

# A Research Article on Evaluation of Microbial Profile in Milk & Some Dairy Products

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**Abstract**—Owing to their, nutrient composition, dairy products ensure a favourable environment for different microorganisms. In our study we investigated the microbiological quality of different commercially available dairy products obtained from local stores and the open-air public market. Milk is a highly nutritious food and it is important to be free of any pathogenic microbes and that could be transmitted to humans and affect public health. A total of 20 milk samples were collected from humans and local stores samples were evaluated for the presence of pseudomonas, E-coli, salmonella species. Streptococcus aureus, Bacillus cereus and clostridium perfringens, yeast and microscopic fungi. Contamination level of evaluated dairy products varied widely. Among samples milk were the most contaminated while low microbiological load was detected in the other samples.

**Index Terms**—Dairy products, microbiological load, pathogenic bacteria. Based on our results it can be concluded that the microbiological quality of the most studied is satisfactory, but there are samples with marginal characteristics.

## I. INTRODUCTION

Dairy products are an important part of the food pyramid and can provide many health benefits to humans.

Food and Agriculture organisation of the united nation declares that the per consumption of dairy products are 30 to 100 kg. In addition, dairy products considered as one of the most important environments of the growth of the various pathogens. Hence dairy products are essential food for the humans that need to control the growth of bacterial pathogens.

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humans that needs to control the growth of bacterial pathogens. Good quality of raw milk health will be beneficial for public health, and lack of milk health will affect the health will affect the health and society as well as economy of the community. Therefore, to identify the source behind the pollution of dairy products is necessary.

Hence, considering importance of milk health, research for the identification of cheese, milk, kalakand, curd and ghee in kesanupalli.

Microbial analysis of dairy products is carried out to determine the degree and type of bacterial contamination on milk and milk products and to estimate the physical and chemical change brought in milk products as a result of microbial growth. The information obtained by microbiological analysis can be employed of a number of purposes such as

- Market milk control and grading
- Improvement of milk production environment and practices

- ✓ Screening of milk supplies to assess their suitability for processing or manufacturing of milk products

### Aim and Objectives

#### Aim

To evaluate the microbial profile in milk and some dairy products.

#### Need of study

Evaluating the microbial profile of milk and dairy products is essential for several reasons

- 1 . Ensuring public health and safety

- 2 . Quality control
- 3 Identification of contamination sources
- 4 Enhancing probiotic quality
- 5 Compliance with food safety standards.

- and dairy products using streak plate method
- ✓ To compare microbial loads among raw and processed samples
- ✓ To assess the hygienic quality of dairy samples
- ✓ To recommend measures for safety and quality control

Objective of study

- ✓ To isolate and identify microbial species from milk

## II. LITERATURE REVIEW

Study/author	Product	Microbes reported	Key finding
Jay [2000]	Milk	E-coli, s.aureus	Raw milks prone to contamination
Singh et al [2014]	Curd	Coliforms, yeasts	Higher counts
ICMSR [2005]	Cheese	Listeria monocytogens	Risk in un pasteurized products
Reddy et.al [2018]	Ghee	Bacillus	Low contamination
Mishra and Sharma 2017]	Kalakand	Moulds, yeast, coliforms	Unhygienic production leads to spoilage

## IV. PLAN OF WORK

Introduction

- To assess the microbial quality and safety of milk and dairy products
- To identify and compare microbial load in various samples using classical microbiological techniques.

Objectives

- ✓ To isolate and enumerate microorganisms from milk and dairy products.
- ✓ To identify bacterial colonies using morphological and biochemical characteristics.
- ✓ To compare microbial loads among different dairy products.

