

# Packaging, storage, and distribution of cream

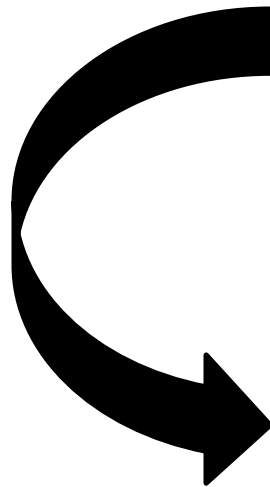


**High  
moisture**



**Easily  
perishable**

**Cream**



**Pasteurization  
Packaging**



**To extend  
shelf-life**

# General requirements for packaging of cream

Exclusion of light as it can initiate auto-oxidation of milk fat resulting in rancid flavors

Cream may be tainted by absorption of odors from various sources so, impermeable to gases

Absorption of moisture/fat can cause the quality of cream to deteriorate and packaging so, impermeable to both

Packaging materials be carefully selected as may contain compounds which can migrate into cream causing gradual quality deterioration

Design of container can also influence product quality

# Packaging of Table Cream

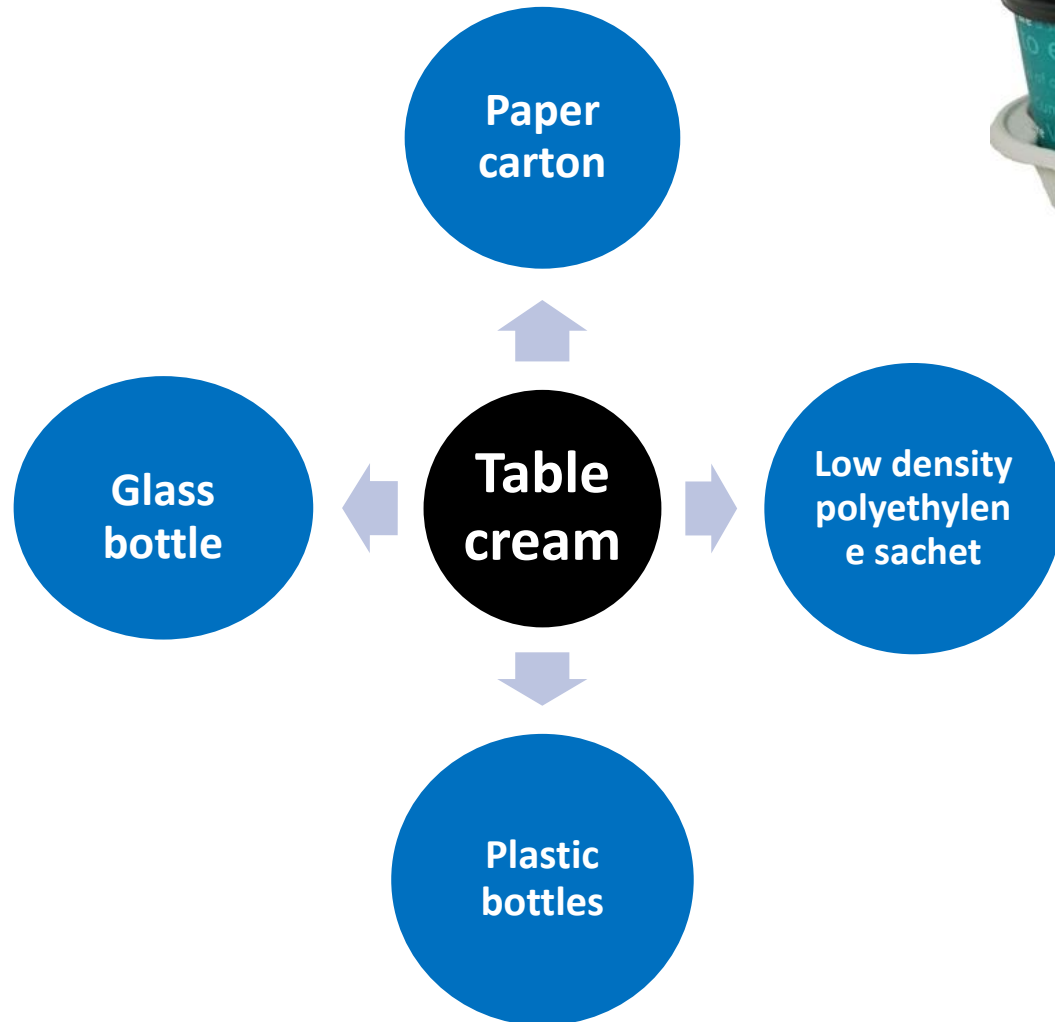


Table cream produced for coffee whitening: **UHT processing is combined with aseptic packaging** employing “multi-cup tray” package format, each cup quantity serve as single dose sufficient for one cup of coffee.

