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Standardization of method for the manufacture of milk cake

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Abstract
Sensory quality of milk cake as a function of processing variables was evaluated to standardize the process for manufacturing long-life milk cake. Different levels of processing variables that were studied included fat percentage (5- 6%) in milk, levels of sugar (4-8 %), corn syrup (0.5 -1.5 %), ghee (0.5 – 1.5 %) and thermization temperature (70 °C for 60 and 90 min.). The sensory parameters studied were colour & appearance, flavour, body & texture, sweetness and overall acceptability. The sugar, ghee and corn syrup levels and thermization temperature were found to significantly ($p<0.01$) affect all the sensory parameters while the effect of citric acid level was not significant on flavor, sweetness & colour and appearance of the product but significant ($p<0.01$) for other sensory parameters. It was concluded that the levels of fat in milk at 6 %, sugar at 6 %, corn syrup at 1 %, ghee at 1 % and thermization temperature of 70 °C/ 60 min were optimum for the preparation of milk cake with best sensory quality.

Keywords: Milk cake, process standardization, sensory quality

Introduction
Production of traditional dairy products account for more than 50 percent of total milk produced and is hence of considerable significance to the Indian dairy sector. Milk cake is one of the popular traditional dairy products (sweets) of northern and central parts of India. Such milk-based Indian sweets have established domestic markets and are popular among Indian ethnic population in other countries as well. According to Rasone (2015) [13] the consumption of dairy products is growing at annual growth rate of more than 20 per cent as compared to the western dairy products, which have growth rate varying from 5- 10 per cent. The market for this largest and fast growing segment of Indian dairy industry is estimated at 75,000 crores (Parekh 2013) [9]. Traditional dairy products also have huge export potential due to strong presence of Indian Diaspora in many parts of world.

Milk cake is one of the most popular traditional dairy products (sweets) of northern and central parts of India and gaining popularity in other parts of the country. *Milk cake* is characterized by well-defined grains having more pronounced caramelized flavour comparatively more intense than *Kalakand*. The traditional procedure of *milk cake* involves the preparation of Danedar form of khoa similar to *Kalakand*, but a part of mass is caramelized more intensively and layered between the less caramelized portions (Mathur, 1991) [8].

Milk cake is rich source of energy, milk proteins, minerals and other growth promoting factors. In spite of its high economic and nutritional importance the *milk cake* has not received adequate attention of R & D workers. Since the process of manufacturing of *milk cake* is confined to unorganized sector. It has proven to be energy and labour intensive with inconsistent quality and poor hygienic condition thereby increasing the microbial load. It would be of great advantage, therefore, to delve deep into the various technological aspects. Organized handling of such products would help the researchers to identify various hazards and control critical points in the production lines, so that the product processes batch to batch consistency and also hurdles are removed to pave the way for export as well as for our own requirements.

However, technology for milk cake manufacture, like other traditional products (sweets), has remained confined mostly to the unorganized sector (halwais) where quality of the products depends on the skills of the manufacturer. For a consistent quality, a standardized method of manufacture of milk cake which can be scaled up for the organized industry is therefore very relevant.

The processing variables both in terms of the levels of ingredients added during the manufacture and the thermization treatment given to the product for Texturization and development of typical colour and luster play a key role in sensory acceptability of the product. The fat content of milk, level of sugar added the concentration of other additives and the time-temperature combinations employed during the thermization are the most critical factors. Several workers in the past have tried different methods for the manufacture of milk cake. Karwasra *et al*., (2001) [3] made milkcake using 6 % sugar and 0.02 % citric acid. Landge *et al*. (2004) [6] used 0.01 % alum for coagulation and 2 % ghee for improved sensory attributes. Rao *et al*., (2003) made milkcake of good quality using milk with 6% fat, and 15% sugar and Varma *et al*., (2005) [17] standardized the process for making milkcake from cow milk.