## V. METHODOLOGY

Preparation of Nutrient agar

Composition	1000ml	500ml	250ml
Beef extract	2gm	1gm	2.5gm
Peptone	5gm	2.5gm	2gm
Sodium chloride	5gm	2.5gm	2gm
Agar –Agar	1.5mg	7.5gm	6.5gm

Preparation [for 250ml]

0.5gm of beef extract + 2gm peptone +2gm nacl  
+6.5gm agar agar

↓

Makeup to 250ml with distilled water

↓

Autoclave

↓

Media transfer for in to laminar air flow chamber

↓

Sanity [get likes]

↓

The stock solution was poured into media by using streak plate method

↓

Incubate into 48 hours

↓ after 48hours

Bacterial population is grown

↓

Observe under microscope

5.1 Observation

- ✓ Gram positive  purple
- ✓ Gram negative  pink/red

Shape-

Coccid [spherical], bacilli [rods], and spiral [spiral]

VI. RESULTS AND DISCUSSION

6.1 results [observed microbial growth on nutrient agar]

s.no	Type of product	Microbial reported	Percentage of microbial growth	Gram staining results
1	Milk[20samples]	Bacillus staphylococcus	50% 20%	Gram positive
2	Curd[20samples]	Bacillus staphylococcus	30% 10%	Gram positive
3	Ghee[20samples]	Bacillus staphylococcus	40% 10%	Gram positive
4	Cheese	Bacillus staphylococcus	25% 5%	Gram positive
5	kalakand	Bacillus	60%	Gram positive

6.2 DISCUSSION

Raw milk

- ✓ Exhibited highest microbial load due to absence of heat treatment
- ✓ Presence of gram positive like lactic acid bacillus, staphylococcus auras

Curd

- ✓ Microbial count due to natural fermentation by lactic acid bacteria
- ✓ Most isolates were gram positive cocci [lactobacillus and staphylococcus] which are beneficial probiotics

Cheese

- ✓ Moderate count, the fermentation and silt content in cheese limits pathogen growth
- ✓ Mix population found, possibly from

- ✓ Evaluation of microbial profile in milk

environmental contamination during storage  
Ghee

- ✓ No microbial growth observes, confirming that heating during ghee preparation but while packing it is contaminated with lactic acid bacillus and staphylococcus auras.

Kalakand

- ✓ Exhibited high microbial growth noted, suggesting contamination may occur post preparation due to handling or storage
- ✓ Proper refrigeration and hygiene clone's preparations are critical.