# Packaging for Pasteurized Cream

## Retail Packaging



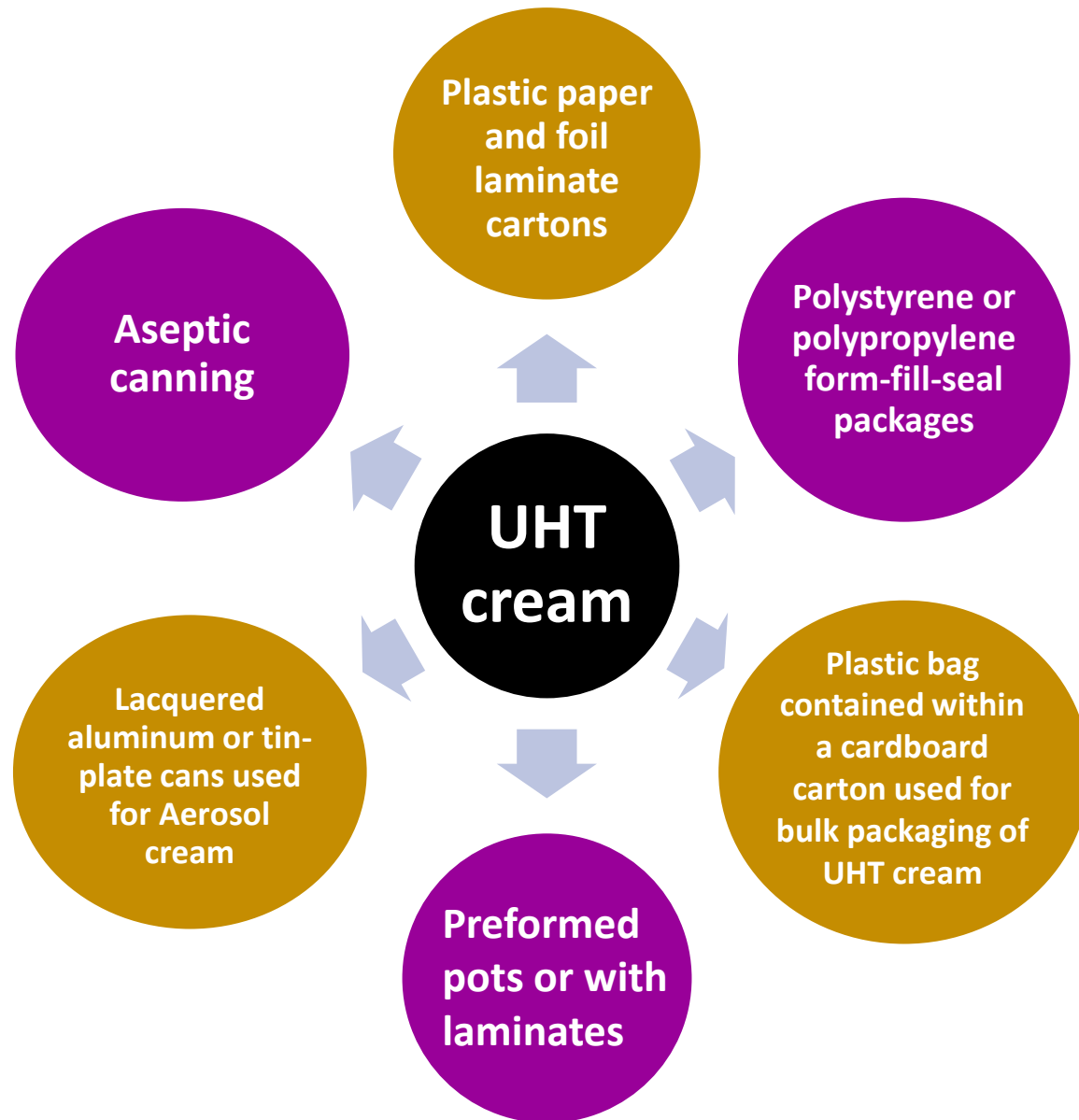
## Bulk Packaging

- ✓ Packaged in cartons and bottles for retail sale with package size usually ranging approx. 100-1000 ml.
  - ✓ Earlier packaged in glass bottles, waxed cartons and polyethylene-coated cartons.
  - ✓ Common form of packaging is injection moulded polystyrene pot, or flat topped round container.
  - ✓ Polypropylene containers less likely cause taint.
  - ✓ To improve barrier properties of plastic packaging for fresh cream, multilayer materials may incorporate an ethylene vinyl alcohol (EVOH) layer.
- ✓ Used for catering or institutional use.
  - ✓ Normally plastic (e.g. polythene) bags contained in plastic crates or cardboard cartons are used for bulk packaging.
  - ✓ Package size ranges from 5 to 25 L.

