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Studies on microbiological quality of milk and milk products sold in Allahabad city

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Abstract

Milk is men's indispensable food from infancy to old age. Microorganisms play a great role in spoilage of milk and milk products, being a perishable commodity. Pasteurization of milk is used since early 1900s. Milk products like Khoa and Paneer are manufactured to a large extent from milk. The investigation was undertaken to find out Micro flora in milk and milk products in 5 areas of Allahabad city (CHOWK, PHAPHAMAU, NAINI, JHUNSI and DHUMANGUNJ). The samples were tested for three Microbial Attributes, viz., Standard plate count, coliform count, and yeast and mould count. The area of CHOWK (T_1) was found best among all the samples in view of all 3 parameters (SPC, Coliform, yeast and mould).

Keywords: Milk, Khoa and Paneer

Introduction

Milk

Milk may be defined as the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy milch animals, excluding that obtained within 15 days before or 5 days after calving or such periods as may be necessary to render the milk practically colostrums free, and containing the minimum prescribed percentages of milk-fat and milk solids-not-fat. In India, the term "milk" when unqualified, refers to cow or buffalo milk, or combination of two. De Sukumar (1991).

Standard according to Food Safety Standards Authority of India (FSSAI) Act 2006, Rule 2011.

- 1) Standard plate count/ml- for
 - a) Raw milk is less than 2,00,000/ml
 - b) Pasteurized milk-30000-50000/ml.
- 2) Coliform count-less than 10/ml.
- 3) Yeast and moulds.-Absent in 1gm.

Government regulations require that dye test run to ensure that pasteurization is properly done and these tests alone should not be used in grading of milk. Inadequately pasteurized milk may contain microorganisms of special importance to man which its presence or absence in milk products may reflect success or failure of good manufacturing practice (GMP) or cause infection when consumed together with food. This is of economic Health complication associated with consumption of inadequately pasteurized milk products include serious infections that are hard to treat with antibiotics. This becomes clinically significant if organisms isolated from an assessed sample resistant to the infected host while providing no alternative drug. (Murphy .2002)

Khoa

Khoa by whatever variety of names it is sold such as Pindi, Danedar, Dhap, Mawa or kava means the product obtained from cow or buffalo or goat or sheep milk or milk solids or combination thereof by rapid drying. The milk fountain at content shall not be less than 30 percent on dry weight basis of finished product. It may contain citric acid not more than 0.1 percent by weight. It Sample be free from added starch, added coloring matter Food Safety & Standards Authority of India Act 2006, rule 2011.

Standards According to FSSAI Act (2006).

1. Standard plate count-50,000-1, 00,000/gm.
2. Coliform count –less than 90/gm.
3. Yeast and moulds-less than 100/gm.

In Indian Villages due to lack of Transportation and storage facilities it becomes necessary for milk producers to preserve whole milk by means of converting their surplus milk into products like khoa and ghee. Which can be stored at atmospheric temperatures can easily be transported to nearby markets.

The relationship of the microbiological quality of milk with that of khoa made from the same milk is negligible, because the drastic heat applied during preparation of khoa kills almost all the microorganisms present in milk. The microbial defects which develop are the result of post preparation contamination of the product from the air. Under practical conditions where contamination from external sources are unavoidable, the product may deteriorate with development of acidity, proteolysis etc. After prolonged storage in ordinary wraps, the product develops a sour flavor and moldiness. Srinivasan and Anantakrishnan (1964)

Paneer

Panner is been defined as a product obtained from cow or buffalo milk or combinations thereof by precipitation with sour milk, lactic acid or citric acid. It shall not contain more than 70 per cent moisture and milk fat content shall not be less than 50 per cent of the dry matter. The milk fat content of skim milk panner shall not exceed 13 per cent of dry matter. Dharmpal and Gupta (1985)

Panner is popular traditional heat and acid coagulated dairy product. It is mainly used as a base material for the preparation of large number of culinary dishes in almost all parts of the country. About 45-50 per cent of total milk produced is converted into variety of traditional milk products by heat and acid coagulation, heat desiccation and fermentation. Indian traditional products market is estimated to be more than Rs. 6,50crores. (Patil, 2004).

Standards According to FSSAI Act (2006) Rule 2011.

1. Standard plate count-3-5 lakh/gm.
2. Coliform-less than 90/gm.
3. Yeast and moulds-less than 250/gm.

As the traditional dairy product preparation is labour intensive and the qualities of finished products are highly variable in terms of physical, chemical, microbiological and sensoric properties, there is an urgent need to produce uniform and high quality products through modernization.

Objectives

- To collect the Milk and Milk products (khoa, Paneer) from different area of Allahabad city (Chowk, Naini, Phaphamau, Jhansi, Dhumanganj).
- To compare the result with the prescribed standard of FSSAI to evaluate the present state of the quality of the Dairy products in the Allahabad city.
- To draw the conclusion on hygienic condition of Dairy products sold in Allahabad city.

Material and Methods

The experiment "Studies on Microbiological quality of Milk and milk-products sold in Allahabad city." Was conducted in student Research laboratory, warner School of Food and Dairy Technology, SHIATS, Allahabad (U.P.)