Sucrose being an important ingredient of milkcake not only imparts flavour but also helps in maintaining the physical characteristics of the product. But in addition to positive effects of sucrose, several negative influences have also emerged. The most important of these have been health concerns associated with high levels of sucrose consumption, principally dental caries, obesity, diabetes, hypertension, hypoglycemic and heart diseases, etc. These have resulted in efforts to find alternative sweeteners that lessen these risks and also help to achieve a reduction in energy consumption (Chetana *et al*., 2005) [1]. When searching for replacements for sucrose it is important to be able to deliver both the physical effects and the clean sweetness characteristics of sugar (Kilcast, 1999) [4]. To meet these requirements, production of reduced/low calorie foods including sugar-free products is on the rise and hence unique qualities (including physical properties and their interaction with other ingredients in the system) of such new additives as ingredients like corn syrup, maltodextrin, polydextrose, polyols such as sorbitol as bulk sweetener, etc. must be studied and understood (Wright, 1990) [18].

To replace sugar, apart from texture and sensory attributes, the stability and packaging aspects of the products must be considered. Corn syrup is a well-known humectant used in various food products. It lowers the water activity of food products in which it is added in addition to improvement in the body & texture, especially of dairy products. Thus, it not only acts as a sweetener but also helps in enhancing storage stability of the product. Dharam Pal (2000) [2] replaced 50% of cane sugar with corn syrup (42 DE) in burfi and observed improvement in texture along with the reduction in water activity which exerted an inhibitory influence on the growth of the bacteria.

Milk sweets and syrup based sweets prepared from cereal or legume flours, individually or in combination are highly common all over India. However, information regarding standardization and storage behavior are lacking for a variety of traditional sweets with such new ingredients (Sen and Ramanna, 1979) [15]. Since there is no scientific literature available related to this product, it is therefore, realized that a stepwise identification of the problems is carried and a systematic research is conducted to standardize the processing technique for the manufacture of this product. Since the raw materials and ingredients play a pivotal role in deciding the final quality of the product, it is envisaged that each ingredient used in the manufacture be tried for its individual influence upon its quality. As the present study was intended to optimize the processing parameters with a long time objective to develop technology for the manufacture of long-life.

Materials and Methods

Buffalo milk obtained from local market was standardized to different fat levels (5 - 6%) and 9% SNF. The levels of fat and SNF were selected based on the results of the market survey (Kumar, 2005; Patel, 2010) [5, 10] and available literature. Corn syrup was added as an ingredient to act as a humectant which could also improve the texture of the product. Three levels of cane sugar (4, 6 and 8 %) and fat (5 and 6%) were tried. The corn syrup was added at four different levels (0.5, 1.0 and 1.5 %) whereas five thermization temperatures (70 °C for 60 and 90 min) were studied during the experiments. The method of manufacture of milkcake recommended by Mathur, (1991) [8] (Figure1) served as broad guideline for standardization of the process for milkcake manufacture. For the manufacture of milkcake, standardized milk was heated in a kettle and filtered with muslin cloth. The milk was boiled and acidified by citric acid (0.02 %) to induce partial coagulation and grain formation in the product. Desiccation was continued till patting stage, sugar added and mixed by stirring properly. After working the mass for few minutes, corn syrup was added and worked further till the mass started leaving surface of the kettle. The hot mass was then packed in laminated pouches, sealed, filled in tin container and thermized at different time-temperature combinations in hot air oven. After thermization, the product was taken out, cooled to room temperature and served to the panel of judges for sensory evaluation. Samples were evaluated for sensory characteristics on a 9-point hedonic scale (Lawless and Hayman, 1998) [7] by a panel of five judges. The data obtained from sensory evaluation was analyzed statistically according to the method described by Snedecor and Cochran, (1994) [16].

