

Detection of *E.coli* and *Staphylococcus* in Milk and Milk Products in and around Pantnagar

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Abstract

The study was designed with the aim to isolate *Staphylococcus* and *E.coli* from milk (dairy farm, vendors and house) and milk products (viz; Dahi, Ice cream, Gulabjamun, Burfi, Khoa and Butter). All samples were inoculated on different bacteriological media and various biochemical tests were performed for the confirmation of isolates. The result of the present study revealed that out of 135 samples, 25 samples were found contaminated with *Staphylococcus* (14) and *E.coli* (11). The highest rate of contamination was recorded in Burfi (5) while the lowest was recorded in Ice cream (1). These enteropathogenic bacteria may cause problems due to improper handling and processing of milk and milk products. These organisms are significant from public health point of view as they have been associated with the onset of food poisoning in human beings.

Key words: *Staphylococcus*, *E.coli*, Food poisoning, Milk Products, Public Health, Entero-pathogenic bacteria.

Introduction

E.coli and *Staphylococcus* were most common Contaminants; pathogenic bacteria could be an important factor of gastrointestinal infection including food poisoning and food borne illness. Raw and unpasteurized milk obtained from milch cow and buffalo by hand milking may contain bacteria from cow's udders, flies, manure etc. Indigenous sweet based product like Khoa, Gulabjamun, Rasgulla are highly susceptible to variety of microorganism because of high nutritive value and complex chemical composition (Soomro, 2003). Contamination of these products with pathogenic bacteria can serve as a source of spread of certain harmful human disease like TB, Gastroenteritis, Brucellosis, Salmonellosis, and Staphylococcal food poisoning (Jay, 1978 and George, 1981). Besides these, enterotoxins producing *Staphylococcus aureus* is most dangerous and harmful for the human health. About 50 % strain of this organism are able to produce enterotoxins associated with food poisoning (Payne & Wood, 1954). Especially in India, rate of infection is still higher (Bhatia, 2007) because of warm and humid climate.

There is evidence that *Staphylococcus aureus* was isolated from Khoa samples (Masud et al., 1988 and Teufal et al., 1992), Rasmalai (Grewal and Tiwari,

1990). The most important source of contamination is probably the human. The contaminants reached the products either during cooking or handling after cooking (Ghosh & Laximiarayan, 1976).

Raw milk represents an ideal growth medium for microorganism (Haridy, 1992). Among all microorganism, *E.coli* is frequently contaminating organism and is reliable indicator of fecal pollution (Dilicchio, 1982). *E.coli* was isolated from milk products like Mawa, Khoa, Cream, Dahi, Cheese, Butter, Gulabjamun (Bhat et al., 1948; Kumar and Sinha, 1989; Kulshrestha, 1990).

Material and Methods

A total of 135 samples of milk (dairy farm, vendors and house) and milk products (viz; Dahi, Ice cream, Gulabjamun, Burfi, Khoa, Butter) were collected from different places of Pantnagar. 15 samples of each product were collected in sterilized test tubes and brought to laboratory for isolation and identification of bacteria.

Staphylococcus

Each sample was enriched in Peptone water and incubated at 37°C for 24 hours. Each inoculum was cultured on Baird parker agar (selective medium for *Staphylococcus*) and incubated at 37°C for 48 hours. The colonies appeared as black color then a single isolated colony was then picked and streaked on

Table-1. Contamination of Various collected samples

Number of samples collected	No. of Positivesamples		% of Positive samples
	<i>Staphylococcus</i>	<i>E.coli</i>	
Dairy farm	15	2	20
Milk vendor on cycle	15	2	26
Milk from houses	15	1	6.6
Dahi	15	1	20
Ice-cream	15	0	6.6
Gulabjamun	15	3	20
Burfi	15	3	33.3
Khoa	15	1	13.3
Butter	15	1	20
Total	135	14	11

Nutrient agar slant and further the organism was identified on the basis of their cultural, morphological, staining and various biochemical characteristics as described by Cruickshank, 1970. All positive samples were subjected to coagulase test for confirmation of *Staphylococcus aureus* as described by Monica, 1991.

E.coli

Each sample was enriched in Peptone water and incubated at 37°C for 24 hours. Each inoculum was streaked on Mac Conkey Lactose Agar (MLA), a differential media and pink colored colonies appeared after incubation at 37°C for 24 hours. A single isolated colony was then picked and streaked on Nutrient agar slant. The cultural characteristics of isolates were confirmed by streaking the pure culture on Eosin Methylene Agar (EMB) and further various biochemical tests were performed.

Results and Discussion

In the present study, it was found that out of all milk samples the highest contamination was recorded in the milk collected from vendors (26%) followed by dairy farm (20%) and house milk (6.6%), this may be due to unhygienic handling of milk. In case of milk products, the highest contamination was recorded in Burfi (33.3%) followed by Dahi (20%), Gulabjamun (20%), Butter (20%), Khoa (13.3%), and Ice cream (6.6%), suggesting that it could be due to contaminated environment and unhygienic handling or preparation.

Conclusion

The result of the present study of milk and milk

products were found contaminated with *Staphylococcus* and *E.coli* which may cause food poisoning and pose a threat to public health. It indicates a need for more strict hygienic practices, regular sterilization of dairy equipments, washing of utensils, milker's hands, udder, eradication of diseased animals, pasteurization/boiling of milk before collection and distribution for consumption and product making.

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