighty-kilogram raw milk, forty-kilogram sugar and five hundred-gram flavors were used for Rossomalai making. Backing powder and Cardamom also used in the manufacture of Rossomala as requirement. A total of 80 kilogram f resh cow milk was

Table 1: Comparison of average score of various organoleptic characteristics of Milk vita made Rossomalai and the Rossomalai of three different sweetmeat shops

Physical Parameters	Samples				Level of Significance
	A	B	C	D	
Flavour (40)	40.8± 0.74	34.6± 3.00	36.2± 1.74	35.6±1.74	**
Body and Texture (30)	29.0± 0.63	23.8± 2.03	25.4±1.35	22.8± 2.63	**
Colour and appearance (15)	13.8 ± 0.40	11.2 ± 0.74	11.8 ± 1.16	12.0 ± 1.41	NS
Taste (15)	8.8 ± 0.40	5.6 ± 1.20	6.8 ± 0.74	6.8 ± 1.16	**
Overall final score (100)	92.4 ± 0.48	75.2 ± 5.15	80.2 ± 4.06	77.2 ± 5.41	**

Significantly different at P < 0.01. Note : A = Milk vita made Rossomalai, B = Bhagabati Pera Bhandar, Comilla, C = Alauddin Sweetmeat, Dhaka, D = Islamia Mistanno Bhandar. NS= Not significant. ** Significant

Table 2: Comparison of average score of various Chemical composition of Milk vita made *Rossomalai* and the Rossomalai of three different sweetmeat shops

Chemical	Samples				Level of significance
Parameters (%)	A	B	C	D	
Total solids	46.47 ± 0.36	39.80 ± 0.73	43.84 ± 0.73	45.90 ± 0.80	**
Moisture	53.52 ± 0.63	60.19 ± 0.73	56.16 ± 0.73	54.09 ± 0.80	**
Fat	7.91 ± 0.42	6.28 ± 0.20	6.4 ± 0.10	6.26 ± 0.23	**
Protein	8.29 ± 0.16	7.03 ± 0.23	5.55 ± 0.49	6.65 ± 0.18	**
Carbohydrate	29.15 ± 0.88	25.68 ± 0.69	30.87 ± 1.26	32.65 ± 0.85	**
Ash	1.10 ± 0.004	0.81 ± 0.008	1.01 ± 0.01	0.91 ± 0.01	**

Significantly different at P < 0.01. Note : A = Milk vita made Rossomalai, B = Bhagabati Pera Bhandar, Comilla, C = Alauddin Sweetmeat, Dhaka, D = Islamia Mistanno Bhandar NS= Not significant. ** Significant

Table 3: Comparison of Bacterial status of Milk vita made Rossomalai and the Rossomalai of three different sweetmeat shops in Natore

Bacterial	Samples				Level of Significance
Parameters	A	B	C	D	
Coliform /ml	1.33 ± 0.47	3.33 ± 1.24	2.33 ± 0.47	3.00 ± 0.81	NS
Total count/ml (x 1000)	41 ± 2.94	55 ± 4.08	52 ± 2.44	60 ± 5.09	**

Significantly different at P < 0.01. Note : A = Milk vita made Rossomalai, B = Bhagabati Pera Bhandar, Comilla, C = Alauddin Sweetmeat, Dhaka, D = Islamia Mistanno Bhandar. NS= Not significant

boiled in a stainless iron pan for five minutes and was cooled to 70 ^{o}C. Then the coagulant, sour whey (8 liter with 1.22% acidity) was added to milk for over 30 seconds allowing to precipitate the milk curd, called Chhana. After filtering through cheesecloth, water was expelled out leaving Chhana into the cloth. Sixteen kilogram of Chhana was obtained from 80 kilogram of milk. In the same time 120 kilogram raw milk was boiled in a stainless pan with constant stirring up to 2/3 water was removed. When milk turned light brown color then malai was formed. Then *malai* cooled at room temperature. Thirty nine-kilogram malai was prepared from 120 kilogram of raw milk.

The allotted quantity of Chhana was broken into bits and was kneaded in such a manner that no sign of cracks observed when Chhana balls were made in the shape of small ball (0.5-0.75 cm). Sugar was dissolved in 12-15 litter of water and the solution was boiled for 1 hour. During boiling the 1.5-kilogram milk was added and the scum labeled out in order to obtain clear syrup. Then small ball shaped chhana put gently in the boiling sugar syrup and cooking for 45 minutes. Care was taken that the balls never over crowded the pan and there was enough space for moving them freely. After swelling the colors of the balls were slightly darken, then the cooking was finished. The product was cooled at room temperature and transferred into box with a minimum depth of 20 cm for 24 hours. Then sweet balls were filtered from sugar syrup. At that time sweet balls became large size due to osmosis activity and weight increased more than three times (1-1.25 cm). Then sweet balls were put gently in the malai. In this way it was ready for consumption. Necessary hygienic matures strictly maintained in this procedure. No studied have has been carried out so far on the manufacture of Rossomala. A schematic presentation for preparation of