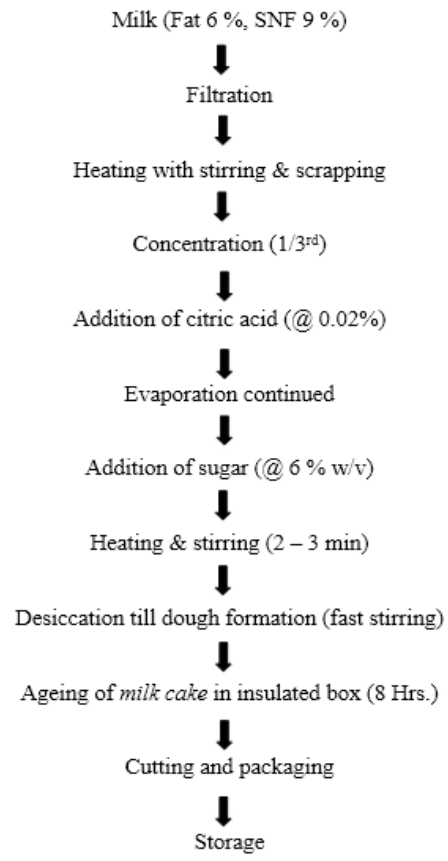

Fig 1: Preparation method of *milk cake* by traditional method

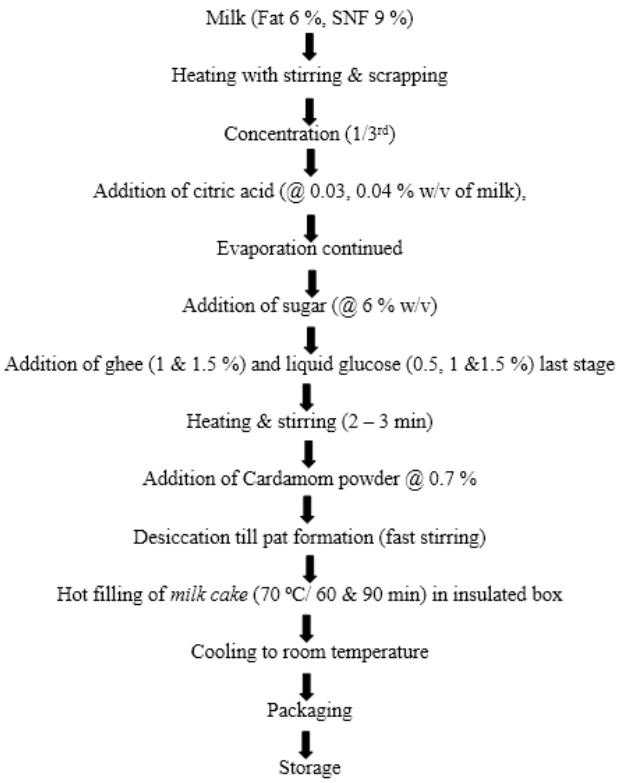

Fig 2: Proposed method of *milk cake*

Results and Discussion

Effect of fat level on sensory quality

The effect of two levels of fat in milk i.e.5 and 6 % on the sensory quality of milkcake was evaluated. The flavour, body & texture and overall acceptability score increased significantly ($p<0.01$) with the increase in fat level from 5 to 6% (Table 1). Kumar (1999) [5] also observed that increase in fat level significantly ($p<0.01$) affected flavour and overall acceptability score of Milkcake. In a similar study, Varma *et al*., (2005) [17] also revealed that with the increase in the fat level, significant ($p<0.01$) increase was observed in the flavour, body and texture and overall acceptability scores of milkcake made from cow milk. From Table 1, it was revealed that, the sensory score increase significantly with increase in fat level. The sensory score of 8.5 for overall acceptability was observed when the milk cake was prepared from the milk having 6 % fat while score for overall acceptability for 5 % fat observed 7.5. Accordingly, the body & texture, colour & appearance, sweetness and overall acceptability scores also increase significantly ($p< 0.01$) as the fat level in the product increased. However the higher sensory score were recorded for the milk cake made from 6 % fat which has sufficient graininess, central dark colour as compared to 5 % fat. It was, therefore, concluded that a maximum of 6 % fat level could be used for the manufacture of milkcake.

