Use of High Temperature

Heat energy is widely used for food processing and preservation. Heat processing aimed at destroying pathogenic and spoilage microorganisms. Various techniques in which heat energy is applied in the form of high temperature includes blanching, thermisation, pasteurization and sterilization.

Heat Processing Methods

The main types of heat treatment are given below

1. Blanching:

Blanching is the heating of some plant food materials in hot water or live steam for a very short period of time (ranging from few seconds to few minutes) mainly to destroy the active food enzymes prior to canning, cold storage, freezing or dehydration. Examples of blanched food are pea, spinach, potatoes, okra etc.

Fig. Peas Blanching

2.Thermisation

Thermisation is a mild process which is designed to increase the keeping quality of raw milk. It is used mainly when it is known that it may not be possible to use raw milk immediately for conversion to other products, such as cheese or milk powder. The aim is to reduce psychrotropic

bacteria, which can release heat resistant protease and lipase enzymes into the milk. These enzymes are not inactivated during pasteurisation and may give rise to off flavours if the milk is used for cheese or milk powders. Temperatures used are 58–6 °C for 15 s. Raw milk thus treated can be stored at a maximum of 8°C for up to 3 days.

2.Pasteurisation

Pasteurization is a heat treatment designed primarily to kill the vegetative forms of microbial cells in liquid foods. Heat destroy the enzymes that make milk spoilage. In simple terms, Pasteurization involves heating of food to a temperature that kill disease causing microorganisms and substantially reduces the level of spoilage organisms.in milk the object is to destroy the pathogenic bacteria specially ‘ Mycobacterium tuberculosis’ which is responsible for tuberculosis in man.

The pasteurization temperature varies with the type of food and the length of the time it is to be exposed to that particular temperature. Usually pasteurized food, which show only reasonable extended shelf life are supplemented by other methods of food preservation such as storage at low temperature or sealing in anaerobic environment. There are three types of pasteurization.

Methods of Pasteurization

Common methods of pasteurization used for pasteurizing of milk are:

a) Low Temperature for Long Time LTLT

b) High Temperature for short Time HTST

c) Ultra High Temperature UHT

a)LTLT

In this low temperature is given to food for long time. **63ºC/ 145ºF for 30 minutes.**

b)HTST

In this high temperature is given to the food for short time.**72ºC/ 161ºF for 15 seconds.**

c)UHT

It is also heat treatment in which **138ºC** temperature is given to food for **2 seconds.** It is used for extreme pasteurization of food. UHT Process also called flash pasterurization.

UHT kill all the microorganisms and keeping the milk in closed sterile container at room temperature.

Fig. UHT treated milk

Sterlization

Sterilization is making a substance free from all microorganisms both in vegetative and sporing states.

3. Commertial Sterlization

A severe heat treatment that destroys pathogenic and many microorganisms that could spoil food. Extended the shelf life of food at room temperature.

Commertial sterilization is also known as canning.

Canning:

Canning is the process of food preservation in which the food contained in permanently sealed container is subjected to an elevated temperature for a definite period of time and then cooled.

Benefits:

- This process kills all type of microorganisms.
- If the microorganisms survive then are unable to grow due to the unfavorable conditions in cans.
- It can save the food at long temperature for long time.

It is essential that there is a supply of raw materials of the right quality and quantity. For fruit and vegetables, appropriate varieties should be selected for canning, as they must be able to withstand the heat treatment without undue softening or disintegration. Food to be processed should be transported quickly to the processing factory.