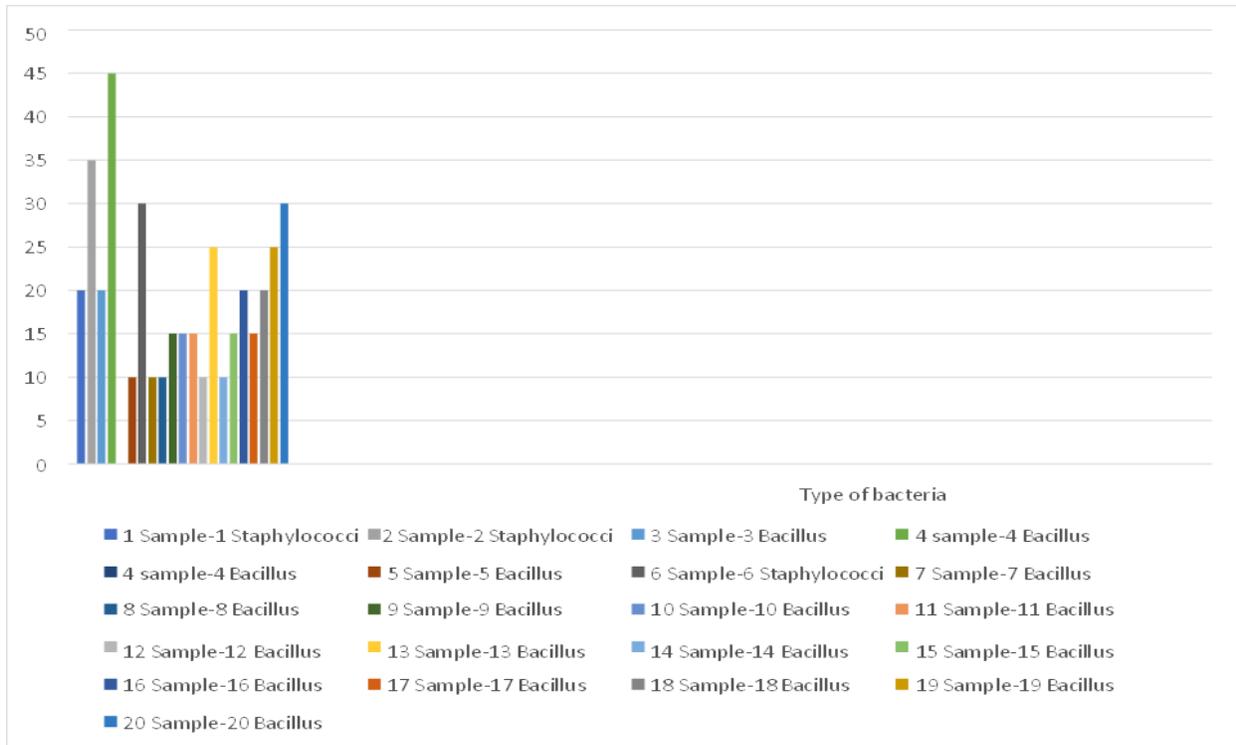
Statistical analyses

- ✓ Analyze microbial load per sample type
- ✓ Compare between samples using XL
- ✓ Graphs or charts can be drawn to show microbial profile differences

S.NO	Sample Number	Type of microbial growth	Number percentage of colony's	Type of bacteria
1	Sample-1	Staphylococci	25%	Positive
2	Sample -2	Staphylococci	35%	Positive
3	Sample-3	Staphylococci	40%	Positive
4	Sample-4	Staphylococci	45%	Positive
5	Sample-5	Staphylococci	35%	Positive
6	Sample-6	Staphylococci	10%	Positive
7	Sample-7	Bacillus	5%	Positive
8	Sample-8	Bacillus	15%	Positive

9	Sample-9	Staphylococci	15%	Positive
10	Sample-10	Bacillus	5%	Positive
11	Sample-11	Staphylococci	5%	Positive
12	Sample-12	Bacillus	5%	Positive
13	Sample-13	Staphylococci	10%	Positive
14	Sample-14	Bacillus	10%	Positive
15	Sample-15	Bacillus	5%	Positive
16	Sample-16	Bacillus	15%	Positive
17	Sample-17	Staphylococci	15%	Positive
18	Sample-18	Staphylococci	10%	Positive
19	Sample-19	Staphylococci	10%	Positive
20	Sample-20	Staphylococci	10%	Positive