Standard Plate Count (SPC) was determined by adopting standard procedure using Standard Plate Count Agar (SPCA) media as mentioned by Amin (1997). Yeast and Mould Count (YMC) was determined as per procedure described in IS: 5403 (1969) using Potato Dextrose Agar (PDA). Coliform count of Milk and Milk products was determined as per procedure described in IS: 5550 (1970) using McConkey's agar. Different media like SPCA, PDA, MA, were prepared as per the procedures explained by Amin (1997).

The data thus obtained were subjected to statistical analysis.

Number of samples- 5

Number of Replications -3

Total number of samples-15

Results and Discussion

The present investigation "Studies on microbiological quality of milk and milk products sold in Allahabad city" Was planned and carried out in Warner School of Food and Dairy Technology, SHIATS Allahabad (U.P.)

Average data of Microbiological quality of milk and milk products sold in Allahabad city are given below

Parameters	Values based on mean values of different parameters of treatments.					S.E.D.	Result	C.D. Value
	T₁	T₂	T₃	T₄	T₅			
Milk-Standard plate count (cfu 10 ³)	14.00	22.33	28.67	29.67	31.33	1.220	S	2.562
Milk-coliform count.	NIL	NIL	NIL	NIL	11.67	0.55	S	1.171
Milka-Yeast and moulds count.	NIL	NIL	NIL	NIL	NIL	NIL	NS	0
Khoa- Standard plate count (cfu 10 ³)	44.67	48.33	52.33	68.33	56.33	1.606	S	3.372
Khoa-coliform count.	Nil	Nil	Nil	16.67	11.33	1.006	S	2.112
Khoa- Yeast and moulds count.	21	28.33	22.33	29.33	27.00	2.852	NS	-
Panner- Standard plate count (cfu 10 ³)	65.33	67.67	45.33	86.67	82.67	2.129	S	4.471
Panner-Coliform count.	3.00	4.67	6.00	14.67	11.67	0.966	S	2.029
Panner-Yeast and moulds count.	14.67	15.67	21.33	34.33	26.33	1.438	S	3.019

The different parameters of experimental microbiological quality of Milk and milk products sold in Allahabad city

Milk: The lowest mean of Standard plate count was recorded in Naini (T₂) and highest count was in Dhumanganj (T₅). The increasing trend of Standard plate count in Milk samples might be due to Processing, handling during pasteurization. The standard plate count in all the Milk-samples found to be

less than The Standard given by FSSAI (2006) rules 2011 is 30000-50000/ml. shows that milk was properly pasteurized. Five samples were tested for coliform-test in which four samples were found to be Nil and 5th (Dhumanganj) samples was found to be positive for coliform test, was found is greater than criteria which should be less than 100/gm. Indicates fecal contamination in product might be due to Poor handling.

All five samples were completely free from yeast and mould. It is evident from the table that Yeast and mould count in experimental samples were 100% negative

Khoa: The lowest mean Standard plate count was recorded in T₁ (Chowk). found less than criteria given by FSSAI, 2011. Indicates that product during manufacturing, processing, storage was handled properly and hygiene measures were taken. The standard given by FSSAI (for standard plate count of Khoa is 50,000-1, 00,000/gm. The samples T₁ (chowk), T₂ (naini), T₃ (Phaphamau) were found nil and T₅ (Dhumangunj) samples lowest mean of coliform count was recorded. It indicates that 5th was positive for coliform in Khoa. Were more than standard given by FSSAI (2011). Indicates that both samples would have been contaminated after manufacturing like temperature, cleanliness of placed where it was kept. The lowest mean Standard plate count was recorded in T₁ (Chowk). value of total count found more than standard. Indicates that improper processing, and storage.

Paneeer: The lowest count was recorded in T₃ (Phaphamau), found which is less than standard and highest T₄ (Jhunshi) Indicates that product had attained proper temperature during pasteurization. The lowest count mean was recorded in T₁ (Chowk) value is more than standard and T₄ (Jhunshi). It might be due to mishandling in manufacturing or contamination with products. The lowest mean Standard plate count was recorded in T₁ (Chowk) and T₄ (Jhunshi) was highest. Indicates good handling, proper temperature, during storage.

Conclusion

In view of experimental results obtained during the present investigation, it may be concluded that the samples of treatment in accordance of Milk -standard plate count (SPC), Chowk has been best in view of coliform count , Chowk was best in view of yeast & mould all samples were completely Nil. For Khoa-SPC Chowk was reported to lowest count. In Khoa-coliform, first three areas viz. Chowk, Phaphamau, Naini were samples were completely negative, and T₄(Jhunsi) and T₅(Dhumanganj) found to be positive for coliform test. T₅ (Dhumanganj being lowest count). Khoa-Yeast & mould Chowk had lowest count. In Paneeer-SPC, Phaphamau had lowest count, for-coliform Chowk had lowest count and in Yeast and mould Chowk had lowest count. A further investigation on studies on Microbiological Quality of milk and milk products from other markets with specific reference to the number and type of Micro-flora and presence of Bacteria would be of real practical significance.

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