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Research Article

The Study on the Physico-Chemical Qualities of Ice-Creams Sold in Varanasi District

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ABSTRACT

An investigation was conducted to find out the "The study on the physico-chemical qualities of ice-creams Sold in Varanasi district" was carried out to compare with the quality of market samples the control sample were prepared in Dairy technology laboratory of Udai Pratap Autonomous College, Varanasi from cow milk, buffalo milk and all necessary ingredients were purchased from nearest market during the years 2012-13 six factories collected Mona Ice-Cream, Glory Ice-Cream, Adarsh Ice-Cream, Gelad Ice-Cream, Rita Ice-Cream and Baba Ice-Cream during the period of three months i.e. at weekly intervals. Each sample were collected between 1.00 P.M. to 7.00 P.M. from the factory and presented in a dry and cleaned wide mounted sample bottle of 250 ml capacity which was there almost no significant variation between the sucrose, acidity content of market and control samples of ice-cream. However, sucrose content of sample no. 6 was significantly higher than that of the control and other market samples. Although, market samples no. 4 is chemically almost equal to the control sample, but the price is more high i.e. 62.56 percent as compared to the control sample. From these studies; It may be mentioned here that sample no 1 (Mona) chemically found at par with the control sample the price is almost reasonable as compared to the market sample.

Key words: *Chatt, Hip, Ice-cream, Vadilal*

INTRODUCTION

Western technology consist of two categories those using bath process and soft served ice cream machine such machine can be observed along with the corner "Chatt" shop the local expense coffee out late, where various flavored "Softy" ice cream in cones is catered to the young or "Hip" generation. Soft serve ice cream is not quite as expensive but is quit popular especially in urban centers that the entire ice-cream manufacturer in Varanasi district had supplied standard quality of ice-cream, except one.

There are a few good reasons for Vadilal to do this. One, India's ice-cream market, estimated at Rs 2,500 crore, is growing at an annual rate of 18 per cent.

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Of this, about Rs 1500 crore is controlled by organized players — Amul, with annual ice cream sales of close to Rs 400 crore, is the market leader; while Vadilal is second with Rs 300 crore of revenues. But, competition is getting fierce, with regional brands like Nagpur's Dins haws and Bhopal's Top n Town trying to eat into their business. More worrisome for Vadilal are the significant expansion plans chalked out by national chains Amul and Mother Dairy, as well as fellow Ahmedabad-based ice-cream maker Hammer.

Among these players, Mother Dairy — a leader in the northern Indian market that is expanding its network to other areas like Mumbai and planning on opening a staggering 7,000 outlets across India over the next two years — poses a serious threat. "Our strategy for ice cream category would be to keep growing the market in both the impulse and take-home categories. We are aiming for a national footprint by the end of 2012-13," a Mother Dairy spokes person says.

MATERIAL AND METHODS

The investigation was carried out at main experiment station in The representative sample of ice-cream at the source of manufactures were collected from different factories and brought for analysis in the laboratory of Dairy Technology, Udai Pratap Autonomous College, Varanasi. the details of the factories from whose the samples were collected Ice-cream samples taken from freeze and kept it at room temperature for softening then sample transferred in beaker and mixed thoroughly with spoon are given as during the year 2012-2013 to find out response of total number of factories six Mona Ice-Cream, Glory Ice-Cream, Adarsh Ice-Cream, Gelad Ice-Cream, Rita Ice-Cream and Baba Ice-Cream there are several factories in Varanasi district where ice-cream under different trade names is manufactured and supplied in the town through factory dealers and venders.

The control sample of ice-cream were prepared in the Dairy Technology, laboratory following the comparison recommended by I.S.I., The control sample of ice-cream was prepared by using fresh buffalo and cow milk, which were obtained from the college dairy farm and other ingredients physical, chemical and qualities of ice-cream mix like cream, milk power, protein, fat, sugar, colour, flavour, ice and salt were purched from the local market.

RESULT AND DISCUSSION

Study of the chemical quality of ice-cream, it is essential to take in to account its physical quality and organoleptic tests the relevant results of the samples have been summarized in table-1 and discussed after words.

