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Antibacterial Effects in Food-Borne and Human Pathogens

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Abstract: *This study was undertaken to assess the antibacterial efficacy of lactobacilli isolated from curd and human milk samples. These strains belonged to five species, Lactobacillus casei, L. delbrueckii, L. fermentum, L. plantarum, and L. pentosus. Antibacterial activities of all the Lactobacillus isolates were estimated through standard agar-well diffusion assay, against commonly occurring food-borne and clinically important human pathogens. None of the lactobacilli exhibited inhibitory activity against three pathogens, namely Staphylococcus aureus, Escherichia coli, and Salmonella typhi. CFS of some of the curd isolates displayed antagonistic activity against Streptococcus mutans; however, human milk lactobacilli did not displayed any inhibitory activity against them.*

Keywords: *Lactobacillus,*

I. INTRODUCTION

Curd is made by the process of **curdling** in which the coagulation of milk is done. The coagulation can be done by using lemon or vinegar, and then allowing them to coagulate. Fermentation of curd involves the conversion of milk(lactose sugar) by *Lactobacillus* to produce lactic acid[1]. These bacteria denature milk protein(casein) so they clump or coagulate to form curd.

Lactic Acid Bacteria

At present, bacterial species from 12 genera are included in a group designated as lactic acid bacteria because of their ability to metabolize relatively large amounts of lactic acids from carbohydrates[2]. ¬ The genera include Lactococcus, Leuconostoc, Pediococcus, Streptococcus, Lactobacillus, Enterococcus, Aerococcus, Vagococcus, Tetragenococcus, Carnobacterium, Weissella, and Oenococcus. Many of the genera have been created recently from previously existing genera and include one or a few species.

Species from the first five genera, i.e., Lactococcus, Leuconostoc, Pediococcus, Streptococcus, and Lactobacillus, are used as starter cultures in food fermentation[3].

LACTOBACILLUS

The genus *Lactobacillus* include a heterogenous group of gram positive, nonmotile, nonsporulating, facultative anaerobes.

They are distributed widely and can be found in plants; vegetables; grains; seeds; raw/ processed milk & milk products; raw/ processed & fermented meat products; and fermented vegetables; some are found in the digestive tract of humans, animals, and birds. Few spp. are consumed live for their

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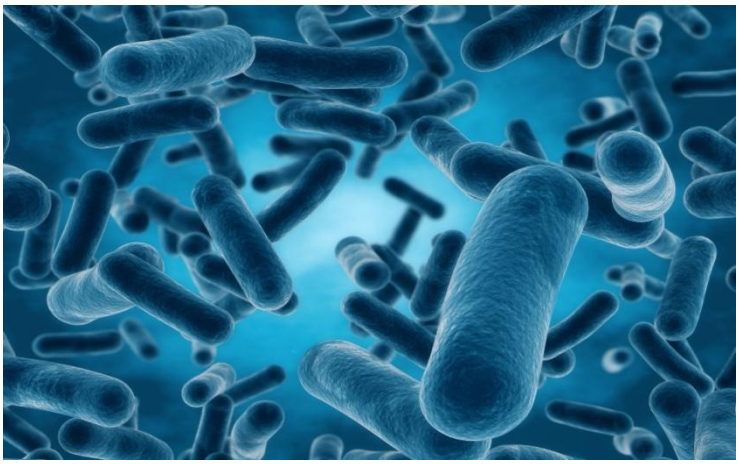
beneficial effect on intestinal health. Many have been associated with spoilage of foods[4]. ¬ Few species have been used in controlled fermentation (dairy, meat, vegetables, and cereal) some are known to be associated with natural fermentation of foods.

Lab. casei is used in some fermented dairy products. It ferments lactose and produces L(+)-lactic acid.



Lactobacillus under microscope

II. METHODOLOGY

2.1 Preparation of Samples

BACTERIAL STRAINS-

Lactobacillus isolates of curd and were taken as subjects for this study. Curd samples were collected from households of Mumbai, India and also the branded curd samples were taken(Amul and Govind). All the samples were collected in sterile containers and stored on ice until delivery to the laboratory. Three strains of pathogenic bacteria viz. *Staphylococcus aureus, Salmonella typhi* and *Escherichia coli* was taken from the culture collection centre. The pathogens were maintained and the culture suspension was made and then propagated on the plates under aseptic conditions.

