

Food preservation techniques and microorganisms

Expected Learning Outcome

- Methods of killing microorganisms or preventing their growth in food so as to ensure preservation of food for future use.
- Principles of killing /inhibiting microorganisms associated with foods by preservation methods involving use of low temperature, high temperature, radiations and chemicals.
- Importance of microbial endospores and cell aggregates on quality of processed foods.

4.1 Food preservation techniques and microorganisms

The foods of plant and animal origin contain several microorganisms and these along with natural food enzymes become active soon after the death of animal and harvest of plant foods. The intrinsic characters of the food and the environmental conditions influence the type and extent of microbial activity leading to spoilage which is characterized by deteriorative changes in food quality making it unfit for human consumption. The different preservation techniques have mainly aimed at reducing or eliminating microorganisms in food thereby prolonging or preventing the spoilage of foods. The preservation of foods is commonly done by use of low temperature, high temperature, drying, radiation and chemicals.

4.1.1 Preservation of foods with low temperature

Low temperature preservation of food is based on the principle of reducing the microbial activity by subjecting to low temperature condition. As all metabolic activities of microorganisms are catalyzed by enzymes, and enzyme reactions are dependent on temperature, the low temperature slows down enzyme activity, thereby brings about reduction in microbial activity. The reduced microbial activity prolongs shelf life of foods.

Shelflife of temperate and tropical water fish

Activity of microorganisms is known to decrease by two fold with every 10°C decrease in temperature. Fresh fish from temperate waters generally have prolonged shelflife than tropical fishes. This is because of the low ambient temperature in temperate waters coupled with low body temperature of fish, being cold blooded, lowers both enzymatic and bacterial growth, thereby reduces deteriorative change and helps in extending the shelflife.

In tropical waters, the high ambient temperature and high body temperature of harvested fish promotes deteriorative changes by enzymes and microorganisms and thus hastens the spoilage.

Methods of low temperature presentation

Low temperature preservation is generally attained by employing three different temperature conditions. They are;

- **Chilling temperature:** keeping foods at $10\text{-}15^{\circ}\text{C}$ (slightly above refrigerated temperature).
- **Refrigerator temperature :** Keeping foods at $0\text{--}7^{\circ}\text{C}$
- **Freezer temperature:** Storage of foods below -18°C .

In Fisheries, fish are preserved by keeping at chilling temperature and by freezing.