Lactic acid fermentation (Yoghurt Production):

Lactic acid fermentation involves converting sugar into lactic acid, a process that releases a small amount of energy that's used by the fermenting cell. Lactic acid can be produced by either microbial fermentation or chemical synthesis. One example of a lactic-acid-fermenting species is *Lactobacillus acidophilus*, the bacteria partially responsible for the production of yogurt and other fermented dairy products. The bacteria convert lactose, or milk sugar, into lactic acid, which in turn ferments the milk.

Starter cultures are micro-biological strains that are added to foods or other material to obtain specific product, especially dairy products to produce cheese, butter, etc. The culture maybe of

***single-strain type** (containing only one strain of bacteria)

***multiple-strain type** (a mixture of several strains, each with own specific effect).

Types of Starter Cultures:

There are two major groups of starter cultures which are used in the preparation of fermented milk products:

Classification on the basis of physiological and growth characteristics.

1-Mesophillic starter culture

These cultures have optimum temperature for growth between 20 to 30°C and include *Lactococcus* and *Leuconostoc*. These mesophillic lactic cultures are used in the production of cheese.

2-Thermophilic starter culture

These cultures have optimum temperature for growth between 37 to 45°C. Thermophilic cultures are generally employed in the production of yoghurt, acidophilus milk, swiss type cheese. Thermophilic cultures include species of *Streptococcus* and *Lactobacillus*.

Classification on the basis of biochemical activities

1-Homofermentative lactic starter

These lactic acid bacteria are characterized for their ability to fermentation one molecule of glucose is ultimately converted to two molecules of lactic acid. The examples of these cultures are *Lb. acidophilus, Lb. bulgaricus*.

2-Heterofermentative lactic starter

Main characteristics of these bacteria are ability to ferment hexoses and pentoses to lactic acid, acetic acid, alcohol and CO_2. The examples of these cultures are *Lb. brevis, Lb. fermentum*.

Yogurt production:

Yogurt is produced from whole or skim milk. It is a fermented dairy product produced by two types of bacteria G+ve cocci such as *Streptococcus thermophilus* and G+ve bacilli such as *Lactobacillus bulgaricus*. The inoculums that contain this type of bacteria is called starter, those bacteria catabolies lactose and produce lactic acid. The lactic acid alter protein of milk (Casein) and make it to precipitate and this cause a thicken to the typical yoghurt consistency.

Procedure:

1. Heat 1 liter of milk in a beaker slowly to 85 ºC and maintain at that temperature for 2 minutes. This step kills undesirable contaminant microorganisms. It also denaturizes inhibitory enzymes that retard the subsequent yogurt fermentation.
2. Cool milk in a cold water bath to 42-44 ºC. The cooling process should take about 15 minutes.
3. Add 5 g of starter culture to the cooled milk and mix with a glass rod.
4. Cover the container to minimize the possibility of contamination. Incubate at 42ºC for 3 to 6 hours undisturbed until the desired custard consistency is reached.