# Packaging for Sterilized Cream

- ✓ In retort sterilized cream, tin cans and glass bottles are commonly used packaging formats.
- ✓ Simplest method of sterilization is to package the material, then heat the complete package and material to confer sterility.
- ✓ Retortable plastic materials are now available for packaging. It is normal to give the cream a preheat treatment before packaging to destroy bacterial spores. Sterilization takes place in a retort or hydrostatic sterilizer using temperature-time regimes of 110-120°C for 10-20 min.
- ✓ Severe heating induces protein denaturation, Maillard browning and fat agglomeration that modify texture and flavor.
- ✓ Calcium sequestering agent (sodium citrate) may be added to make more casein available for stabilizing the emulsion.
- ✓ Unit packaging volumes have to be relatively small (400 ml) because of the restriction on heat transfer with larger volumes.
- ✓ Cream (approx. 23% fat) is the base cream for in-can sterilized cream. It enjoys a substantial market as dessert adjunct or ingredient in dressings and sauces.

# Packaging of UHT Cream



- ✓ For aseptic packaging, packaging material is first treated with hydrogen peroxide solution, later removed by squeezing or natural drainage.
- ✓ Residual solution is removed by heat; while the evaporating and decomposing peroxide sterilizes the material.
- ✓ The sterilized product must then be filled in a sterile environment.
- ✓ In Tetra Pak system, the laminate is in the form of a continuous tube and the evaporating peroxide above the filler forms a natural aseptic barrier.



## **Storage and Distribution**

- ✓ Fresh cream can be stored at 5 C and the shelf-life is 14 days. Cream distributed early, preferably within 3 h of removing it from cold storage.
- ✓ Frozen cream can be stored for 18 months.
- ✓ Sterilized cream can be stored for 6 months.
- ✓ Sterilized UHT creams have a shelf-life of several months at 5°C.

**In addition to pasteurization, sterilization and UHT treatment of cream, the cream can also be preserved and stored for several months by freezing and drying of cream.**

# Freezing

Bacterial spoilage of cream can be inhibited by freezing of cream however, this process leads to destabilization and gross separation of fat and serum resulting on thawing.

## Plate Freezing:

The plates contain circulating refrigerant are arranged vertically, in parallel, with bottom and end seals to form a series of moulds with hydraulic pressure maintaining the plates in place. The cream is poured into gaps between plates, and surface freezing is instantaneous at the pre-cooled plate surface (prevent adhesion of cream to the plate). The cream freezes progressively towards the centre with refrigerant in the plates absorbing the heat, so that finally slabs of frozen cream are formed. The slabs are removed for packaging and subsequent storing by separating the plates.

## Drum Freezing:

A rotating drum containing recirculating refrigerant is immersed in a vat of cream to form a frozen film. Frozen cream is then removed from drum with a knife, and a flaked product is obtained. More rapid freezing than plate freezing and less damaging to the cream and is continuous. The cream flakes are packaged in heat-sealed plastic bags as used for frozen vegetables.

## **Drying (Spray dried cream):**

- 1. Removal of water from cream gives a product with an extended shelf-life.**
- 2. Particular problem in the production of spray dried cream is the high fat: SNF ratio in the finished product. The fat is in a liquid state at temperature at which it would exit a spray drying chamber, so it is essential that the fat globules are encapsulated and protected by the non-fat solids.**
- 3. Addition of sodium caseinate, lactose, dextrose, maltodextrin or sucrose act as a carrier.**
- 4. Cooling of powder is necessary to solidify fat and prevent caking, which will occur if the thin protective membranes are ruptured.**
- 5. Cyclone collection of powder results in mass caking of powder on the cyclone walls and bag filters soon become impervious if fat is deposited.**

6. High fat content of cream powder renders it susceptible to deterioration which impair flavour.
7. Oxidation of fat is also a potential problem and addition of antioxidant extends shelf life.
8. Storage of cream powders should be at low ambient temperatures, as an elevated temperature gives high proportions of liquid fat, resulting in caking problems and rapid flavour deterioration. Addition of free-flowing agent prevent caking.
9. Dried cream can be used as an ingredient for dried soup, dessert, ice cream or packet cake mixes.