Table 1: The physical qualities of laboratory and market ice-cream sample physical qualities studies

Sample	General appearance	Body and texture	Flavour	Taste
Control sample (Laboratory ice-cream)				
1.	Light creamy	Hard and grannular	Pleasant	Sweet
2.	Creamy white	Hard and grannular	Pleasant	Sweet
3.	White	Hard and grannular	Pleasant	Sweet
4.	White	Hard and grannular	Pleasant	Sweet
Market ice cream samples				
1-	Mona white	Soft and grannular	Chocolate	Sweet
2-	Gloty Dirty white	Hard and smooth	Chocolate	Low sweet
3-	Adarsh Creamy white	Soft and granular	Pleasant	Sweet
4-	Gland Yellowish	Soft and granular	Chocolate	Sweet
5-	Rita Creamy white	Hard and smooth	Pleasant	High sweet
6-	Baba. Dirty white	Hardand smooth	Chocolate	Low sweet

Body and texture of ice-cream mainly depends upon total solids content of ice-cream types of milk use and treatment given during its preparation. Lower total solids content of ice-cream tends to make it with a soft and loose body. The texture of the product is also affected by adulteration of milk with water.

Market ice-cream samples varied in body and texture. The soft hard smooth and granular surfaces were observed in the market ice-cream samples (table-1). It shows that most of ice-cream factories had not done freezing to the desired stage and consequently had produced ice-cream of soft and loose body. However, the samples prepared in the laboratory gave a hard and small granular surface.

Flavour of the ice-cream also varied less from sample to the sample. A good quality of ice-cream should have a pleasant flavour which was exhibited by the control samples of ice-cream in the present study. It reveals that probably ice-cream making factories did not use the high quality milk and did not follow the right procedure of ice-cream making which may be responsible for such flavor, Davis, Warner, and De and Ray, flavour can be prepared from high quality.

This test was observed mainly on the basis of palatability of the product and its desirable characters viz; General appearance, body, texture and flavour. Some of market ice-cream samples were not recorded to be suitable for sweet making (table-1). Such samples should be discarded by the sanitary inspector.

Table 2: Mean value of the total solids contents of the control and market ice-cream samples

Detail of the samples	Mean value (percent)	Range (%)	Deviation from control sample
Control sample	38.35 (± 0.44)	37.50-39.77	-
Sample No. 1	41.33	41.15-40.11	+1.98
Sample No. 2	33.50 (± 0.13)	33.24-34.00	-4.85
Sample No. 3	33.06 (± 0.16)	32.40-33.40	-5.29
Sample No. 4	36.34 (± 0.2)	35.52-36.83	2.01
Sample No. 5	32.26 (± 0.12)	31.76-32.55	-6.09
Sample No. 6	41.95 (± 0.13)	43.77-40.35	-3.33
Mean (Sample No. 1-6)	35.09 (± 1.132)	32.26-40.33	-3.25

The mean values of the market samples collected from 6 ice-cream factories varied between 32.26 ± 0.12 and 40.33 ± 0.18 percent (table no. 1). In order to test the difference between the mean values of the total solids content of market samples, the analysis of variance was done and presented in table no-2. Ice-cream samples differed significantly ($P<0.01$). A study of the CD test (table no. 3) reveals that the market samples 1, 2, 3, 4, 5 and 6 were not similar to control samples and sample no. 4 was similar to the control samples. Market sample no. 1, 2, 3, 4, 5 and 6 contained significantly lower total solids control than that of the sample no 1.

The total solids content of the ice-cream samples were compared with those of the control samples, it was noted that only market sample number 1 contained 1.98 percent higher, while sample number 1, 2, 3, 4, 5 and 6 contained 1.98, 4.85, 5.29, 2.01, 6.09, and 3.33 percent respectively, two or three ice-cream manufacturers have not adopted recommended procedures of ice-cream making

and are keeping lower total solids content Arbuckle 40.0 to 42.0 percent and Indian Standard Institute not less than 36.0 percent.

