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## Prevalence of Bacterial Pathogens in Pedha (A Milk Product) Sold in Amravati (India)

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**Abstract:** The present study was aimed to evaluate the microbial quality of pedha and produce awareness of health hazard due to its consumption to the consumer. Total 50 pedha (milk product) samples were randomly collected from various shops of Amravati city and analyzed for bacteriological quality. The 92 bacterial strains were isolated and identified among them were *Pseudomonas aeruginosa* (23.91%), *Staphylococcus aureus* (17.39%), *Salmonella typhi* (16.30%), *Escherichia coli* (14.13%), *Enterobacter aerogenes* (11.95%), *Shigella flexneri* (8.69%) and *Proteus vulgaris* (7.6%).

**Key words:** Milk product, pedha, *E. coli*, *Pseudomonas* sp., bacterial contaminations

### Introduction

Access to good quality, safe and nutritious food is considered a basic right of the people. Consumption of unsafe, contaminated food leads to food-borne diseases, which cause considerable morbidity and mortality. In India the diseases transmitted by food are commonly referred to as food poisoning and are characterized by abrupt onset of gastrointestinal disturbances viz., abdominal pain, vomiting and diarrhoea. The foods most commonly involved in food-borne disease are meat and meat products, poultry, eggs, milk and milk products, sweetmeats and rice preparations (Tambekar and Bhutada, 2004). The milk products like pedha sometimes, are responsible for the outbreak of enteritis and food poisoning. The unsanitary condition during production, storage and handling of milk product are the main causes of food born diseases (Kamat and Sulebele, 1974). Naidu and Ranganathan (1965) studied the keeping quality of khoa by storing it at the room temperature and observed yeast and mould increases with the time. Sharma *et al.* (1972) examined 220 samples of khoa and recorded SPC more than 10 million per g. Singh *et al.* (1975) conducted survey on the microbiological quality of burfi and pedha in Allahabad and observed SPC of burfi as  $2.1 \times 10^5$  and pedha as  $4.5 \times 10^6$  (Ghodekar *et al.*, 1980) recorded the presence of species of *Penicillium*, *Aspergillus*, *Geotrichum*, *Mucor*, *Syncephalastrum*, *Fusarium*, *Rhizopus* and *Cladosporium* in khoa, burfi and pedha.

Jatkar *et al.* (1982) studied on microbiological quality of market milk sweets in twin cities of Hyderabad and Secunderabad and observed 90% of pedha, 75% of kalakand and 100% of rasagollas were microbial contaminated with yeast and molds. Varadaraj and Nambudripad (1983) studied on microbiological quality of market khoa samples. Garg and Mandokhot (1984) observed that pedha in general had more bacterial contamination than burfi and reported enterotoxigenic *Staphylococcus aureus* in pedha. Patel (1984) had reported pedha and burfi contaminated with *Escherichia coli*, *Salmonella schottmuelleri*, *Shigella flexneri*, *hemolytic streptococci* and *Pseudomonas aeruginosa*. Mandokhot

and Garg (1986) reviewed microbial quality of market khoa, burfi and pedha and reported the microbiological counts in the products exceeding the limits prescribed by ISI. Kakar and Udipi (1997) studied microbiological quality of khoa and selected milk sweets collected from railway stalls, small shops and streets of Bombay and showed presence of *Salmonella enteritis* in pedha sample and *Salmonella newport* in burfi, pedha and khoa.

Thus the consumption of contaminated pedha may causes typhoid, salmonellosis, dysentery, food poisoning, cholera, alfatoxicosis, mycotoxicosis, gas gangrene, diarrhea, tuberculosis, diphtheria, Q fever etc. Therefore the aim of this project was to evaluate the microbial quality of pedha and to produce awareness of health hazards due to its consumption to the consumers. Hence, a sanitary survey with special references to bacteria of public health significance was undertaken to determine the coliforms and food poisoning bacterial species presents in pedha sold in Amravati city.

## **Materials and Methods**

### *Collection of Pedha Samples*

Fifty pedha samples were randomly collected aseptically in sterile container, for bacteriological examination from various places in Amravati city and brought to the laboratory and processed within an hour of collection.

### *Preparation of Dilution*

Twenty-five grams of each pedha samples were mixed in a 225 mL of sterile phosphate buffer (pH 7) and prepared final 1:100 dilution.

