



Lecture 10

—Physical Methods of Food Protection

Food protection method are measures taken to protect food from being contaminated by any agent. All food be protected at time during storage and preparation from the following contaminants;

- Any water that is not known be safe
- Dirty hands.
- Coughing and sneezing .
- Dust and soot .
- Flies ‘rodents .
- Insecticides and other chemicals.
- Un clean surface ;cigarette smoke.

1. COOKING

Type of cooking

A. Boiling :

- boiling ; is the process of applying heat to water until the tempearture (100 c).

- spore of some bacteria extremely resistant to heat and are not killed at this temperature, however most pathogens are killed, provided that sufficient exposure time is maintained. Although the spores of **Clostridium botulinum** which causes botulism are extremely heat-resistant, the toxin produced by this organism is readily destroyed by this way.
- Some toxins produced by other bacteria such as Staphylococci are not easily inactivated. Thermophilic (heat loving) organisms survive the effect of boiling and can cause food spoilage if environmental conditions are favourable for them.

B- BAKING AND ROASTING

Use heated air to remove moisture from food and to form a desired texture. Generally the temperature on the outside of the food during baking reaches **100°C** for a suitable time, which is sufficient to destroy most vegetative forms of microbial cells. Baking and roasting depend on the amount of heat penetration, removal of water during the baking process reduces and inhibits microbial growth.

C - Frying

- ✓ Is a common cooking process used by industrialists to impart flavour and texture to a variety of food products.
- ✓ Frying involves high temperature (**170-190°C**).
- ✓ The temperature and time associated with frying are sufficient to destroy vegetative cells of microbial agents responsible for disease and spoilage, and the removal of moisture inhibits microbial growth.

D - HOT SMOKING

- Is done at a temperatures of **(60-80c)**.
- Depending on the times and temperature ,hot smoking usually cooks the food and destroys most vegetative microbial cells .
- the **antimicrobial** effects of hot smoking also occur from dehydration and chemical constituents in the smoke.

2-CHILLING

Chilling involve reducing food temperature but only approximately. refrigerators for cold storage/chilling are normally used **at(0-8)**for preservation of a wide variety of foodproducts.

3- Radiation

- Several forms of non ionzing radiation are used to generate heat (dielectric heating) for food processing . Microwaves technology has become commonplace as a heat treatment .
- Depending on the **power level** and duration of exposure , microwaves , can be used for cooking , pasteurization , sterilization and other purposes.

4-Freezing

- Is one of the best method of preserving food stuffs in as nearly natural a state possible
- It is preserves the storage life of foods by slowing down enzyme reaction and the growth of microorganism

- ❑ Various type of microorganisms have different capacities for survival under freezing temperature
- ❑ Gram-negative bacteria such as E-coli and salmonella species are more sensitive to extreme cold
- ❑ Gram-positive bacteria such as staphylococcus aureus are more resistant.

pasteurizations

- Is a process of heat treatment of milk, peer, sport drink and some solid food so as to kill pathogenic bacteria that may be present in matter without changing colour , flavour and nutritive value
- It kills most but not all of the microorganism present, as spores are not destroyed.

TYPE OF PESTURIZATION

- The first temperature-time combination is called low temperature long time (LTLT) pasteurization (63-30)
- Second time temperature combination is called high temperature short- time(HTST) pasteurization (100c for 0.01second)
- The temperature-time combination are sufficient enough to destroy mycobacterium tuberculosis .