

JANTA VEDIC COLLEGE BARAUT (BAGHPAT).

CLASS – MSc(ag) 3rd SEM. 2022-23

DAIRY SCIENCE AND TECHNOLOGY

SUBJECT - J3012 ELEMENTARY OF FOOD SCIENCE

TOPIC – FOOD FERMENTATION

Fermentation is a metabolic process that involves the breakdown of carbohydrates by bacteria and yeast. It results in a distinctive change in flavor and is used to make foods like yogurt, cheese, and wine, beer, vinegar.

Fermentation is a natural process through which microorganisms change starch and sugar into alcohol or acids. The alcohol or acids act as a natural preservative and give fermented foods. Fermentation also promotes the growth of beneficial bacteria, known as probiotic. Probiotics have been shown to improve immune function as well as digestive and heart health.

TYPES OF FOOD FERMENTATION : -

Food fermentation is mainly two types.

1. ALCOHOLIC FERMENTATION.

2. LACTIC ACID FERMENTATION.

1. ALCOHOLIC FERMENTATION- known as ethanol fermentation, is the anaerobic pathway carried out by yeasts in which simple sugars are converted to ethanol and carbon dioxide. Alcoholic fermentation, is a biological process which converts sugars such as glucose, fructose, and sucrose into cellular energy, producing ethanol and carbon dioxide as by-products. Because yeasts perform this conversion in the absence of oxygen, alcoholic fermentation is considered an anaerobic process. It also takes place in some species of fish where (along with lactic acid fermentation) it provides energy when oxygen is scarce.

Microbes used in ethanol fermentation –

YEAST – Saccharomyces cerevisiae.

BACTERIA – *Zymomonas mobilis*.

2. LACTIC ACID FERMENTATION is a metabolic process by which glucose or other six-carbon sugars are converted into cellular energy and the metabolite lactate, which is lactic acid in solution. It is an anaerobic fermentation reaction that occurs in some bacteria and animal cells, such as muscle cells.

Homo fermentative process :-

Homo fermentative bacteria convert glucose to two molecules of lactate

Glucose + 2ADP + 2Pi → 2lactate + 2ATP. Hetero fermentative process :-

Hetero fermentative bacteria produce less lactate and less ATP, but produce several other end products:

Glucose + ADP + Pi → lactate + ethanol + CO₂ + ATP

Advantages of Fermentation: -

Fermentation is suitable for all kinds of environments. It is one of the oldest metabolic processes which is common to prokaryotes and eukaryotes.

Fermentation is widely used in various industries.

Using suitable microorganisms and specified conditions different kinds of products are formed namely:-

- Wine
- Beer
- Biofuels
- Yoghurt
- Pickles
- Bread
- Sour foods containing lactic acid

Fermentation can make food nutritious, digestible and flavoured. There are many benefits of consuming fermented food.

- It improves digestion and helps to maintain intestinal bacteria.
- It has an anti-cancer effect.
- Improves immune system.
- Reduces lactose intolerance.

Both the above fermentations are preceded by the process of **glycolysis**.

GLYCOLYSIS -is the process in which glucose is broken down to produce energy. It produces two molecules of pyruvate, ATP, NADH and water. The process takes place in the presence or absence of oxygen . Glycolysis is the primary step of cellular respiration. In the absence of oxygen, the cells take small amounts of ATP through the process of fermentation.

WINE MAKING

The process of making wine from the selection of the fruit. The science of making wine is **OENOLOGY**. Wine is an alcoholic beverage usually made from ripe grapes. There are five basic stages or steps to making wine:

harvesting, crushing and pressing, clarification, and then aging and bottling.

References-

Different site of www.google.net