

Sanitary Quality of Commercially Produced Ice Cream Sold in the Retail Stores

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Abstract: The sanitary quality of commercially produced ice cream of Milkvita, Igloo, Pollar and Savoy were examined for total bacterial count (TBC), coliform count and Staphylococcal count. Each brand of ice cream was collected from retail stores of Dhaka City. The TBC was determined on plate count agar incubated at 30EC for 3 days, coliform count on violet red bile agar incubated at 30EC for 24 hours and Staphylococcal count on mannitol salt agar plates incubated at 37E C for 24 to 48 hours. The TBC reported in ice cream of Milkvita, Igloo, Pollar and Savoy varied from 2800 to 3800 with an average of 3280 CFU/ml, 2800 to 4000 with an average of 3450 CFU/ml, 10,000 to 19,000 with an average of 15,000 CFU/ml and 26,800 to 56,000 with an average of 42,460 CFU/ml respectively. The coliform count varied from 4 to 18 with an average 11.60 CFU/ml and 18 to 42 with an average of 28 CFU/ml in Polar and Savoy but in case of Milkvita and Igloo, it was found negative. The Staphylococcal count in the samples of Igloo and Savoy varied from 2 to 7 with an average of 3.80 CFU/ml and 7 to 17 with an average of 11.20 CFU/ml respectively, whereas it was found negative in the samples of Milkvita and Polar.

Key words: Coliform count, Staphylococcal count

Introduction

Ice cream is a milk product, which contain a variety of ingredients in addition to milk, cream and sugar. This is a popular dairy product throughout the world. As a result, its production and consumption are rapidly increasing and the substantial part of milk produced in many countries is being utilized for the manufacturer of frozen dessert. The richness in nutritive constituents of ice cream although has been realized by all but the problem lies in the production and handling of this food is vary complex one and is associated with so many problems. So, there are great difficulties in regards to quality and quality of ice cream and microbiological quality of ice cream is also far from satisfactory. At many points, during production, transportation, storage and preparation milk food for consumption, it may become contaminated with biological agents. The biological agents contaminated with in food are traced to ingredients added post pasteurization and environmental factors such as air, faults in storage tank, cracks in the plant and packaging materials (Bigalke and Chappel, 1984). In developed countries ice cream receives quality control measures to increase its shelf life as well as prevent potential threat of public health. Bangladesh is still backward in this respect. Due to non-enforcement of inspection act and lack of maintenance of standard relation to hygienic quality of ice cream, the consumers of this country are deprived of getting quality ice cream. In our country, some commercial company has been marketed ice cream in the local market. The microbiological status of ice cream for public health significance in Germany is known (Furh, 1986) but such type of investigation is not known in Bangladesh. The present work was conducted to:-

- find out presence of selected microbial groups in samples obtained from different brands of ice cream
- determine and ascertain the sanitary quality of commercially produced ice cream in Bangladesh and compared it with international standards.
- identify the possible cause of quality deterioration influencing public health hazard.

Materials and Methods

Four different brands of commercially produced ice cream available at retail stores were selected for the study. These brands were Milkvita (Bangladesh Milk Product Co-operative Union Ltd., Dhaka), Igloo (Abdul Monem Ltd., house of Igloo, Dhaka), polar (Dhaka Ice cream industries Ltd., Dhaka) and Savoy (Savoy Ice cream Factory, Sks Product, Dhaka). Three cups of ice cream of each

brand were collected from the local market of Dhaka City using sterile containers, which were kept in iceboxes and brought to the laboratory within 30 minutes of collection. A quantity of about 10ml of liquid ice cream was pipetted out from different depths and transferred into a sterile glass bottle fitted with a screw-capped stopper. Three cups of ice cream of each brand were handled as above and the samples were taken in the labeled bottles. In this way, a total of 30 ml of the ice cream sample was collected from each brand. The collected ice cream was considered as a single representative sample. From this thoroughly mixed sample, an exact quantity of 1 ml of ice cream was pipetted out aseptically and transferred into a sterile empty test tube and plugged with cotton. To this ice cream 9 ml of dilution was added to give a 1:10 dilution v/v. Further, decimal dilution as required were prepared according to standard method given by APHA (1960). The prepared samples were bacteriologically examined in order to determine the total viable count of bacteria present in ice cream as well as to detect and enumerate Coliform and Staphylococci. The media employed for total bacteria counts, Coliform and Staphylococci counts were plate count Agar (PCA), Violet Red Bile Agar (VRB) and Mannitol salt agar (MSA) respectively, as described by APHA (1953, 1958, 1960). The test sample poured on PCA plates were incubated at 30EC for 3 days, VRB plates were incubated at 30EC for 24 hours and MSA plates were incubated at 37EC for 24 –48 hours.

