**FERMANTATION**

**FERMANTATION** is one of the oldest forms of food preservation technology in the world. Indigenous fermented foods such as bread, cheese & wine have been prepared &consumed for thousands of years are strongly linked to culture &tradition, especially in rural house hold &village communities.

**What is fermentation?**

Fermentation is the slow decomposition process of organic substances included by microorganisms, or by complex nitrogenous substances (enzymes) of plant or animal origin.Fermanted foods use microbes to convert the original food into fermented product by the use of specific microbes.

Fermentation involves the introduction of the desirable microbes into the original product. Some of the microbes used in food fermentation are –

* Lactococcus latis – used for dairy fermentation.
* Streptococcus thermophilus - used for dairy fermentation.
* Pediococcus sp. – meat fermentation, vegetable fermentation, ripening of some cheeses.
* Lactobacillus sp. - meat fermentation, vegetable fermentation, dairy fermentation, sourdough bread.
* Propinibacterium sp. – Swiss cheese.
* Yeast – bread, beer, wine,liquors.
* Moulds – ripening cheese, soy sauce.
* Lactobacillus bulgaricus & streptococcus thermophilus – making of yogurt.

Fermentation of food has been in used for thousand of years, it is likely that the microbial& enzymatic process responsible for the transformation where largely unknown.

**Fermented baked preparations**

In baked products such as bread & bun, the yeast Sccharomyces cervisiae which is popularly known as “Baker’s yeast”, helps by raising the dough giving it the texture & also adding flavors. The different ingredient added give distinctly different taste to each of the products.

The **naan** which is popular in India is made of maida, salt, yeast or curd, vegetable oil is also used to soften the product. Dough was formed & allowed it to ferment for 30 minutes to 1hours. Sccharomyces cervisiae is responsible for leavening by carbon dioxide production.

**Bread** is also another beaked item, maida, sugar, yeast is required to make the dough & allowed it to ferment. Sccharomyces cervisiae is responsible for leavening by carbon dioxide production.

**Fermented vegetable foods**

We all consumed vegetable in fermented or cooked form. But, we can even consume these by making fermented product.

**Sauerkraut** is a fermented fresh cabbage product. The main organism which is involved in the fermentation of this pickle is lactic acid bacteria.

**Cucumber** is a fermented product of fresh cucumbers, lactic acid bacteria is involved in this preparation.

Fermented **onion & chilly** are also fermented vegetable product.

The bacteria that involved are **Lactobacillus plantarum.**

**Fermented dairy product**

A large number of dairy products are available in our markets. Different bacteria, yeast, moulds are involved in fermentation of dairy products.

**Cheeses are** the byproducts of lactic fermentation of milk. There are different type of cheese classifier as hard, semi hard &soft cheese. The curing of cheese is done by the help of **Streptococcus & Lactobacillus.** The Swiss cheese is cultured with the help of mixed culture, Streptococcus thermophilus, Lactococcus bulgaricus & Propionibacterium shermanii which impart the characteristic eye formation.

Dahi & Yogurt are common fermented dairy products. For dahi preparation Lactobacillus is required. Yogurt is the preparation with the action of two organisms, Streptococcus thermophilus & , Lactobacillus bulgaricus . The ideal ratio of this two organism is 1:1 for best result.

The microorganisms which are involved in the preparation of butter are Streptococcous lactis & Streptococcous cremoris which convert lactose in the milk to lactic acid. There are other organisms which involved in imparting the aromatic flavors in butter.

 **Other fermented food products** idli,vada,dosa, dhokla etc are important.

**Idli** – the microorganism involved in this preparation is Leuconostoc mesenteroides which grow fast followed by Streptococcous &Pediococcus.

**Vada** – It fermented over night by Leuconostoc mesenteroides.

Dosa - It fermented by Lactic acid bacterial fermentation ,followed by Leuconostoc mesenteroides to form carbondioxide production.

**Dhokla** - Leuconostoc mesenteroides & Streptococcous are the common bacteria involved in fermentation.

**Bhatura** – Though curd is involved Lactobacillus & Streptococcus are the organism involved for fermentation.

**Fermented Soya Bean products**

Tempeh is highly popular soya bean preparation. The chief organism in this preparation is mould Rhizopus oligosporus.

Soya sauce is a very popular preparation . For preparation & fermentation Aspergillus sp, lactobacillus & saccharomyces sp organism are involved.

In **economically important fermentation products** beer, wines are involved. The organisms responsible are Sccharomyces cervisiae & Sccharomyces uvarum.

**Other uses of microbes in industry are** Vinegar & antibiotics.