Correspondence

Bacteriological analysis of ice creams from Mangalore, south India

Sir,

Ice cream is the major dairy product that dominates interest of large segments of the population. As a result, its production and consumption are rapidly increasing. The microbiological quality of ice cream during retail marketing mainly depends on the contamination during the product handling as well as efficiency and sanitary conditions during frozen storage. Many food poisoning cases associated with the consumption of ice creams have been reported\(^1,2\). We studied the bacteriological profile of softee ice cream sold at retail outlets in Mangalore, a city in Karnataka State, India.

Softee ice creams were collected from ice cream vending machines installed in small shops in Mangalore. A total of five retail outlets were selected from four different localities. Random sampling method was followed to collect different flavours of ice creams from these five outlets at regular weekly intervals for a period of six months from January to June 2006. A total of 18 samples were collected from each outlet in sterile containers and transported on ice to the microbiology laboratory, Kasturba Medical College, Mangalore, within 30 min. The samples were processed immediately. The culture media used in the present study were procured from Hi-Media Laboratories Pvt. Ltd., Mumbai.

Aerobic bacterial counts were determined by incorporating 10-fold diluted samples into molten tryptic soy agar plates\(^3\). The plates were allowed to set, and then incubated at 37°C for 48 h. Plates showing colonies between 30 to 300 were used to determine the aerobic bacterial counts. Coliform counts of the ice cream samples were determined by multiple tube technique\(^4\). The tubes showing acid and gas production were streaked onto MacConkey’s agar plate to obtain discrete colonies. Typical lactose fermenting colonies (n = 5-10) were picked up and identified as *Escherichia coli* by standard biochemical reactions\(^5\).

In addition, the samples were also screened for enteric pathogens like *Salmonella* spp., *Shigella* spp. and Shiga toxigenic *E. coli* (STEC) by inoculation into selenite F broth (SFB) and buffered peptone water (BPW). Subsequently, SFB was subcultured onto MacConkey’s agar and deoxycholate citrate agar. Whereas, BPW was subcultured onto Sorbitol MacConkey’s (SMAC) and cefixime tellurite sorbitol MacConkey’s (CT SMAC) agar. All the plates were incubated at 37°C for 24 h. The samples were also streaked onto blood agar plates to isolate *Staphylococcus* spp. and *Enterococcus* spp. The bacterial isolates were identified by standard biochemical reactions\(^5\).

Of the 90 ice cream samples analyzed, 19 showed the growth of *E. coli*. *Staphylococcus aureus* was isolated from four samples and two samples yielded the growth of *Enterococcus faecalis*. Enteric pathogens like *Salmonella* spp., *Shigella* spp. and STEC were not detected in the samples screened (Table). More than one type of bacteria were isolated from 72 samples. *Acinetobacter* spp. was isolated from one strawberry

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and two vanilla flavoured ice cream samples. Coliform count of \( >10^7 \text{ cfu/g} \) was detected in 80 samples. Total aerobic bacterial counts in these contaminated ice cream samples were also \( >10^7 \text{ cfu/g} \). Total aerobic bacterial and coliform count of \( 10^5 \text{ cfu/g} \) was detected in ten samples.

As per the Bureau of Indian standards (BIS) regulations\(^6\), the total bacterial counts in the ice creams should not exceed \( 25\times10^4/\text{g} \) and coliform count should not be more than \( 100/\text{g} \). None of the softee ice creams screened in the present study were within the BIS limits for coliform and total aerobic bacterial counts, thereby indicating high levels of contamination and higher risk of infection. High coliform count, presence of \( E. \text{coli} \) and \( E. \text{faecalis} \) indicated faecal contamination of ice creams thereby suggesting possible risk of infection involved in the consumption of such food. Presence of \( S. \text{aureus} \), an enterotoxin producer, may cause serious health problems. Moreover, \( \text{Pseudomonas} \) spp., detected in the present study, is an important opportunistic pathogen and can cause food spoilage\(^7\). However, dangerous pathogens like \( \text{Salmonella} \), \( \text{Shigella} \) and \( \text{STEC} \) were not detected in the samples screened.

High level of contamination in the ice cream seen in the present study could be due to the bias in the selection of ice cream samples from a few petty shops in small localities. Moreover, branded ice creams and ice creams from big parlors were not included in the study. The study also lacks information on condition of people who consumed these ice creams. However, there were no reported outbreaks of any gastrointestinal disease during the study period.

Among the isolates from samples tested, only \( E. \text{coli} \) and \( S. \text{aureus} \) were significant potential pathogens. However, presence of other organisms could be attributed to unhygienic conditions during preparation, handling and serving of ice creams. Softee ice creams may also get contaminated if the ice cream preparation machines are exposed to dust and flies. Health education of the vendors and strict implementation of hygienic standards may help to reduce the contamination rates.

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**References**


