

## **Introduction**

### **Technology of fermented milks (starter culture)**

Starter cultures are those microorganisms that are used in the production of cultured dairy products such as dahi, yogurt and cheese.

The organisms selected for this purpose need to produce the desired effect in the finished product.

Starters are a group of active and desirable microorganisms capable of bringing about desirable changes in the milk product through the process of fermentation. These are carefully selected microorganisms that are deliberately added to milk to initiate ('start') and carry out the desired fermentation in the production of fermented milk products. In other words starters bring about the specific changes in the appearance, body, texture and flavour characteristics of the final product.

The natural microflora of the milk is inefficient, uncontrollable and unpredictable, or is destroyed altogether by the heat treatments given to the milk. A starter culture can produce particular characteristics in a more controlled and predictable fermentation when added to milk.

The most common use of starter cultures is for the production of lactic acid from lactose (milk sugar), which in most cases causes or assists in the coagulation of milk protein by lowering pH of milk. Cultures that produce lactic acid are generally referred to as "lactic acid bacteria" (LAB). Certain starter organisms are added specifically for their ability to produce flavour compounds such as diacetyl. Starter organisms can also influence texture of cultured and/or aged products through the breakdown of proteins, fats and other milk constituents in addition to the pH effect. The lower pH of cultured products can be inhibitory to certain spoilage organisms, although inhibition is associated with other by-products of growth with some starters.

More recently, probiotic cultures are finding their way into cultured milk products. These organisms possess some claimed health benefit for the consumer, e.g., better digestion, anti-cancer compounds, and prevention of heart disease etc.

Probiotic cultures may be added as adjuncts or they may be directly involved in the fermentation process.

### **Starter Cultures and Fermented Milks**

Fermented foods are of great significance since they provide and preserve vast quantities of nutritious foods in a wide diversity of flavours, aromas and textures, which enrich the human diet. Over 3500 traditional, fermented foods exist worldwide. Fermented foods have been with us since early ages and of these fermented milks have long been an important component of nutrition and diet. Originally fermented milks were developed as a means of preserving nutrients (Milk and other products).

When our ancestors acquired the knowledge to use milk, they also learnt how to use lactic acid bacteria (LAB) in dairy products even though they did not know about the existence of microorganisms. When milk was left at room temperature, it was spontaneously fermented and was used as such or after dilution with water.

As an alternative fermented mix could be concentrated by drainage of whey, resulting in a new product, which could be stored for several months: the first cheese. Owing to this long period of consumption, such products were found to be safe and healthy. By trial and error, the practice of inoculating milk with a small amount of previously fermented milk was developed. Heating the milk before inoculation increased the quality of the product and it became possible to develop a range of specific, traditional fermented milk products.

About two hundred years ago, cheese and butter production became industrialized. Traditional products were standardized and slightly modified to adjust them to industrial production. Starters were grown in manufacturing plants, but, as the size of the operations grew, the importance of standardized starters increased. In the late 19th century companies with specialized in the starter production were founded. In the beginning the constraints were that, the starters were still undefined, containing an unknown mixture of different strains of the suitable species. Later on, starters were analysed and defined, allowing them to be composed of specific strains with selected properties selected to give a standard product. In general, defined starters are composed of some specific strains with less species variety than undefined starters, and do not usually contain yeast.

### **Advantages of Milk Fermentation /Role of Fermentation in Food**

- i) Enrichment of human diet through a wide variety of flavours, aroma and texture of foods
- ii) Preservation of foods *via* lactic acid, alcoholic, acetic acid and alkaline fermentations
- iii) Bio-enrichment of food substantially with proteins, essential amino acids, Essential fatty acids and vitamins
- iv) Detoxification during food fermentation processing
- v) Nutritional and physiological benefits such as
  - Promotion of growth and digestion
  - Settling effect on the GI tract by decreasing harmful bacteria
  - Improvement of bowel movements
  - Suppression of cancer
  - Suppression of blood cholesterol
  - Suppression of tumours
  - Catering to the needs of lactose intolerant people