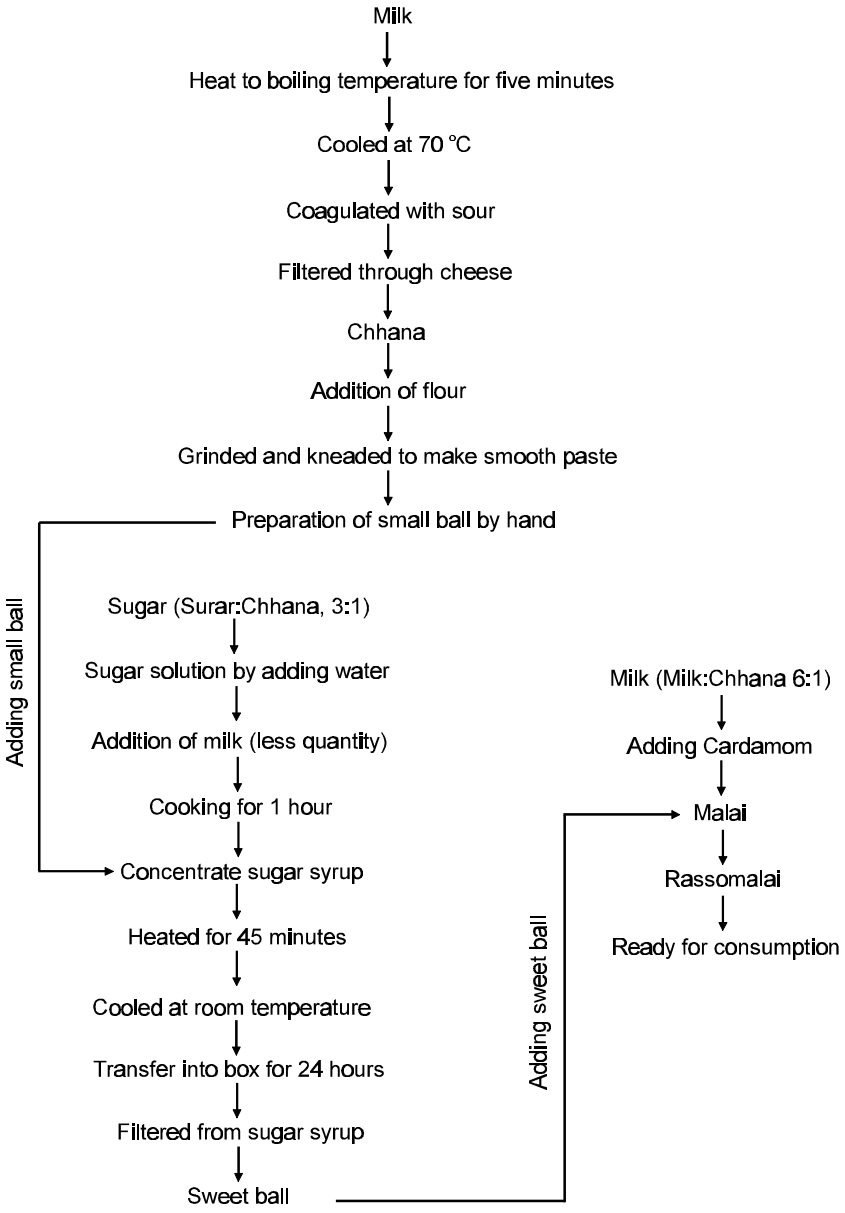

Fig. 1: Schematic representation for preparation of Milk vita Rassomalai

Dairy plant of Milkvita made Rossomala is shown in Fig. 1.

Parameter Studied Procedure: After preparing and collecting the Rossomalai samples were kept in the refrigerator until further experimental work. The samples were subjected to physical (flavor, body and texture, color and appearance, taste), chemical (total solid, moisture, protein, carbohydrate and fat content) and microbiological evaluations (coliform, total count). The Rossomalai was also analyzed in the laboratory to know the moisture, total solids, fat, protein and ash content. AOAC (1982) method was used for analysis. The Rossomalai was evaluated for sensory quality by a team of experienced judges. Microbiological parameters were determined by standard plate count (SPC) method as per APHA (1967).

Statistical Analysis: All experimental materials were completely homogenous and statistical analysis was done as per Steel and Torrie (1980) by using Completely Randomize Design. Analysis of variance test was done to find statical differences between the treatments. LSD value was also calculated to see the difference within the means.