Results and Discussion

The bacteriological status of four brands of ice cream is present in Table-1. The mean TBC in use samples of ice cream of Milkvita (3280CFU/ml) was found lower in comparison to use samples of Igloo (3450 CFU/ml), Polar (15,000 CFU/ml) and Savoy (42,460 CFU/ml). These findings support the results of Marino (1954) and Keller *et al.* (1987) who were suggested that use fresh ice creams contained not more than 1,00,000 CFU/ml of total bacterial count (TBC) per ml. From the above findings, it was revealed that all brands of ice cream samples were within acceptable limit of public health safety because the samples did not exceed the total viable count 1,00,000 CFU/ml which were in agreement with that of Marino (1954) and Hankin *et al.* (1984). It is clear from the overall results that ice cream samples of milk vita were of the superior most quality, because the counts of total bacteria were less than recommended microbiological standard of Food and Drug Administration and USPHS (1965). Rossi (990) reported that the ice cream might be contaminated due to improperly cleaned servers and debris falling into uncovered tubes at the the point of scale.

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Table 1: Bacteriological status of different brands of ice cream

Producers	No. of samples	Total bacterial count		Coliform count		Staphylococcal count	
		CFU/ml	Log.	CFU/ml	Log.	CFU/ml	Log.
Milkvita	10	2800-3800 (3,280)	3.45-3.58 (3.52)	00	00	00	00
Igloo	10	2800-4,000 (3, 450)	3.45-3.6 (3.54)	00	00	2-7 (3.8)	0.3-0.8 (0.58)
Polar	10	10,000-19,000 (15,0000)	4.0-4.28 (4.18)	4.08-18 (11.6)	0.6-1.26 (1.06)	00	00
Savoy	10	26,000-56,000 (42,460)	4.43-4.75 (4.63)	18-42 (28)	1.26-1.62 (1.54)	7-17 (11.2)	0.8-1.23 (1.05)

The highest Coliform count was recorded with the ice cream of Savoy (28 CFU/ml) followed by Polar (11.6 CFU/ml) and lowest (nil) in the samples of Milk vita and Igloo. The results of the samples of Savoy and Polar are consistent with that reported by Tampieri (1967). His report showed that the ice cream contained > 10 Coliform per ml. The Coliform standards for ice cream should not over 10/ml (Frazier,1958 and James,1978). So, this study demonstrated that the samples of Milkvita and Igloo met the recommended criteria of USPHS (1965). Hence it could be taken into consideration as superior quality ice cream. The average Staphylococcal count in ice cream sample of Igloo was found lower (3.8 CFU/ml) than the sample of Savoy (11.2 CFU/ml). On the other hand, in case of Milkvita and Polar, the Staphylococcal counts were found negative. Pelczar *et al.* (1965) stated that Staphylococci might be entrance into milk product from food handlers either suffering from acute pyogenic infections or being at a state of healthy carriers harboring the organism--s in nose or throat.

References

American Public Health Association, 1953. Standard Methods for Examination of Dairy products. 10th ed. APHA, Inc., New York. pp: 144 and 147-148.

American Public Health Association, 1958. Recommended Methods for the microbiological examination of Food APHA Inc., New York.

American Public Health Association, 1960. recommended Methods for the Examination of Dairy Products. 11th ed. APHA Inc., New York.

Bigalke, D. and R. chappel, 1984. Ice cream microbiological quality.1. Controlling coliform and other microbial contamination in ice cream. Dairy and Food Sanitation, 4: 318-319.

Frazier, W. C. and D. C. Westhoff, 1958. Pasteurized milk in milk ordinance code. USPHS. Food microbiology. 1st ed., Mc Grav-hill Inc., New Delhi, pp: 112.

Fuhr, R., 1986. Bacteriological quality of different types of ice cream and milk shake during 1980-1985. In; arbeitsstagung des Arbeitsgebietes " lebensmit-telhygiene" Leitthema: Forschung und praxis der Lebensmittelhygiene" Vom 9-12. September 1986 in Garmisch-Partenkirchem.1986, pp: 257-261. Giessen/Lahn, German Federal Republic.

Hankin, L. and J. G. Hanna, 1984. Quality of ice cream and ice milk. Bulletin Contecticut Agricultural Experiment Station, No.818. p: 6.

James, M. and J. M. Jay, 1978. Indices of Food Sanitary quality and microbiological standards and criteria, modern Food Microbiology, 2nd ed., p: 311.

Keller, J. J., M. A. Steinmann and B. S. Wentzel, 1987. The quality of South African ice cream. Suid Afrikaanse Tydskrif vir Suiwelkunde, 19:145-147.

Marino,V., 1954. Maximum limits of bacterial count in ice cream. Ann. Sanita Pubbl., 13:1075-1082.

Pelczar, J. J., Michael, D. R. Roger, 1965. Food and water borne infections of man. Microbiology 2nd ed., USA. Chap. 27: 436-437.

Rossi, C., 1990. Bacteriological quality of soft ice cream. Environmental Health, 98:161-163.

Tampieri, A., A. Dosseena, 1967. Microbiological control of ice cream produced on a small scale. Riv. Ital. Ig., 27: 90-101. (Cited from Dairy Sci. Abstr., 31 : 1969).

USPS, 1965. Standard method for examination of milk and dairy product.