The analysis of variance of data presented showed significant ($p<0.01$) difference for all the above parameters.

Table 1: Effect of fat level on sensory quality of Milkcake

Fat Level	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
5 %	7.5	7.3	7.6	7.3	7.5
6 %	8.5	8.5	8.4	8.6	8.5
F- Value	23.84**	17.02**	12.33**	33.83**	18.06**
C. D	0.63	0.60	0.47	0.59	0.63

Average of three replications
** Significant at ($p<0.01$) level

Effect of citric acid level

The sensory scores for the milkcake prepared from buffalo milk with 6 % fat and 9 % SNF by the addition of 0.01, 0.02 and 0.03 % citric acid along with the control Milkcake are presented in Table 2.

Perusal of table revels that flavour scores for the Milkcake prepared from buffalo milk made with 0.01, 0.02 and 0.03 % addition of citric acid where found to be 7.2, 8.4 and 8.6 respectively. The scores for body and texture were found to be 7.2, 8.3 and 8.5 whereas the scores for color and appearance where found to be 7.8, 8.1 and 8.5. similarly the scores for sweetness were found to be 8.5, 8.5 and 8.6 finally the scores for the overall acceptability of Milkcake prepared from buffalo milk with 0.01, 0.02 and 0.03 addition of citric acid was observed to be 7.5, 8.2 and 8.5 respectively.

The analysis of variance of the data resented showed that significant difference in flavour, body & texture, color and appearance and overall acceptability at ($p<0.01$). However, there is no significant between noticed between the treatments for sweetness scores.

Table 2: Effect of citric acid level on sensory quality of Milkcake

Milkcake made with	Flavour	Body & texture	Colour & appearance	Sweetness	Overall acceptability
0.01 % Citric acid	7.2	7.2	7.8	8.5	7.5
0.02 % Citric acid	8.4	8.3	8.1	8.5	8.2
0.03 % Citric acid	8.6	8.5	8.5	8.6	8.4
F – Value	17.88^{**}	74.14^{**}	8.44^{**}	2.09^{NS}	16.28^{**}
C. D	0.40	0.28	0.33	0.11	0.40

Average of three replications
** Significant at ($p<0.01$) level
NS: Not Significant

Effect of stage of addition of citric acid

The sensory scores pertaining to buffalo Milkcake made by addition of citric acid at three different stages i.e., to the milk before start of heating, after first boiling and after partial concentration are depicted in Table 3. The flavour score were found to be 8.4, 8.5 and 8.5 respectively while the scores for body & texture were found to be 7.6, 8.4 and 8.8 respectively. The average score for color and appearance were found to be 8.3, 8.3 and 8.5 respectively. Further, it may observed from table 3 that scores for sweetness of Milkcake were found to be 8.4, 8.3 and 8.5 respectively. While the score pertaining to overall acceptability were observed as 8.0. 8.3 and 8.5 of

milkcake prepared by the addition of citric acid at different stages of its preparation.

The most desired obtained grains were obtained when the citric acid was added after partial concentration and the body and texture scores were significantly higher than the other two stages. The other sensory attributes such as flavour, colour and appearance and sweetness were not appreciably influenced by the stage of addition of citric acid. Since the overall acceptability score was significantly ($p<0.05\%$) higher when citric acid added after partial concentration, this stage was selected for further studies.

The statistical analysis of variance of the data resented showed that significant difference between the treatments observed for body & texture ($p<0.01$) and overall acceptability at ($p<0.05$). However, there is no significant between noticed between the treatments for other parameters.