Table 3: Water content of the control and market ice-cream samples

Detail of the samples	Mean value (percent)	Range %	Deviation from Control sample
Control sample	61.65 (± 0.44)	60.23-62.50	-
Sample No. 1	59.67 (± 0.18)	58.86	-1.98
Sample No. 2	66.50 (± 0.13)	65.70-66.76	+4.85
Sample No. 3	66.94 (± 0.16)	65-86-67.64	+5.29
Sample No. 4	63.66 (± 0.2)	62.48-64.28	+2.01
Sample No. 5	67.74 (± 0.12)	67.25-6845	+6.09
Sample No. 6	59.87 (± 0.19)	56.32-67.55	+10.17
Mean of the samples	64.90 (± 1.132)	59.67-67.74	+3.25

The fat content of the ice-cream samples under study were the mean value of the fat content of the ice-cream samples under study were analyzed and the details are contained in the mean value of the control samples and market samples along with the statistical analysis of the samples are given in the table 4.

Table 4: Fat content of the control and market ice-cream in samples

Detail of the samples	**Mean value (percent)**	**Range %**	**Deviation from Control sample**
Control sample	13.45 (± 0.19)	13-14	-
Sample No. 1	10.40 (± 0.06)	10.5-10.3	-3.05
Sample No. 2	10.20 (± 0.20)	9.01-10-25	-4.21
Sample No. 3	9.24 (± 0.4)	9.24-11.8	-3.21
Sample No. 4	10.30 (± 0.16)	9.00-11.20	-3.15
Sample No. 5	7.88 (± 0.33)	7.1-8.9	-5.59
Sample No. 6	12.05 (± 0.64)	11.45-12.60	-1.15
Mean (Sample No. 1-6)	9.61 (± 0.43)	7.88-10.40	-3.84

The data table number 5 indicate that the cost price of control sample of ice-cream prepared in the laboratory was found to be Rs. 191.12 per kg. or 10 per carton containing 10 gm ice cream. However, the comparison of the sale price of the district of the control sample assuming 16.11 percent profit. The (table-5) indicate the samples numbers 1, 2, 3, 4, 5 and 6 sold under the trade name Rita, Baba, Mona, Glory, Adarsh and Gelad are fetching Rs. 27.73, 39.34, 62.56, 37.73, 39.34 and 16.12 percent expected profit respectively.

Considering these factors it may be said that all the samples of ice-cream are being sold in the district more higher prices. Smple no. 5 is being sold at cheaper rate as this sample was found tube poorest amongst all the samples. Consequently, it may be mentioned

here that market samples number 1 is better than all the samples under the study. However, sample no.5 is being sold on 16.12 percent profit basis, but it is of quite poor chemical composition as compared to the control one. Although, sample no. 4 is chemically almost equal to the control one, but the price is much more (62.56 percent) than that of the control sample.

Table 5: Comparative sale price and profit of control and market ice-cream samples considering the profit from control sample as 100 percent

Detail of samples	Amount of ice-cream per cup (Rs.)	Cost of production (Rs.)	Sale price per cup (Rs.)	Sale price per kg. (Rs.)	Profit percentage
Control sample	100	86.12	10.00	100.00	16.12
Sample no. 1	100	-	11.00	135.00	37.73
Sample no. 2	100	-	12.00	120.00	39.34
Sample no. 3	100	-	12.00	120.00	39.34
Sample no. 4	100	-	14.00	140.00	62.56
Sample no. 5	100	-	10.00	145.00	27.12
Sample no. 6	100	-	15.00	150.00	65.56

CONCLUSION

The present study in relation to response of micronutrient on total solids content of the market samples varied between 32.26 $\pm$ 0.12 to 40.33 $\pm$ 0.18 with over all mean value of 35.09 $\pm$ 1.132 percent; while the total solid content of the control sample varied between 37.50 and 39.77 with the mean value of 38.35 $\pm$ 0.44 percent This finding can be exploited on quality total solid, water, fat and sugar contents i.e. (Baba) so that all the ice-cream manufacturer in Varanasi district had supplied standard quality of ice-cream, except one manufacturer i.e. Baba.

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