Short Communication

Microbiological Quality of Ice Cream Available in Chittagong

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A study was carried out to investigate microbiological quality of ice cream available in Chittagong area of Bangladesh during June to July 2008. Each brand of ice cream was collected from retail stores of Chittagong City. Standard plate count (SPC) and coliform count were done for bacteriological assessment of the ice cream samples. The average SPC count of Kwality, Igloo and Sub Zero ice cream samples were 2×10^3, 3×10^3 and 4×10^3 cfu/g respectively. Coliform organisms were detected in all the ice cream samples and the average coliform counts of the ice cream samples from Kwality, Igloo and Sub Zero were 12, 18 and 42 cfu/g respectively. Coliform bacteria exceeded standard limits, which can cause serious health problems.

Ice cream, a milk based product, is good medium for microbial growth due to high nutrient value, almost neutral pH value and long storage duration[1-2]. Quality of ice cream depends on both extrinsic factors that include manufacture procedure, and intrinsic factors that include proportion of ingredients used[2]. The biological agent contaminated with in food are traced to ingredient added post pasteurization and environmental factors such as compressed air fault in storage tank, cracks in the plant and sanitary quantity of ice-cream packaging materials[2]. Primary sources of microbial contamination to ice cream include water and raw milk whereas secondary sources include flavouring agents, utensils and handling. At many points during production, transportation and storage, milk can be contaminated with biological agents[3]. Many psychrophiles and psychrotolerant microorganisms like *Listeria monocytogens*, *Staphylococcus aureus*, *Bacillus*, *Salmonella*, *Shigella*, *Streptococus*, *Pseudomonas*, *Campylobacter*, *Brucella* and other bacteria are generally present in ice cream[4].

In developed countries ice cream receives quality control measures to increase its shelf life as well as to 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 have been marketed ice cream in the local market. The microbiological status of ice cream for public health significance in Germany is known[4], but such type of investigation is not known in Bangladesh. It is essential to create awareness among the consumers about the microbiological quality ice cream. Therefore the present work was conducted to determine the total bacterial load and the presence of coliform bacteria in some popular varieties of ice cream samples.

Two cups ice cream samples each of three popular varieties including Kwality, Igloo and Sub Zero were collected from different retail stores in Chittagong City. The bacteriological analyses were done at the Dairy Microbiology Laboratory of Chittagong Veterinary and Animal Sciences University, Chittagong during June to July 2008. Standard plate count (SPC) and total coliform count were performed according to American Public Health Association[5], using plate count agar medium for SPC and violet red bile (VRB) agar, brilliant green agar (BGA), endo agar and eosine methylene blue (EMB) agar media for total coliform count.

Figure 1 shows the standard plate count of the ice cream samples. The average SPC count/g of ice cream samples of Sub Zero brand (2×10^3 cfu/g) was found lower in comparison to of Kwality (4×10^3 cfu/g)and Igloo (3×10^3 cfu/g) varieties. These findings are in agreement to that reported by Keller *et at*.[6]; they suggested that the used fresh ice creams should not contain more than 10^4 cfu/g of total bacterial count. It was apparent from the present study that the bacterial load of the ice cream samples of the three
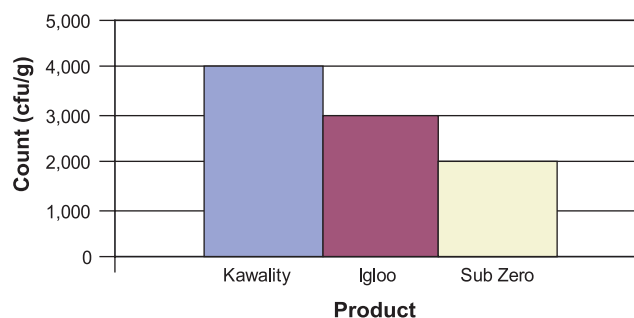

Figure 1. *Average total bacterial count of ice cream sample of three different manufacturers.*

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manufacturers were within the acceptable limit of public health safety, since the count was well below the acceptable limit, *i.e.*, less than 10^5 cfu/g. Similar findings were also reported Marino[7] and Hamelin *et al.*[2]. Considering the total bacterial load, the ice cream of Sub Zero brand seemed superior to the other two brands, because the counts of total bacterial counts were less than recommend microbiological standard of USPS[8].

The average coliform count of ice cream samples from different brands including Kwality, Igloo and Sub Zero was 12, 18 and 42 cfu/g respectively (Figure 2). Tampieri[9] in his study found more than 10 coliform bacteria per gram of the ice cream samples studied. The standards for ice cream limit the coliform bacterial count $\leq 10/g$[3,10]. The highest coliform count was recorded in the ice cream samples of Sub Zero brand (42 cfu/g), the count was relatively lower in the ice cream samples of Kwality (12 cfu/g) and Igloo (18 cfu/g) brands.
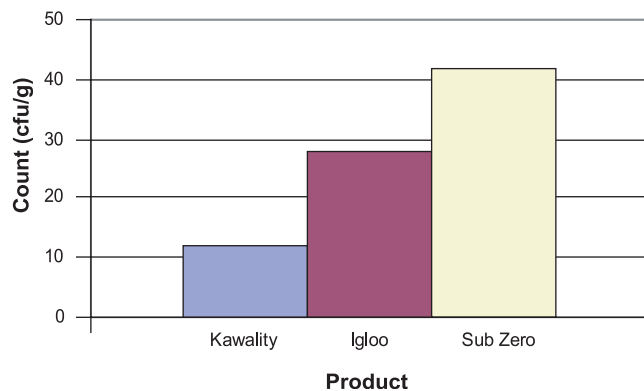

Figure 2. *Average coliform bacterial count of ice cream sample of three different manufacturers.*

Although pasteurization, freezing and hardening steps in production can estimate most of the microbial hazards, but still numerous health hazards are persistent due to various conditions[3]. Rossi[11] reported that the ice cream might be contaminated due to improperly cleaned serves and debris falling into uncovered tubes at the point of scale. The coliform counts of the ice cream sample were higher than the standard limits, which reflects lack of standard hygiene and sanitation measures during preparation of ice cream.

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