Table 3: Effect of stage of addition of citric acid on sensory quality of Milkcake

Stage of addition	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
Milk (Before start of heating)	8.4	7.6	8.3	8.4	8.0
After first boiling	8.5	8.4	8.3	8.3	8.3
After partial concentration	8.6	8.8	8.5	8.5	8.5
F – Value	1.68^{NS}	54.46^{**}	1.99^{NS}	1.53^{NS}	4.54^{*}
C. D.	0.13	0.55	0.12	0.14	0.71

Average for three replications
** Significant at ($p<0.01$) level
* Significant at ($p<0.05$) level
NS: Not significant
APC - After partial concentration
PS - Pat Stage

Effect of sugar level on sensory quality

Sugar contributes to the sweetness and caramelized flavour to the milkcake and hence affects the overall acceptability of the product. Three different levels of sugar added on the milk weight basis (4, 6 and 8 %) that were used in the study were evaluated for its effect on the overall acceptability of the product. The average sensory scores for various sugar levels presented in Table 4 showed that the sensory scores increased with the increase in the level of sugar from 6 to 8 % while the milk cake with 4 % sugar was rated as less sweet. The addition of sugar at 6 % level not only resulted into highest score for flavour but also for overall acceptability of the product. Sugar at 6 % level gave desired sweetness and caramel flavour. Moreover, at 8 % sugar level, browning and caramelization was pronounced which possibly decreased the average flavour and overall acceptability scores for milkcake. Ramesh (2000) [12] reported that flavour and overall acceptability score for milkcake was higher for 12 % sugar level. The body and texture score increased as the sugar level was increased from 8 to 10%, which is in accordance with the results obtained by Ramesh, (2000) [12]. However, several authors in the past have reported that 6-7 % sugar (on the basis of weight of milk) is appropriate for good quality milkcake and other such products viz. Burfi, peda and kalakand (Kumar, 1999; Reddy, 1985; and Sachdeva, 1980) [5, 14]. In our study, milkcake containing sugar at 6% level was reported to be less sweet by the sensory panel. So based on our observations 6 % level of sugar was selected as the optimum.

The analysis of variance (Table 4) showed that there was significant difference for flavour, body & texture, color and appearance, sweetness and overall acceptability at ($p<0.01$). By the study of the above sensory scores, it was concluded that Milkcake made with 6 % sugar level had all the desirable attributes higher as compared to the other 4 % and 8 % sugar level.

Table 4: Effect of sugar level on sensory quality of Milkcake

Sugar Level	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
4 %	7.6	7.2	7.3	8.1	7.4
6 %	8.3	7.8	7.8	8.4	8.1
8 %	7.2	6.4	6.9	8.0	7.5
F – value	56.99^{**}	35.33^{**}	60.39^{**}	11.02^{**}	92.09^{**}
C. D.	0.65	0.93	0.64	0.62	0.56

Average three replications
** Significant at ($p<0.01$) level

Effect of stage of sugar addition

Since the addition of sugar contributes to other characteristics such as body and texture and colour and appearance in addition to sweetness. So it is important to find out the right stage of its addition. In the first attempt three stages were tried and the sensory scores and results of statistical analysis are given in Table 5. Addition of sugar to milk at boiling stage produced milkcake having extremely soft grains and light brown colour and therefore scored significantly lower than the other two stages i.e., addition of sugar after partial concentration and at pat formation stage. Though scores of flavour and colour & appearance of milkcake increased when sugar added at partial concentration stage, but body & texture and the overall acceptability scores were significantly higher at pat stage. Milkcake obtained from addition of sugar to partially concentrated milk had desirable grains in terms of size and softness, but the body was brittle and the color was slightly of low intensity, Addition of sugar at pat stage though helped in overcoming the characteristics, it produced slightly hard grains with too dark brown colour. With a view avail the beneficial effects of both stage, it was planned to add sugar in parts at both the stages i.e. 50 % after partial concentration and 50 % at pat stage. The results obtained from this experiment vis-a-vis complete addition of sugar at pat stage are given in the Table 5. It is clearly evident from the Table 5 that the addition of sugar in parts at both the in stages produced Milkcake, which received significantly higher

scores for all the sensory attributes except sweetness, in comparison with one stage addition.

On statistical analysis of the data presented in that Table 5 indicated, that a significant difference between treatments were observed for flavour, body & texture, color and appearance and overall acceptability at ($p<0.01$).

