

# INCIDENCE OF LACTIC ACID BACTERIA ISOLATED FROM INDIGENOUS DAHI

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## Summary

Fifty samples of indigenous dahi were collected randomly from the local market of Rawalpindi/Islamabad to determine the incidence of lactic acid bacteria. The micro-organisms isolated were *Lactobacillus bulgaricus* (86%), *Streptococcus thermophilus* (80%), *Streptococcus lactis* (74%), *Lactobacillus helveticus* (34%), *Streptococcus cremoris* (30%), *Lactobacillus casei* (20%) and *Lactobacillus acidophilus* (14%) respectively.

The results of the present study revealed that indigenous dahi contains mixtures of lactic acid bacteria and thus the quality of dahi may vary with the type of starter culture used for inoculation. (Key Words : Indigenous, Dahi, Lactic Acid Bacteria)

## Introduction

Dahi similar to yoghurt, is a popular product of Indo-Pak subcontinent. In Pakistan its consumption is next to that of whole milk, especially during summer a beverage called "Lassi" made from dahi is relished by the most of the people for its refreshing taste and flavour. Dahi has been reported to contain a mixed culture of lactic streptococci and lactobacilli in addition to the well known yoghurt organisms *S. thermophilus* and *L. bulgaricus* (Warsy, 1983; Isani et al., 1986).

In the preparation of this indigenous fermented product, milk is boiled in open containers, cooled to lukewarm, transferred to prewashed earthenware plates known as koondas, then inoculated with previous day dahi or lassi. This starter is a mixture of unclassified lactic acid bacteria along with contaminants. Thus the quality of dahi is unpredictable and may fail to produce the desired product (Naccm and Rizvi, 1983; Masud et al., 1988).

This study, therefore, was designed to identify the different lactic acid producing bacteria found

in samples of indigenous dahi collected from the twin cities of Rawalpindi/Islamabad.

## Materials and Methods

### Collection of Samples :

Fifty samples of dahi were collected in sterilized sample bottles from local markets of Rawalpindi/Islamabad during summer 1990 early in the morning. The samples were transported to the laboratory and processed within an hour of their collection.

### Microbiological Analysis :

The samples were cultured on an improved lactic acid media (Matalon and Sandine, 1986) and then incubated for 24 hours at 37°C. The colonies which showed different morphological characteristics were then identified by using various biochemical tests as described by Collins and Lyne (1980).

## Results and Discussion

The organisms identified in this study are listed in table 1. The presence of such bacteria have been reported in earlier studies (Naccm and Rizvi, 1983; Isani et al., 1986). Moreover, it is again observed that all the isolated bacteria from indigenous dahi were thermophilic and mesophilic in nature (Jay, 1978).

In this study *L. bulgaricus* and *S. thermophilus*

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TABLE 1. DISTRIBUTION OF LACTIC ACID BACTERIA ISOLATED FROM INDIGENOUS DAHI

Types	Percentage (%)
<i>Lactobacillus bulgaricus</i>	86
<i>Streptococcus thermophilus</i>	80
<i>Streptococcus lactis</i>	74
<i>Lactobacillus helveticus</i>	34
<i>Streptococcus cremoris</i>	30
<i>Lactobacillus casei</i>	20
<i>Lactobacillus acidophilus</i>	14

constituted the dominant microflora of dahi. Thus these species may play an important role for the preparation of this fermented milk product, as also noted by Warsey (1983) and Mohanan et al. (1983). Similarly the successful manufacture of yoghurt depends upon the correct lactic fermentation being carried out by a mixture of *S. thermophilus* and *L. bulgaricus* (Accolas et al., 1980) rather than single strain culture due to the symbiotic relationship between species of bacteria (Rasic and Kurmann, 1978; Tamine and Deeth, 1980). Moreover the presence of *L. helveticus* in our dahi samples is consistent with the finding of Thomas (1985) who reported that *L. helveticus* may be used in yoghurt starter culture with *S. thermophilus* or in combination with mixed culture *S. thermophilus* and *L. bulgaricus*. These two species of lactobacilli are mainly used for acid and flavour production in yoghurt making (Kosikowski, 1982).

The high number *L. bulgaricus* recorded in the present investigation may be due to the long incubation time. Mohanan et al. (1983) reported that when milk was inoculated with the mixed culture of *S. thermophilus* and *L. bulgaricus* for preparation of dahi, the streptococci initially grow at much faster rate than the lactobacilli but after sixteen hours of incubation the lactobacilli became dominant. Furthermore, they are of the view that the inoculum added to milk has a predominance of lactobacilli and as in the case of old or sour curd the relative growth rates of the two organisms would be different.

The presence of *S. lactis* and *S. cremoris* in our study is of great interest. Kosikowski (1982) reported that these organisms are mostly used for the preparation of different types of

cheese. However, they may be used for the preparation of yoghurt where multistrains starter culture is used to produce the desired acidity. Kosikowski (1982) also suggested that these strains have a different optimum temperature (about 72 °F for multiplication) than the optimum temperature for yoghurt starter. The role of these strains in dahi has not yet been clarified, however, they may play a role in the preparation of this product in winter (Laxminarayana et al., 1977). Furthermore, Kosikowski (1983) reported that *S. cremoris* and *S. lactis* are slime producers, releasing complex carbohydrate capsular materials which increase viscosity. In the Netherlands, 90% of the yoghurt is made with slime producing bacteria. Therefore, it may be assumed that these bacteria contribute to the formation of dahi by their unique biological properties.

The presence of *L. casei* in dahi is in line with the finding of Naeem and Rizvi (1983), but their role is again unknown. Roginski (1988) reported that *L. casei* is used in the production of a popular Japanese fermented milk product called yakult.

Although only nine of our samples of dahi contained *L. acidophilus*, their presence was also reported by Naeem and Rizvi (1983) and Isani et al. (1986). Kosikowski (1983) was of the opinion that this microorganism is mostly used for the preparation of acidophilus milk, where it produces acid ranging from 1.2 to 2.0%. However their presence in dahi may be objectionable due to their high acid production capability.

On the basis of the results obtained in this study, it is concluded that in high quality fermented milk products a small change in the starter may be acceptable. The indigenous dahi contains a mixture of lactic acid bacteria, and the quality of dahi varies with the type of predominant species in the starter used for inoculation. Therefore, it can be suggested that efforts should be made to select suitable indigenous strains of bacteria to local environmental conditions in order to produce a uniform high quality fermented milk product.

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