ISOLATION OF BACTERIA

E. coli was spread on the MacConkey's agar plate, *S. typhi* was spread on the Salmonella shigella agar plate and *S. aureus* was spread on the Nutrient agar plate.

The plates were kept for incubation at 37 degree Celsius for 30minutes and further process was done.

SAMPLE LOADING

ANTIBACTERIAL ACTIVITY OF CURD-

The antibacterial property of *Lactobacillus* from curd isolates was done by using **agar well diffusion** method. The well was made using the cork borer and hence this method is also called the **cork borer method.** In the wells, the uncoagulated and liquified curd samples were filled using a micropipette. The plates were kept for incubation at 37 degree Celsius for 24 hours. The

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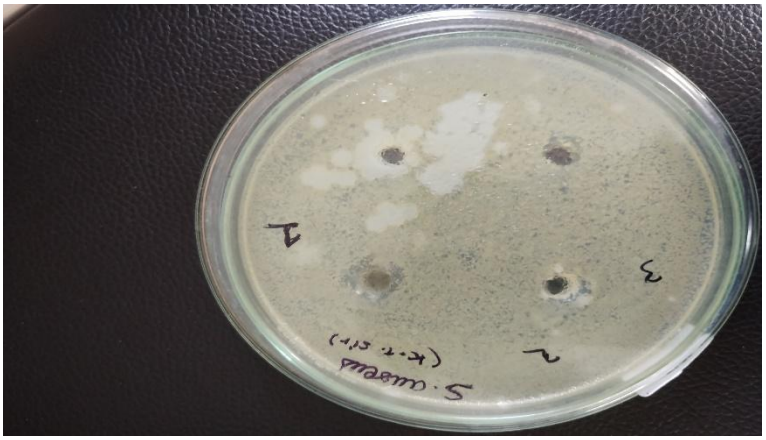
antibacterial activity was checked by the formation of zone of inhibition surrounding the well, was recorded using zone scale.

D)OBSERVING GROWTH:

E. coli growth on MacConkey's agar



S. aureus growth on nutrient agar

S. typhi growth on ss agar

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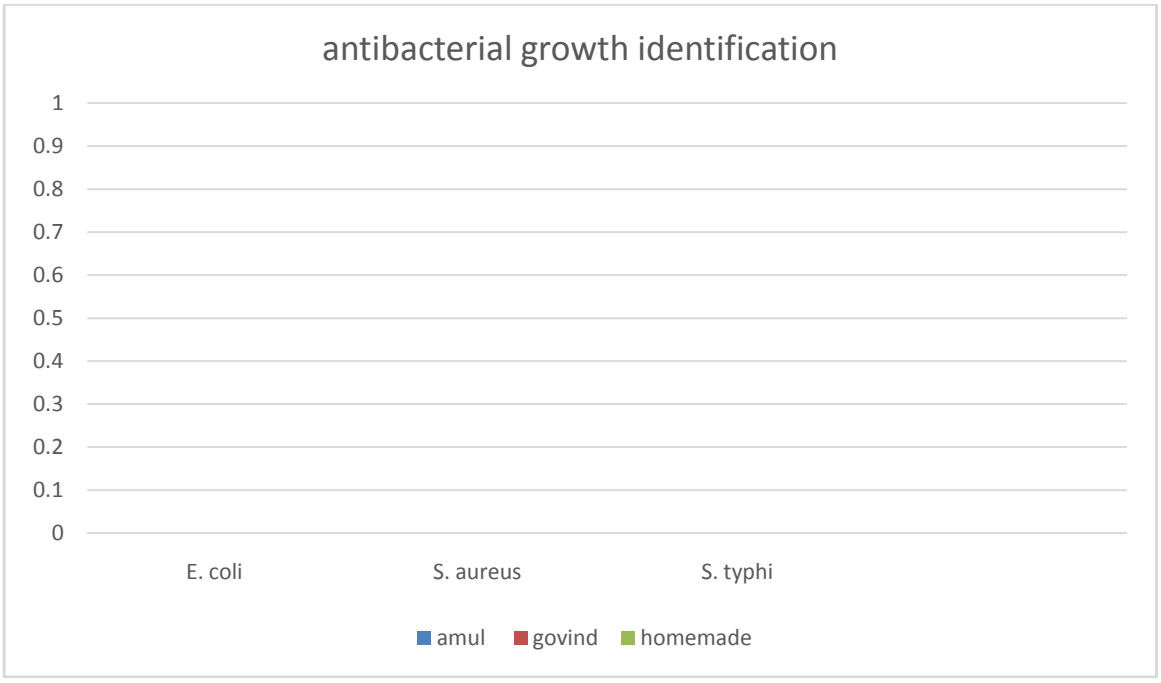
Observation Table