✓ Milk

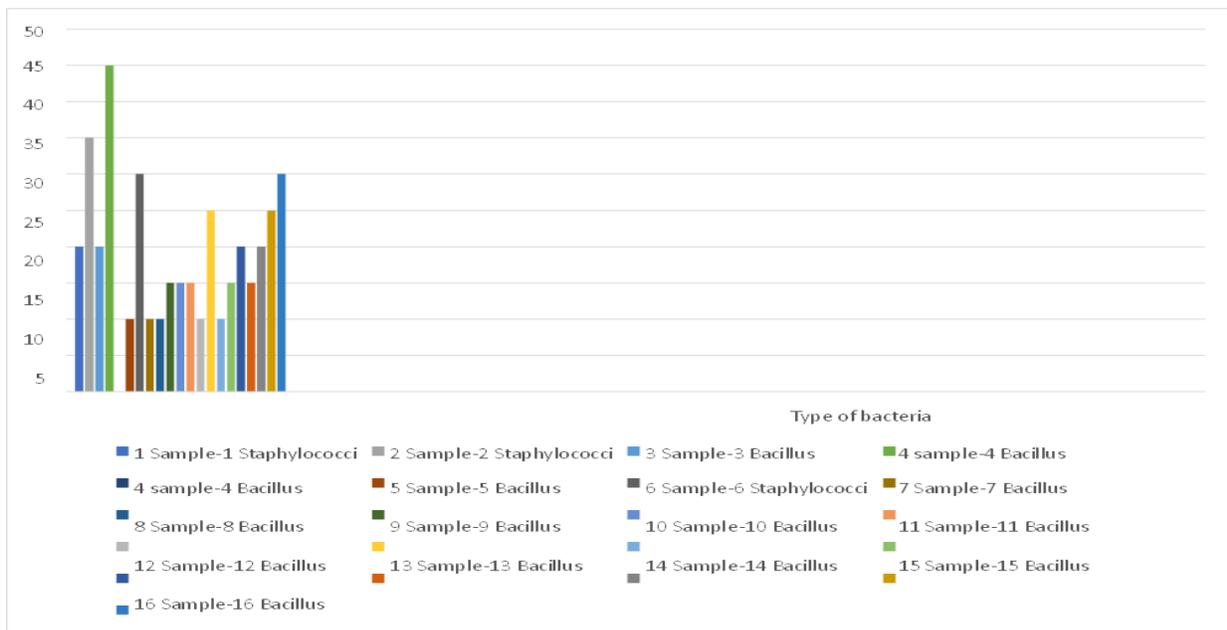


EVALUATION OF MICROBIAL PROFILE IN CURD

S. NO	Sample number	Type of microbial growth	Number percentage of colony's	Type of bacteria
1	Sample-1	Staphylococci	20%	Positive
2	Sample-2	Staphylococci	35%	Positive
3	Sample-3	Staphylococci	20%	Positive
4	Sample-4	Staphylococci	45%	Positive
5	Sample-5	Staphylococci	10%	Positive
6	Sample-6	Staphylococci	30%	Positive
7	Sample-7	Bacillus	10%	Positive
8	Sample-8	Bacillus	10%	Positive

9	Sample-9	Staphylococci	15%	Positive
10	Sample-10	Bacillus	15%	Positive
11	Sample-11	Staphylococci	15%	Positive
12	Sample-12	Bacillus	10%	Positive
13	Sample-13	Staphylococci	25%	Positive
14	Sample-14	Bacillus	10%	Positive
15	Sample-15	Bacillus	15%	Positive
16	Sample-16	Bacillus	20%	Positive
17	Sample-17	Staphylococci	15%	Positive
18	Sample-18	Staphylococci	20%	Positive
19	Sample-9	Staphylococci	25%	Positive
20	Sample-20	Staphylococci	30%	Positive

