

# Preservation 2

# The recognized methods by which meat foods may be preserved are

- Drying
- Salting, curing
- Application of low temperature – Chilling/cold and Freezing
- Application of high temperature - Thermal Processing
- By the usage of Chemicals, Antibiotics, etc.
- Radiation - Ionizing radiations.

# DRYING

- Though it was one of the earliest methods of preservation now it on a commercial scale .

Product	Country and animal
<b>Jerked beef</b>	<i>South America , beef</i>
<b>Pemmican</b>	<i>North America , venison, fish or beef.</i>
<b>Biltong</b>	<i>South Africa , beef ,flesh of game animals (antelope), Zebra and Ostrich</i>
<b>Charque</b>	<i>Uruguay and Brazil , salting and sun drying of the rib less forequarters of beef.</i>
<b>Uppukandam</b>	<i>India (Tamil Nadu), salted and sun dried mutton and/or goat meat</i>
<b>Odka</b>	<i>Somalia and other East African countries, beef</i>
<b>Qwanta</b>	<i>Ethiopia and other East African countries, beef</i>
<b>Kilishi</b>	<i>Nigeria and some of the West African countries, beef, goat, lamb</i>
<b>Pastirma</b>	<i>Turkey, Egypt and Armenia , beef also young calves</i>

# **FREEZE DRYING OR LYOPHILIZATION**

- This is the process of removing water from frozen foods.
- Removal of water is accomplished by sublimation, i.e the water in the frozen meat evaporates without melting of ice.
- Food product must be in comminuted form (sliced or diced) and [packaging](#) must be completely moisture proof since, the dried products are hygroscopic.
- Can preserve beef, pork, chicken and shellfish, whole steaks and chops can be freeze dried.
- Since, meat has high moisture content, it is expensive to preserve meat by lyophilization.
- Advantage- shrinkage and distortion of shape are minimal, and retention of flavour and nutrition is excellent.

## INTERMEDIATE MOISTURE MEAT PRODUCTS

- Studies revealed that meat products with 20-50% moisture had moderate juiciness and texture on rehydration.
- Such products were resistant to bacteriological spoilage and could be held without refrigeration. These products were referred as Intermediate Moisture Meats (IMM).
- The basic reason for the stability of these products lay in the reduced availability of water to the microorganisms (water activity 0.6 to 0.85)
- These semi-moist meats are of special significance to the developing countries where refrigeration facilities are not always available. Such products can be easily carried in defence expeditions and stress situations like floods, famines, for airdrop, etc

# Humectants

- Additives employed for lowering the water activity of foods are known as humectants. They are low molecular weight compounds, which are easily soluble in water. These are chemically inert and do not modify the normal sensory qualities of the product. Besides, these compounds are edible in large quantities without any adverse effect. Eg Glycerol, Propylene glycol, Sodium chloride, Polyhydric alcohols (e.g. sorbitol), Sugars (e.g. sucrose, dextrose, corn syrup etc)
- use of antimycotic agents like potassium sorbate, sodium benzoate, propylene glycol etc. is a must in the semi-moist meats because 0.6 to 0.85 water activity ranges specifically permits the growth of moulds.

# Basic processing techniques

- **Moist infusion or desorption-** It involves soaking and / or cooking of meat chunks or cubes to yield a final product having desired water activity level, E.g. sweet and sour pork, Hungarian goulash etc.
- **Dry infusion or adsorption-** It involves initial dehydration of meat chunks or cubes followed by soaking in an infusion solution containing desired osmotic agents. E.g. ready-to-eat cubes of roast pork, chicken a la king, etc.
- **Component blending-** In this process dry and wet ingredients or components are blended, cooked and extruded or otherwise mixed to give a final product of desired water activity.

# Thumb rules for the preparation of IMM are:

- Reduction of water activity by addition of humectants
- Retardation of microbial growth by addition of antimicrobial especially antimycotic agents and
- Improvement of sensory properties

## Stability of intermediate moisture meats

- Fairly stable at ambient temperature for several weeks or even months.



## **Prolonged storage may result in some quality deterioration due to:-**

- breakdown of both myofibrillar and sarcoplasmic proteins.
- Collagen being more susceptible to degeneration results in more hydroxyproline formation.
- Degradation of haemoprotein (myoglobin and haemoglobin), loss of colour
- Development of rancidity
- Non-enzymatic browning resulting in loss of colour, consumer appeal, nutritive value and possibly off-flavour
- Formation of lipid protein cross links causing decreased water binding capacity and net protein utilisation of meat products.

## SALTING

- Salting, a very ancient method of preservation, principle involved in applying salt is dehydration and germicidal.
- In salted meat, dry salt is applied to the meat which dissolves in the meat fluid near the surface and further withdraws fluid from the meat forming a hypertonic solution.
- It then passes slowly inward, dissolves throughout the meat substance, until the concentration of salt is approximately the same throughout the meat substance

- salt has no harmful effects on the bacteria but act by extraction of water from the meat, by exerting a strong osmotic pressure, causing a drying effect and rendering water non-available to bacteria.
- Higher concentration of salt gives greater preservative action.
- Organisms that can grow in the presence of and require high concentrations of salt be termed as halophiles, while, those that can withstand but not grow in higher concentration are termed as halodurics.

- In curing halophiles are allowed to grow and halodurics are kept at low levels.
- Parasitic cysts, cysticerci, in meat are fairly rapidly destroyed, when the ratio of the salt to moisture in the meat is not more than 1:4.
- The destruction of parasitic cysts in biltong may therefore be ensured by submitting the biltong to an adequate salt concentration followed by a holding period of not less than 6 days.