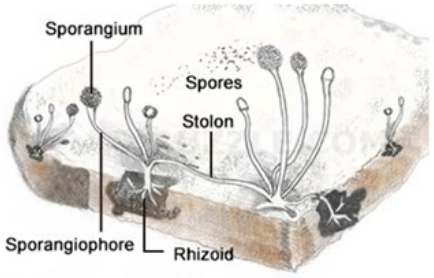
What is Food Preservation?

Food preservation is the process of treating food to stop or slow down spoilage, loss of quality, edibility, or nutritional value.

Food spoilage

Food spoilage: means the original nutritional value, texture, flavor, odour or color of the food are damaged or changed, so that the food become harmful to people and unsuitable to eat.

Reasons for food spoilage



- Growth of microorganisms like bacteria, fungus etc or insects
- Autolysis: Enzymes are proteins found in all plants and animals.
- Oxidation by air cause rancidity or colour changes
- Physical changes caused by freezing, burning, drying etc

Objectives of Food Preservation

a. To prevent and to remove microbial contamination
b. To inhibit microbial growth
c. To kill contaminating pathogens
d. To minimize food spoilage, food infection and food poisoning

Methods of Food Preservation

1. Pickling
2. Salting
3. Smoking
4. Aseptic processing
5. Canning
6. Bottling
7. Pasteurization
8. Refrigeration
9. Sterilization
10. Dehydration
11. Lyophilization
12. High osmotic pressure
13. Chemical additives
14. Radiation

1. Pickling

- Food preserved in vinegar.
- Preserves meat, vegetables spoilage due to action of acetic acid

2. Salting

- Food preserved in salt such as fish, lemon
- Salt prevent microbial growth

3. Smoking

- Smoking of fish and meat prevent spoilage by dehydration
- The smoke produced from burning wood contains a large number of compounds, some of which will kill bacteria

4. Canning

- Food contents are processed and sealed in an airtight container at high temperature.
- Food products such as meat, fish, fruits, vegetables

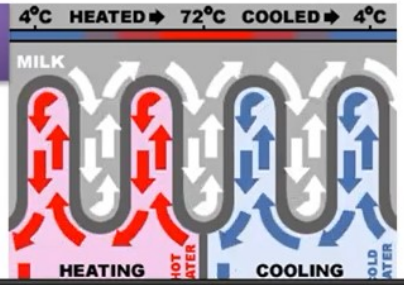
Figure 28.1 The commercial sterilization process in industrial canning. 1 Blanching is a treatment with hot water or steam intended to soften the product so the can will fill better. It also destroys enzymes that might alter the color, flavor, or texture of the product and lower the microbial population. 2 Cans are filled to capacity, leaving as little dead space as possible. 3 To exhaust (drive out) most dissolved air, cans are heated in a steam box. 4 The cans are sealed. 5 Cans are sterilized by steam under pressure. 6 Cans are cooled by submerging them or spraying them with water. 7 Cans are labeled for sale.

Q **How does commercial sterilization differ from complete sterilization?**

5. Bottling

•**Liquid** food contents are processed and sealed in an airtight bottles at high temperature.
•Liquid foods like milk, wine etc.

6. Pasteurization



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•**Pasteurization** is the process of heating milk below boiling point (or any liquid or a food) to kill pathogenic bacteria to make the food safe to eat.
•Stops fermentation
•Named after Pasteur who introduced the technique
•2 methods
•A) Holding method: Milk kept for 30 min at low temperature 62.8^{0}C. Also called low temperature holding method (LTH)
•B) Flash method: Milk kept for 15 sec at high temperature 71.7^{0}C. Also called high temperature short time method (HTST)

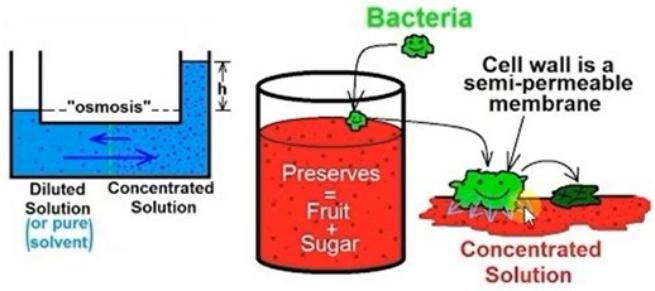
8. Refrigeration

- Keeping food at low temperatures or cold
- Remain unspoiled in refrigerator @ 4^0C
- Freezer temperature is ~-18^0C
- Deep freezers @ -60^0C are good for storing meat and fish for more time
- Slows down the growth of bacteria

9. Dehydration

- The process of removal of water from food
- Simplest and cheapest method
- Prevent microbial growth due to lack of water
- Fish, fruits etc can be stored

12. High Osmotic Pressure

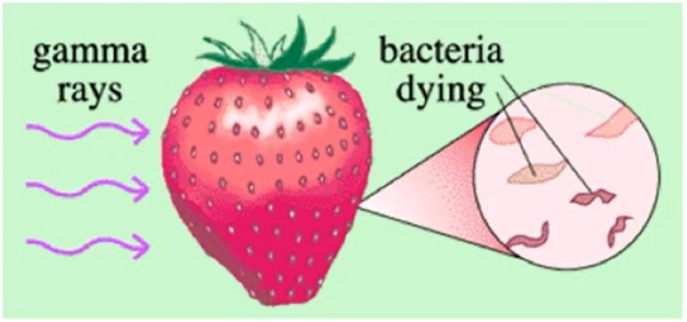


- Food stored in solutions containing large amount of dissolved sugar or salt
- Prevents microbial growth due of water loss from bacteria

13. Chemical Additives

- Food additives are substances added to food to preserve flavour or enhance its taste and appearance or prevent spoilage
- Chemical additives inhibit microbial growth
- Acetic acid, lactic acid, benzoic acid used legally to preserve food
- Nitrates and nitrites preserve meat colour

14. Food Irradiation



- Process of exposing food and food packaging to ionizing radiation, such as from gamma rays, x-rays
- Radiation kills microorganism

10. Lyophilization

- Rapid freezing and dehydration of frozen product under vacuum.
- Useful for storing, transporting and preserving food and bacterial culture