CURD

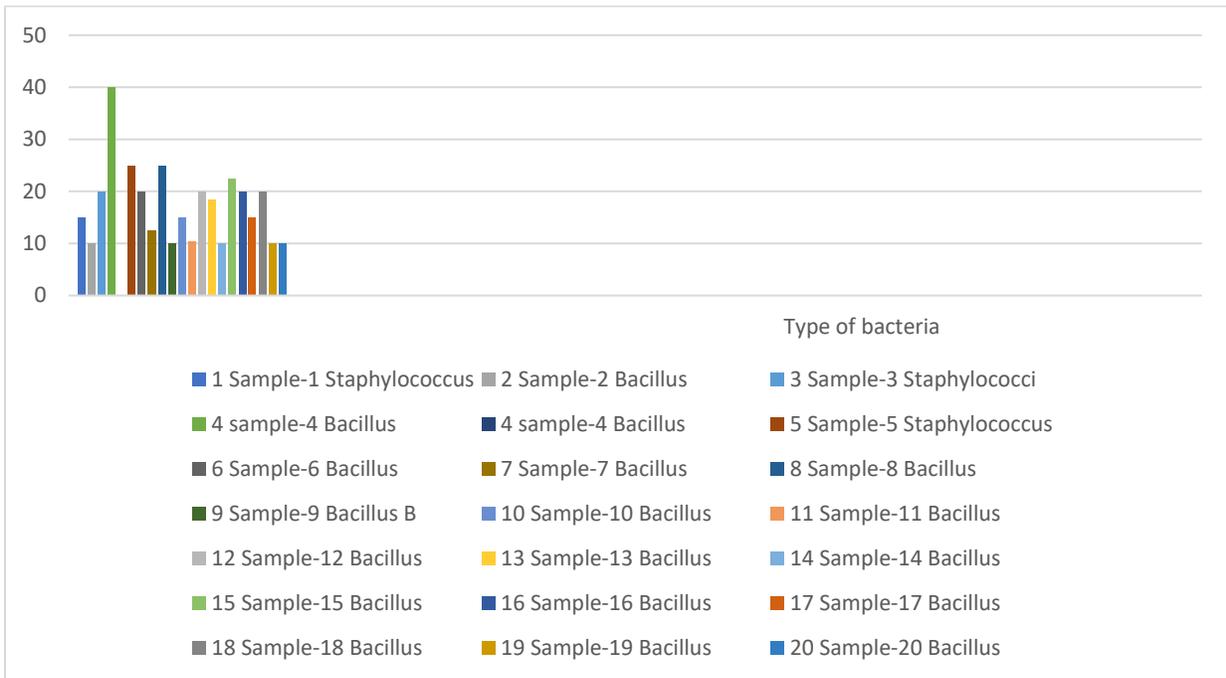


Evaluation of microbial profile in ghee

s.no	Sample number	Type of microbial growth	Number percentage of colony's	Type of bacteria
1	Sample-1	Staphylococcus	15%	Positive
2	Sample-2	Bacillus	10%	Positive
3	Sample-3	Staphylococci	20%	Positive
4	Sample-4	Bacillus	40%	Positive
5	Sample-5	Staphylococcus	25%	Positive
6	Sample-6	Bacillus	20%	Positive
7	Sample-7	Bacillus	13%	Positive
8	Sample-8	Bacillus	25%	Positive
9	Sample-9	Bacillus B	10%	Positive
10	Sample-10	Bacillus	15%	Positive
11	Sample-11	Bacillus	11%	Positive

12	Sample-12	Bacillus	20%	Positive
13	Sample-13	Bacillus	18%	Positive
14	Sample-14	Bacillus	10%	Positive
15	Sample-15	Bacillus	22%	Positive
16	Sample-16	Bacillus	20%	Positive
17	Sample-17	Bacillus	15%	Positive
18	Sample-18	Bacillus	20%	Positive
19	Sample-19	Bacillus	10%	Positive
20	Sample-20	Bacillus	10%	Positive

GHEE:

