

Physico-chemical quality of kulfi

ABINASH KUMAR, K.P. SINGH, M.P. GUPTA¹ AND BIRPAL SINGH²

Deptt. of A.H. & Dairying, R. B. S. College, Bichpuri, Agra.

Abstract

The samples of kulfi marketed in different zones of Agra city and prepared in the laboratory as control samples were analysed for various attributes of sensory and chemical quality. The control samples prepared in the laboratory were superior in sensory quality viz. colour, flavor and body and texture and in chemical quality viz. Acidity, pH, T.S. fat, protein, lactose, sucrose and ash, to the market samples of different zones.

Key words: laboratory, chemical quality, fat, protein, lactose, sucrose

Introduction

Besides concentrated indigenous milk products some varieties of frozen milk products are prepared as to preserve the milk from its deterioration by micro biological changes. Amongst the common indigenous milk products kulfi has its important place as it contains about two and half fold of the total solids of milk. According to PFA Act (1955) kulfi is a frozen milk product prepared from cow or buffalo milk and / or a combination thereof. The minimum requirements of ice-cream, kulfi and chocolate ice-cream are as, T.S. 36% fat 10% protein 3.5% and 0.5% stabilizer. The quality of kulfi includes the sum of total of its properties, i.e. physical, chemical and microbiological (Bomdyopadhyay 1985).

Materials and Methods

1. Collection of market samples:

The samples of kulfi were collected from the hawkers and halwais of different zones of Agra city. The samples were collected in an insulated ice box to prevent any change in the quality.

2. Preparation of control samples:

The control samples of kulfi were prepared in the laboratory under hygienic conditions using the method described by Srikumar, De (1988).

3. Examination and analysis:

A. Physical quality

The samples of kulfi collected from market and prepared in the laboratory were examined for their physical quality (sensory evaluation) by a panel of judges drawn from the dept. of AH & Dairying, RBS College, Bichpuri, Agra using 9 point hedonic scale.

The quality was judged on the basis of colour, flavor and body and texture. Melt down time of the product was also included in the physical quality.

B. Chemical analysis

The titratable acidity of kulfi was determined according to IS: 1165-1967 Ph of Kulfi was determined by Bachman Ph meter. Total solids of product were determined according to IS: 2802-1964. The moisture content was determined by subtracting total solids from 100. The fat and protein of the product were determined according to Gerber's method (AOAC, 1965) and by kjeldahl method (AOAC 1965), respectively. The lactose content of kulfi was determined according to the method described by Knowles and watkin (1947). The sucrose content was determined according to Lane Eynon method IS:4079-1967. The method recommended by A.O.A.C (1965) was employed for the determination of ash content of kulfi. The starch was determined qualitatively by adding, few drops of iodine-solution in the sample taken in a test tube.

Results and Discussion

The colour of market samples from different zones varied from yellowish to white and control samples had whitish-yellow colour. The market samples of different zones had cardamom flavor and control samples had pleasant flavor without adding any artificial flavor. All the samples from different zones of marked had hard body and coarse texture and few of them had crystallization of sugar. While all the control samples had hard body and smooth texture. The score for overall acceptability of overall market samples was 4.45 ± 0.46 points. The control samples of kulfi had 6.80 ± 0.19 points of overall acceptability

¹ Ex-Prof., Deptt. of Dairy Science, U.P Pt. D.D Upadhyay, Veterinary Univ., Mathura- 281001 (U.P.)

² Principal, R.B PG College, Agra.

Table 1: Physical (sensory) quality and chemical composition of kulfi\

S.N.	Quality	Zones					Overall
		Zone-I	Zone-II	Zone-III	Zone-IV	Control	
1. Sensory quality							
A.	Overall acceptability	4.17±0.27	4.50±0.64	4.60±0.26	4.60±0.26	6.80±0.19	4.45±0.46
B.	Meltdown time(minutes)	59.00±2.77	60.50±2.52	61.00±2.77	59.00±1.45	77.50±1.34	59.87±1.18
2. Chemical composition%							
1.	Acidity	0.25±0.008	0.26±0.001	0.25±0.009	0.24±0.007	0.18±0.002	0.25±0.002
2.	pH	5.35±0.08	5.19±0.001	5.24±0.12	5.43±0.10	6.17±0.07	5.30±0.05
3.	Total solids	27.80±1.65	28.70±1.71	27.25±1.74	28.26±0.97	35.21±0.31	28.00±0.75
4.	Moister	72.18±0.15	71.30±1.71	72.75±1.74	71.70±0.98	64.78±0.31	71.98±0.75
5.	Fat	2.47±0.15	2.86±0.21	2.59±0.17	2.58±0.18	8.10±0.10	2.63±0.09
6.	Protein	5.46±0.35	5.07±0.25	5.62±0.36	5.51±0.31	5.24±0.10	5.42±0.32
7.	Lactose	5.07±0.36	5.55±0.33	5.17±0.22	5.05±0.39	6.16±0.14	5.21±0.16
8.	Sucrose	12.24±0.89	12.97±1.24	10.75±0.87	12.80±0.93	13.72±0.16	12.19±0.49
9.	Ash	1.69±0.13	1.69±0.31	1.71±0.20	1.74±0.10	1.34±0.03	1.74±0.11
10.	Starch	+	+	+	+	+	-

(Table 1). The melt down time of overall market samples of kulfi was 59.87 ± 1.18 minutes and for control samples it was 77.50 ± 1.34 minutes.