Table 5: Effect of stage of sugar addition on sensory quality of Milkcake

Sugar stage	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
At first boiling	7.7	7.8	7.7	8.1	6.8
At partial concentration	8.7	8.5	8.5	8.3	7.3
At pat stage	8.2	8.8	8.4	8.4	8.6
F – value	54.28**	54.51**	11.88**	15.35**	65.73**
C. D.	0.23	0.25	0.33	0.25	0.38

Average three replications
** Significant at ($p<0.01$) level
APC - After partial concentration
PS - Pat Stage

Effect of corn syrup level on sensory quality

Corn syrup was added in milkcake with the purpose of preventing adverse changes in body & texture or colour during manufacture as well as during subsequent storage. It was observed during the preliminary studies that addition of corn syrup at the initial stage led to significant browning in the fresh product and if added at the last stage of manufacture the obtained product was pasty. Addition of corn syrup at the patting stage however resulted in an acceptable quality.

Three different levels of corn syrup (0.5, 1 and 1.5 %) were used and the average sensory scores (Table 6) for milkcake added with corn syrup revealed that the sensory attributes of milkcake were significantly ($p<0.01$) affected at all the levels of addition. When the corn syrup was added at the 1 % level, the average sensory scores increased for flavour, body and texture, colour and appearance, sweetness and overall acceptability as compared to 0.5 and 1.5 % corn syrup level. Hence, it was found that corn syrup at the level of 1 % contributed well towards sensory properties of freshly prepared milkcake improving its acceptability.

Table 6: Effect of corn syrup level on sensory quality of Milkcake

Corn syrup Level	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
0.5 %	7.8	7.7	7.7	7.5	7.7
1.0 %	7.9	8.1	8.0	7.9	7.9
1.5 %	7.7	7.5	7.4	7.6	7.4
F – test	**	**	**	**	**
C. D.	0.25	0.25	0.23	0.24	0.33

Effect of ghee level on sensory quality

Ghee was added in milkcake with the purpose to increase the taste, flavor and influencing the body and texture of product during manufacture as well as during subsequent storage. Addition of ghee at the patting stage however resulted in an acceptable quality.

Three different levels of ghee (0.5, 1 and 1.5 %) were used and the average sensory scores (Table 7) for milkcake added with ghee revealed that the sensory attributes of milkcake were significantly ($p<0.01$) affected at all the levels of addition. When the ghee was added at the 1 % level, the average sensory scores increased for flavour, body and texture, colour and appearance, sweetness and overall acceptability as compared to 0.5 and 1.5 % ghee level. Hence, it was found that ghee at the level of 1 % contributed well towards sensory properties of freshly prepared milkcake improving its acceptability.

Table 7: Effect of ghee level on sensory quality of Milkcake

Ghee Level	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
0.5 %	7.9	7.8	7.6	7.5	7.7
1.0 %	8.2	8.0	7.9	7.8	8.0
1.5 %	8.0	7.7	7.5	7.4	7.6
F – test	**	**	**	**	**
C. D.	0.22	0.23	0.24	0.25	0.23

Effect of ageing time on sensory quality of Milkcake

When the product is drawn from the processing kettle its temperature is around 85-90°C and at this stage the grains are relatively soft and the colour is not fully developed. It also lacks in gumminess and chewiness characteristics. Thus the product has to be cooled under controlled conditions to achieve these characteristics. In our preliminary trials it was observed that uncontrolled cooling of Milkcake at room temperature did not yield desirable and consistent product. It was noticed that 70 °C is the optimum temperature at which product should be kept for certain time to simulate desirable characteristics in the final products. Therefore the product was kept in a hot air oven at 70 °C for 60 and 90 minutes and the effect on the sensory quality were studied. The body and texture, colour and appearance and overall acceptability scores were significantly higher for the Milkcake aged for 60 minutes (Table 8) as compared with that aged for 90 minutes. Ageing for longer than 60 minutes resulted in developing for very hard grains, chewy body and too dark brown colour. So the ageing time of 60 minutes was found to be optimum on the basis of these results.