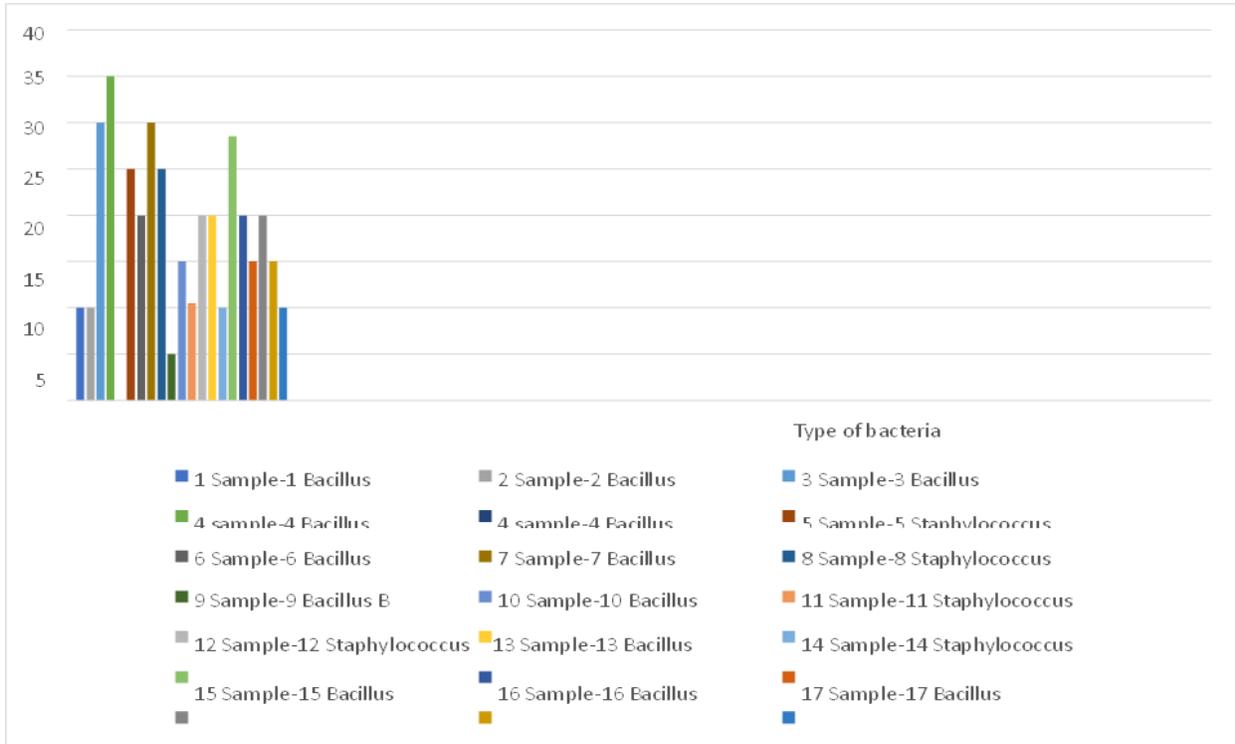


Evaluation of microbial profile in cheese

S.NO	Sample number	Type of microbial growth	Number percentage of colony's	ype of bacteria
1	Sample-1	Bacillus	10%	Positive
2	Sample-2	Bacillus	10%	Positive
3	Sample-3	Bacillus	30%	Positive
4	Sample-4	Bacillus	35%	Positive
5	Sample-5	Staphylococcus	25%	Positive
6	Sample-6	Bacillus	20%	Positive
7	Sample-7	Bacillus	30%	Positive
8	Sample-8	Staphylococcus	25%	Positive
9	Sample-9	Bacillus b	5%	Positive
10	Sample-10	Bacillus	15%	Positive
11	Sample-11	Staphylococcus	11 %	Positive
12	Sample-12	Staphylococcus	20%	Positive
13	Sample-13	Bacillus	20%	Positive

14	Sample-14	Staphylococcus	10%	Positive
15	Sample-15	Bacillus	28%	Positive
16	Sample-16	Bacillus	20%	Positive
17	Sample-17	Bacillus	15%	Positive
18	Sample-18	Staphylococcus	20%	Positive
19	Sample-19	Bacillus	15%	Positive
20	Sample-20	Bacillus	10%	Positive