The acidity of kulfi samples (or overall market zones samples) was $0.25 \pm 0.004\%$ and it was $0.18 \pm 0.007\%$ in control samples. Our results are in fair agreement of Yarriswamy et al., (1984). The pH of kulfi collected from market (as overall zones samples) was 5.30 ± 0.054 and it was 6.17 ± 0.071 in control samples. The total solids content of market (overall zones) samples was $28.00 \pm 0.72\%$ and it was $35.21 \pm 0.31\%$ in control samples. Similarly, the moisture content was 71.98 ± 0.75 and $64.78 \pm 0.315\%$ in market (overall zones) and control samples respectively. The results of present study are in fair tune of Bandyopadhyay (1985). The fat content was lowest in zone I and highest in zone II. It was $2.63 \pm 0.15\%$ in overall zone samples and $8.10 \pm 0.15\%$ in control samples. The result of present study is in agreement with those of Bandyopadhyay (1985) for control samples. The market samples had lower fat content. The protein content was lowest in samples of zone II and highest in zone III. The protein content of $5.42 \pm 0.32\%$ and $5.24 \pm 0.10\%$ was, respectively, in overall zone samples and in control samples. The results of present study on protein content of market samples as well as in control samples are lower than that of yarriswamy et al., (1984) but are in fair agreement of PFA (1955) for control samples. The lactose content was lowest in samples of zone IV and

highest in samples of zone II. It was $5.21 \pm 0.16\%$ in overall zone samples and $6.16 \pm 0.14\%$ in control samples of kulfi. The results of lactose content are lower in market samples and higher in control samples than that reported by chae et al. (1982). The sucrose content was lowest in samples of zone III and highest in samples of zone II. The sucrose of overall zone samples was $12.19 \pm 0.49\%$ and it was $13.72 \pm 0.16\%$ in control samples. The results of present study on sucrose content of market and control samples are in fair tune of Bandyopadhyay (1985) and salooja and Balachondran (1982). The ash content was almost same in all zone of market. It was $1.74 \pm 0.11\%$ in overall zone samples and $1.34 \pm 0.03\%$ in control samples. There is pursity of data on ash content of kulfi to affirm the present findings. The starch test was positive in kulfi samples collected from different zones of market. While it was negative in control samples prepared in the laboratory.

The analysis of variance (Table 2) revealed that the type of samples (different zones samples and control samples) had significant ($p \leq 0.01$) effect on overall acceptability of sensory quality, melt down time, acidity, pH, total solids and moisture (p) effect on overall acceptability of sensory quality, melt down time, acidity, pH, total solids and moisture ($p \leq 0.052$), and fat content. The protein lactose, sucrose and ash content differed insignificantly.

It is concluded from present investigation that control samples prepared in the laboratory were

Table 2: Analysis of variance for sensory (Physical) and chemical quality

S.No.	S.V.	DF	M.S.S & F-Value									
			Overall acceptability	MeltDown Time	pH	Total solids	Moisture	Fat	Protein	Lactose	Sucrose	Ash
1.	Zone	4	11.46(14.40**)	62925(12.28**)	0.1082(20.03**)	1.592(5.49*)	106.91(5.45*)	60.15(189.17**)	0.48(0.56NS)	2.20(2.34NS)	12.15(1.54NS)	0.275(1.59NS)
2.	Error	45	0.79	51.22		0.104	19.45	0.318	0.86	0.94	7.84	0.726

NS=non – significant * = significant at (pd^{0.05}) ** = significant at (pd^{0.01}) Figures in parenthesis- F-Value

superior in all respect of sensory and chemical attributes than market samples of different zones. A good quality kulfi could be made using the milk of good quality buffalo milk, adding sugar, stabilizer in proper ratio.

References

- A.O.A.C. (1965) official methods of analysis. Pub. By Association of Official Agricultural Chemists, 7th Edn. Washington. D.C.
- Badyopadhyay, A.K. (1985). Indian Milk Products. A compendium. Cited in Dairy India (1985) P.118
- Chae, S.K. and Lee, S.G. (1982). Studies on evaluation of quality of food by sensory testing IV. Evaluation of the sensory quality of commercial ice-cream Korean. J. of Food Sci. and Techno. 14 (3) : 203-209. Cited in Dairy Sci. Abstract 45 (2) : 1274.
- I.S.I (1964). IS : 2802, Specification for milk powder (whole land skim). Indian standards institution, Manak Bhawan, New Delhi-1
- I.S.I(1967). Is:1165. Specification for milk powder (whole land skim). Indian standards institution, Manak Bhawan, New Delhi-1
- I.S.I(1967). IS:4079. Specification for canned rasogolla. Indian standards institution, Manak Bhawan, New Delhi-1.
- Knowles and Watkin (1947). A practical course in Agriculture chemistry. 2nd Edn. P. 139.
- P.F.A. Act (1955). The prevention of Food Adulteration Act with rules (as amended upto date). Pub. Central law agency, Allahabad.
- Salooja, M.K. and Balachandran, R. (1982). Studies on the production of Kulfi, the acceptable level of total milk solids. J. of Food Sci. and Tech. India. 19 (3) : 116-118.
- Sukumar, De. (1988). Outlines of Dairy Technology. Oxford' Univ. Press, New Delhi-1.
- Yerryswamy, K., Atmaram, K. Natarajan, A.M. and Anantakrishnan, C.P. (1984). Quality of Kulfi manufactured by different methods. Cited in Dairy Sci. Abstr.46 (12) : 8485..