Bacteria	Sample	Inhibitory zone diameter (in mm)
	Amul curd	0 mm
Escherichia coli	Govind curd	0 mm
	Homemade curd	0 mm
	Amul curd	0 mm
S. aureus	Govind curd	0 mm
	Homemade curd	0 mm
Salmonella typhi	Amul curd	0 mm
	Govind curd Homemade curd	0 mm 0 mm

Graph:

Bar graph



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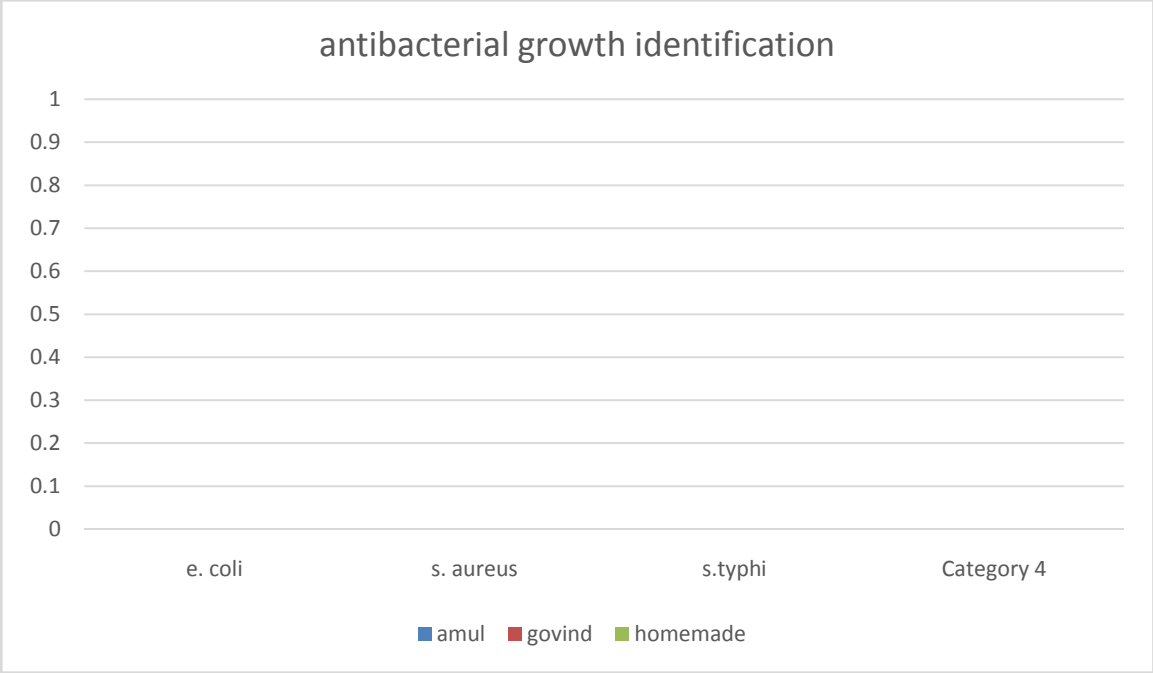

III. RESULT

Growth was observed on all of the Petri plates of the organisms *E. coli, S. aureus and Salmonella typhimurium.*

No zone of inhibition was observed in the plates of all the three pathogens loaded with curd samples. Hence, no antibacterial activity was shown by the lactobacillus on food borne pathogens.

It does not necessarily indicate that the pathogens are either utilising or degrading the *lactobacillus* of all the three curd samples(Amul, household and other).

The *E.coli*pathogenis normal microflora of the human intestine hence it indicates that the *lactobacillus* doesn't have the affect on the growth of *E.coli.* The other plates of *S.aureus*and *Salmonella typhimurium* is also not affected by the *lactobacillus* samples.

IV. CONCLUSION

After 24 hours of incubation, no zone of inhibition was found on each of the plates, hence it indicates that no antibacterial property was shown by the *lactobacillus* and also it does not affect the growth of the food-borne and human intestine pathogens.

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