Table 8: Effect of ageing time (70 °C) on sensory quality of Milkcake

Time in minutes	Flavour	Body & Texture	Colour & appearance	Sweetness	Overall acceptability
60	8.1	8.2	8.3	8.2	8.4
90	7.8	7.6	7.6	7.8	7.7
C. D	0.07	0.08	0.10	0.01	0.07

Conclusions

Realizing the potential of developing a standardized method for the manufacture of milkcake which could be taken up by the organized dairy industry, an attempt was made to study the levels of various important variables which affect the sensory quality of the product. It was observed that the level of fat in the milk, sugar concentration, corn syrup, ghee level and the temperature-time of thermization had significant effect on the sensory properties of the product. The study revealed optimum levels of the variables for sensorily acceptable quality of milkcake.

References

1. Chetana R, Srinivasa PC, Reddy SRY. Moisture sorption characteristics of milk burfi, a traditional Indian sweet, using sugar substitutes. Eur. Food Res. Technol. 2005; 220:136-141.
2. Dharam Pal. Technological advances in the manufacture of heat desiccated traditional Indian milk products- An overview. Indian Dairyman, 2000; 52(10):27-34
3. Karwasra RK, Srivastava DN, Hooda S. Standardization of the process for the manufacture of milkcake. Indian Journal of Dairy Science. 2001; 54(5):280-282.
4. Kilcast D. Food Ingredients. Anal Int. 1999; 21:27-33.
5. Kumar RK. Technology and shelf life of milk cake. Ph.D thesis submitted to CCC Haryana Agri. University, Hisar, 1999.
6. Landge SN, Kulkarni DN, Chavan BR, Shiva Aithal. Alum improves granular consistency in milkcake. Abstract in compendium of 16th Indian Convention of Food Scientists and Technologists. 2004, 56.
7. Lawless HT, Haymann H. Consumer field tests and questionnaire design. Sensory Evaluation of Food (Lawless, H.T. and Haymann, H. eds.) Chapmann and Hall, New York, 1998, 480-518.
8. Mathur BN. Indigenous milk products of India: the related research and technological requirements. Indian Dairyman. 1991; 43:61-74.
9. Parekh JV. Innovations in traditional Indian dairy foods. Global dairy industry and food security. In: Souvenir, 41st Dairy Industry Conference & IIDE. IDA (west zone) Mumbai, 2013, 21-30.
10. Patel SY. Physico-Chemical, Sensory, Rheological Characteristics and Storage related changes in Market Samples of Milk Cake at Ambient Temperature. M.Sc thesis submitted to AAU, Anand, 2010.
11. Rao TM, Reddy CR, Ranganadahm M, Laxmnarayan M. Standardization of the method for milkcake preparation. Indian Journal of Dairy Science. 2003; 56(6):397-399.
12. Ramesh BP. Standardization of method for the manufacture of milk cake. M. Tech thesis NDRI, Karnal, 2000.
13. Rasone R, Tanwar B, Dey A. Khoa: A study desiccated indigenous Indian dairy product. Research journal of pharmaceutical, biological and chemical science. 2015; 6(5):39-48.
14. Sachdeva S. Studies on Technology and Shelf life of Burfi. M.Sc Dissertation. Submitted to Krukshetra University, 1980.
15. Sen DP, Ramanna BR. Proceedings of the symposium on the status and prospects of the confectionery industry in India, Mysore, India, 1979, 78-83.
16. Snedecor GW, Cochran WG. Statistical Methods. Oxford and IBH Publications, New Delhi, 1994.
17. Varma RV, Reddy KY, Sharma KS, Shiv Kumar, Kumar Ravi. Process optimization of milkcake using cow milk. Journal of Food Science and Technology. 2005; 42(2):167-169.
18. Wright N. Manuf. Confect. 1990; 70:65-69.