### *Isolation of Bacteria from Pedha Samples*

Bacterial isolation was done by pour plate method on Mac-Conkey agar. 0.1 mL of each dilution was inoculated on Mac-Conkey agar medium and plates were incubated at 37°C for 24 h for isolation of bacterial pathogens. The plates were examined for colony characters. The isolated colonies were subcultured and maintained on nutrient agar. From these 50 pedha samples, 92 bacterial pathogens were isolated and identified on the basis of morphological, cultural and biochemical tests, such as, sugar fermentation reaction. Enzyme productions, Indole, Methyl-red, Voges Proskauer, Citrate utilization and Triple Sugar Iron agar tests etc.

## **Results and Discussion**

Milk and milk products have high nutritive value but they are less perennial because different types of microorganisms are often present it due to unhygienic condition. The unsanitary conditions followed by the halwais in preparation, processing, packaging and storage of sweetmeats are often so poor that the products on reaching the consumers have an unbelievable microbial load, which may includes the different strains of pathogens that causes the serious health hazards (Dwarkanath and Srikanta, 1978).

Total 50 pedha samples were randomly collected from various shops of Amravati city and analyzed for bacteriological quality. The 92 bacterial strains of *Escherichia coli*, *Enterobacter aerogenes*, *Salmonella typhi*, *Shigella flexeneri*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Proteus vulgaris* were isolated and identified on the basis of morphological, cultural and biochemical tests from these 50 pedha samples. Among them *Pseudomonas aeruginosa* were

Table 1: Identified pathogens from pedha from different locality

Area	No. of samples							
	examined	<i>E. coli</i>	<i>E. aerogenes</i>	<i>P. aeruginosa</i>	<i>P. vulgaris</i>	<i>S. typhi</i>	<i>S. flexeneri</i>	<i>S. aureus</i>
Ambadevi road	6	1	4	5	--	1	1	2
Bhaji bazar	2	1	1	1	--	--	--	--
Bus stand road	1	1	--	--	--	--	1	--
Camp road	3	--	--	1	2	1	1	--
Chitra chowk	6	--	--	2	1	4	--	1
Ervin	2	1	--	--	--	--	1	1
Itwara	3	--	1	3	--	1	1	1
Jaisthamb sq.	4	2	--	2	--	1	1	1
Jawahar gate	8	2	2	3	1	5	1	3
Panchawati sq.	2	1	--	--	2	--	1	1
Pannalal Nagar	8	2	2	2	1	1	--	4
Raj kamal sq.	3	2	--	2	1	--	--	1
VMV Road	2	--	1	2	--	--	--	--
Total	50	13	11	22	7	15	8	16
	%	14.13	11.95	23.19	7.6	16.3	8.69	17.39

predominant (23.91%) *Staphylococcus aureus*, (17.39%) *Salmonella typhi* (16.30%), *Escherichia coli* (14.13%), *Enterobacter aerogenes* (11.95%), *Shigella flexeneri* (8.69%), *Proteus vulgaris* (7.6%) (Table 1).

Highest prevalence of *Pseudomonas aeruginosa* indicated aerial contamination often enters into the food through hands, utensils and equipment and play an important role in food poisoning (Godbole and Wable, 1981). *Staphylococcus aureus* might have gained access to pedha through the poor hygienic conditions during its manufacture and handling. Since *Staphylococci* are known to be associated with hands, nails and skin in human beings. *Escherichia coli*, *Salmonella typhi* and *Shigella flexeneri* in the pedha indicates faecal contamination, enter into the food during, production, processing, preparation, handling and storage of these foods and causes food poisoning serious health hazards. *Proteus* sp. also might enter the sweetmeats through similar means. *Enterobacter aerogenes* are present in sewage, feces, soil and water and commonly enter in pedha through unhygienic practices (Soomro, *et al.* 2002).

The dirty hands of worker, poor quality of milk, unhygienic conditions of manufacture unit, inferior quality of material used and water supplied for washing the utensils could be the source of the bacterial contamination of milk products (Tambekar, D.H. *et al.*, 2004.). The rapid growth of pathogens in pedha has been observed with serious concern as consumption of such pedha results in public health hazards. It is therefore essential for the public health authorities to take necessary steps in strictly enforcing the hygienic concept, which is lacking, so as to avoid pathogenic contamination at various stages of processing, storage, handling and transportation of pedha. The present study suggests the need for more strict preventive and control measures used to avoid pre and post process contamination in milk food products.

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