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Isolation and identification of bacteria from commercial curd using gram staining

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Abstract

The study aimed to isolate and identify bacteria present in commercially available curd samples using the Gram staining technique. Fresh curd samples were collected from three different local dairy shops. A small quantity of curd was diluted with sterile water and smeared on glass slides for Gram staining. Microscopic examination revealed the predominance of Gram-positive bacilli arranged singly or in chains, characteristic of *Lactobacillus* species, along with occasional Gram-positive cocci. These findings confirm that curd is a rich source of probiotic bacteria which play a beneficial role in human gut health. This simple microbiological approach highlights the significance of traditional fermented foods in promoting intestinal microflora.

Keywords: Curd, gram staining, lactobacillus, probiotic bacteria, fermented food

Introductions

Fermented dairy products like curd (yogurt) are known for their nutritional and probiotic value. Curd contains beneficial bacteria that improve digestion, boost immunity, and maintain gut microbiota balance. The predominant bacteria in curd belong to the *Lactobacillus* and *Streptococcus* genera, which ferment lactose into lactic acid. The aim of the present study was to isolate and identify bacteria from commercial curd samples using a simple Gram staining technique and to observe their morphology under a microscope.

Materials and Methods

Sample Collection

Three curd samples were collected from different local markets in clean, sterile containers and labelled as Sample A, B, and C.

Preparation of Smear

A loopful of each curd sample was mixed with a drop of sterile distilled water on a clean glass slide to prepare a thin smear. The smears were air-dried and heat-fixed.

Gram Staining Procedure

1. Smears were flooded with crystal violet for 1 minute and rinsed.
2. Gram's iodine was applied for 1 minute and washed off.
3. Decolorized with alcohol for 15–20 seconds.
4. Counterstained with safranin for 30 seconds and gently washed.
5. Dried and observed under an oil immersion microscope (1000× magnification).

Microscopic Observation: The stained slides were examined for bacterial morphology (shape, arrangement, and Gram reaction).

Results

Microscopic examination revealed the presence of numerous Gram-positive bacilli appearing purple, arranged singly or in short chains, characteristic of *Lactobacillus* species. Occasional Gram-positive cocci were also observed, indicating possible *Streptococcus* species. No Gram-negative bacteria were detected, suggesting proper fermentation and low contamination.

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Discussion

The study confirmed the presence of beneficial lactic acid bacteria (*Lactobacillus*) in all commercial curd samples. These organisms are responsible for lactic acid production during fermentation, which gives curd its characteristic sour taste and prevents spoilage by inhibiting harmful microorganisms. The absence of Gram-negative bacteria indicates hygienic production and effective fermentation. Similar findings were reported by other studies where *Lactobacillus bulgaricus* and *Streptococcus thermophilus* were predominant species in yogurt cultures.

Conclusion

Curd is a natural source of probiotic bacteria, mainly *Lactobacillus* species, which contribute to its health-promoting effects. The simple Gram staining method is an effective preliminary technique to identify and visualize such microorganisms. Encouraging the consumption of traditional fermented foods like curd can help maintain gut health naturally.

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