Results and Discussions

Physical Parameters: The scores of flavour, body and texture, colour and appearance, sweetness and overall final scores of Rossomalai samples were given in the Table 1. The flavour scores of Milk vita made Rossomalai (A) and the Rossomalai of three different sweetmeat shops (A, B, C and D) were 40.8±0.74, 34.6±3.0, 36.2±1.74 and 35.6± 1.74, respectively. Significant difference (P< 0.01) was found in respect of flavour of the samples (Table 1). Similar trend was found in case of body and texture and colour and appearance. The taste scores of Milk vita Rossomalai (A) and three different famous sweetmeat shops Rossomalai (B, C and D) were 8.8±1.2, 5.6±1.2, 6.8±0.74 and 6.8±1.16, respectively (Table 1). Significant difference (P< 0.01) was found in respect of tastes of the samples (Table 1). The overall scores of four samples were determined on the basis of the average scores recorded for different sensory attributes and the results are presented in Table 1. Significant differences (P < 0.01) was found in respect of overall score of the samples (Table 1). In respect of overall score C, D and B type of sample found that samples A ranked first followed it. Judging from the results of all physical parameters, it may be said that Milk vita made Rossomalai was better than market Rossomalai and the Rossomalai of Alauddin Sweet (sample C) was better than the Rossomalai sample B and D.

Chemical Parameters: The total solids content of Rossomalai samples of A B, C and D were 46.47 ± 0.36, 39.80±0.73, 43.84±0.73 and 45.90±0.80%, respectively. There was a significant difference (P< 0.01) in total solid contents of the samples (Table 2). Table 2 indicates that the total solid content of sample A was the highest among four samples and the sample B was the lowest. The moisture percentage of Rossomalai samples of A, B, C, D were 53.52±0.63, 60.19±0.73, 56.16±0.73 and 54.09±0.80, respectively. There was a significant difference (P< 0.01) in moisture content of the samples (Table 2). Table 2 demonstrates that there was some difference of moisture content within different of four samples. The maximum moisture content was noticed in sample B and the lowest moisture content was found in sample A. Increased level of moisture content in Rossomalai due to effect of duration of cooking. The fat percentage of Rossomalai samples of A, B, C and D were 7.916±0.42, 6.28±0.20, 6.4±0.10, and 6.26±0.23, respectively. Statistical analysis showed that there was a significant difference (P< 0.01) in fat content within different four samples (Table 2). Fat content was the highest in sample A among four samples and sample D was lowest. Increased level of fat content in Rossomalai due to effect of pure Chhana. The percentage protein content of Rossomalai samples of A, B, C and D were 8.29±0.16, 7.03± 0.23, 5.55 ±0.49 and 6.65±0.18, respectively. There was a significant difference (P< 0.01) in protein content of the samples (Table 2). The percentage of carbohydrate of Rossomalai samples of A, B, C and D were 29.15±0.88, 25.68±0.69, 30.87±1.26 and 32.65±0.85, respectively. Statistical analysis showed that there was a significant difference (P< 0.01) in carbohydrate content within four different samples (Table 2). Carbohydrate content of Rossomalai samples depended upon the addition of sugar and starchy materials. The percentage of ash content of Rossomalai samples of A, B, C and D were 1.10±0.004, 0.81±0.008, 1.01±0.01 and 0.91±0.01, respectively. Significant difference (P< 0.01) was found in respect of ash content of the samples (Table 2). Table 2 shows that the ash content of Rossomalai samples differed widely. Ash content of the sample A was the highest among four samples and sample B was the lowest.

Microbiological Status: The number of coliform per ml of Rossomalai Presented in Table 3. Coliform bacteria indicates that proper hygienic condition were not usually taken during the Rossomalai Preparation .The number of coliform per ml of Rossomalai of A, B, C and D samples were 1.33±0.47, 3.33±1.24, 2.33 ± 0.47 and 3.00±0.81, respectively. Statistical analysis showed that there was significant not difference (P< 0.01) of coliform content within four different samples. The number of total viable count per ml of Rossomalai samples of A, B, C, D were 41 x 10^3, 55 x 10^3, 52x10^3, and 60 x 10^3, respectively. There was a significant difference (P< 0.01) of total viable content of the samples (Table 3). Table 3 indicates that the number of total viable count in sample A was the lowest and D was the highest among four samples.

No other information is available in the literature, which deal the physiological, chemical and microbiological quality of Rossomalai.

It is concluded that to produce better quality Rossomalai the following recommendations may strictly be followed:

i) Suggested appropriate technique for Rossomalai making with specific proportion of ingredients should be followed.
ii) Weekly routine tests might have to be made for improving the quality on the product manufactured. These examinations should be included flavour, body and texture, colour and appearance, sweetness and acceptability of the product.
iii) Routine chemical analysis should be made in order to obtain the constituents of the product manufactured. The moisture content should be within the range of 52.55%; total solids 45-48%; fat 7.9%; protein 8-10%; carbohydrate 28-30% and ash content 1-2% level.
iv) Regular checks on processing procedures including hygienic method of making, preservation and

distribution should be done periodically.

v) Sanitary measures should strictly be followed during making Rossomalai.
vi) Dairy equipment and utensil must be clean and germ free.

Although it is very difficult o arrive at a suitable decision about manufacturing procedure of Rossomalai from this single piece of work but it appear that Milkvita Rossomalai showed better performance.

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