CHEESE

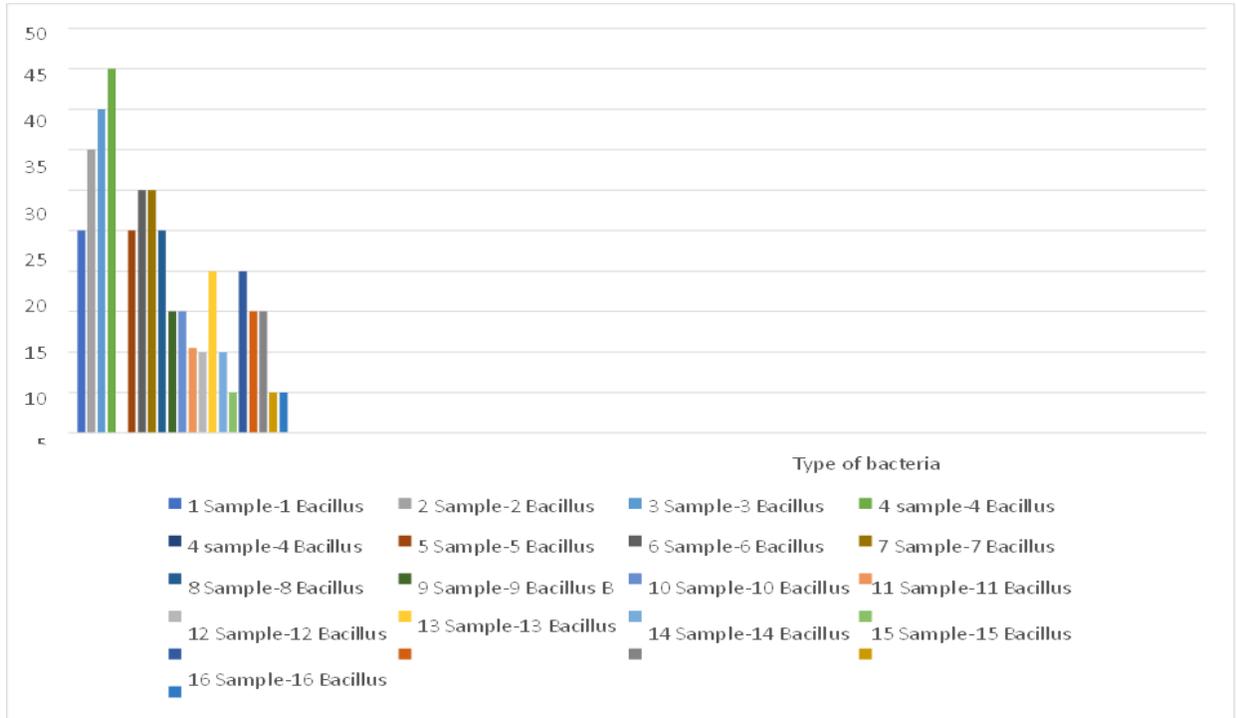


EVALUATION OF MICROBIAL PROFILE IN KALAKAND

s.no	Sample number	Type of microbial growth	Number percentage of colony's	Type of bacteria
1	Sample-1	Bacillus	25%	Positive
2	Sample-2	Bacillus	35%	Positive
3	Sample-3	Bacillus	40%	Positive
4	Sample-4	Bacillus	45%	Positive
5	Sample-5	Bacillus	25%	Positive
6	Sample-6	Bacillus	30%	Positive
7	Sample-7	Bacillus	30%	Positive
8	Sample-8	Bacillus	25%	Positive
9	Sample-9	Bacillus b	15%	Positive
10	Sample-10	Bacillus	15%	Positive
11	Sample-11	Bacillus	11%	Positive
12	Sample-12	Bacillus	10%	Positive
13	Sample-13	Bacillus	20%	Positive

14	Sample-14	Bacillus	10%	Positive
15	Sample-15	Bacillus	5%	Positive
16	Sample-16	Bacillus	20%	Positive
17	Sample-17	Bacillus	15%	Positive
18	Sample-18	Bacillus	15%	Positive
19	Sample-19	Bacillus	5%	Positive
20	Sample-20	Bacillus	5%	Positive

kalakand:



VII. CONCLUSION

The study highlights the importance of hygienic processing, proper storage and quality control in ensuring the safety of dairy products regular microbial evaluation is essential to minimize the risk of food borne illness and to extend the shelf-life adaption of good manufacturing practices [GMP] and consumer awareness can greatly contribute to improving dairy product quality.

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