



Packaging of cheese



Packaging refers to put a commodity into a protective wrapper or container for shipment or storage. Any material used for packaging natural cheeses:

Afford general protection

Prevent oxygen transmission

Prevent moisture loss

Improve appearance

Protect against microorganisms



- ✓ Packaging of cheese is done to protect cheese at time of storage and transportation.
- ✓ Traditionally, cloth was used with wood to give support and protection, but invention of polymers or plastics has revolutionized cheese packaging.

Cheese is packaged mainly in two forms:



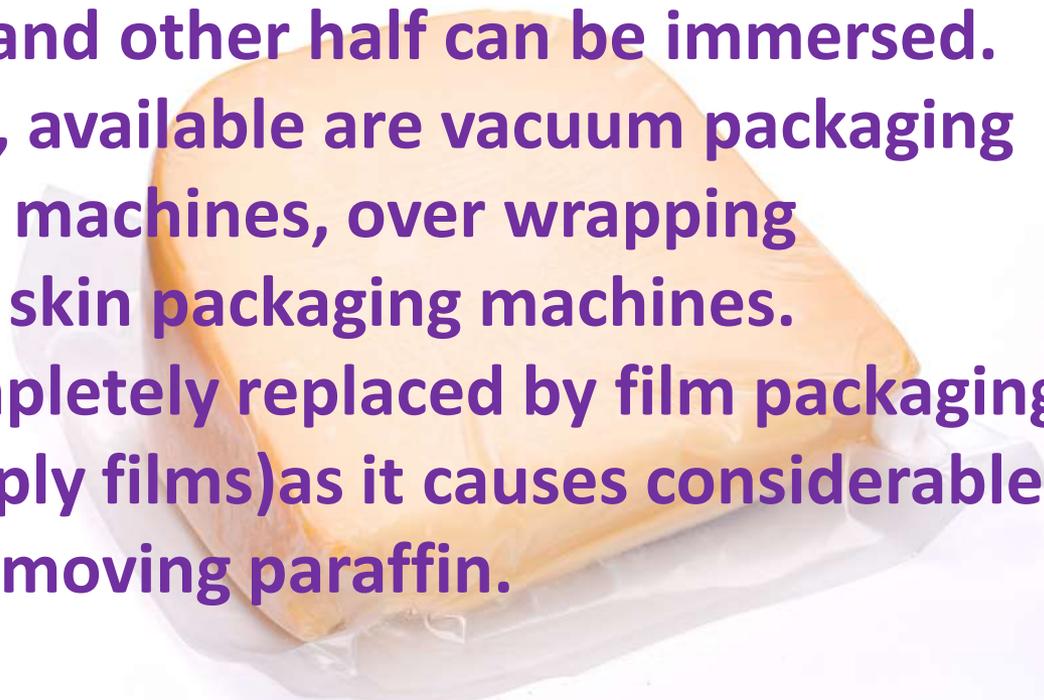
**Packaging cheese
for storage and
ripening (bulk
packaging)**



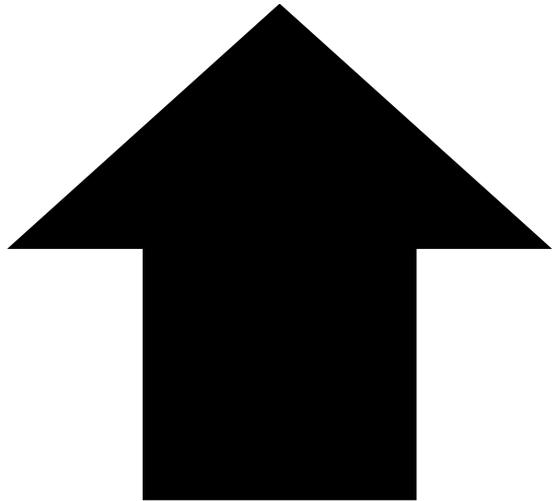
**Packaging for
consumers (retail
packaging)**

Bulk Packaging of Cheese

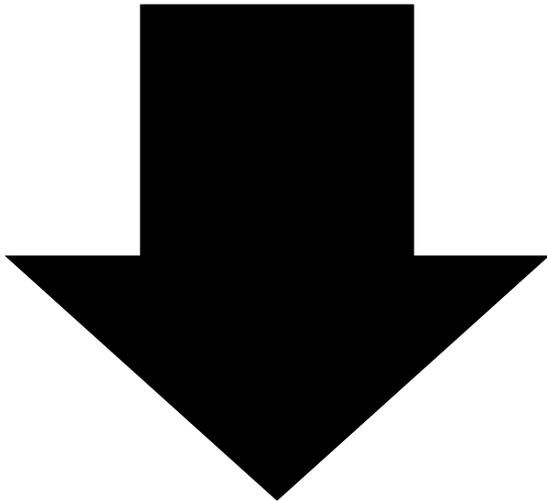
- For bulk packaging of cheese, it is either paraffined or vacuum packed in flexible film.
- For waxing, cheese can be lifted by means of suction and half immersed in wax and other half can be immersed.
- For vacuum packaging, available are vacuum packaging machines, gas flushing machines, over wrapping machines and vacuum skin packaging machines.
- Paraffining is now completely replaced by film packaging (cheap and easy-to-apply films) as it causes considerable loss of cheese while removing paraffin.



Modern Packaging Materials and Forms



Materials—Paper (coated or lined), parchment, foil (aluminum), polythene, propylene, treated cellulose and cellulose acetate (cellophane), polystyrene, polyester, polyamide (nylon), rubber hydrochloride (cryovac) and Saran (a mixed polymer) as well as laminates.



Forms - wrappers, cartons, bags, tubes, tubs, jars, cans, etc.

Film packaging

- **Green cheeses of uniform size and shape are ripened in bags made of plastic films. Wrapped cheese may be placed in wooden box to preserve its shape.**
- **If the cheese is made and ripened in conventional way, it may be cut into retail portions and wrapped by such method as the cryovac.**

Desirable properties of films for packaging

- **Film must be strong so that it does not tear or change its property when rubbed against a sharp point.**
- **Should be easily applied and sealed.**
- **Must be impervious to water vapor and oxygen.**
- **When the film is in contact with cheese, it should not change its inherent properties.**
- **Material must be chemically inert and non-toxic for humans.**

Plastic film packaging of cheese is applicable except cottage (very high moisture content) and Parmesan (very low in moisture).

Merits of Film Packaging

- **Affords a considerable saving in labor.**
- **Protects cheese from attacks by molds, insects, rodents and fault inducing microorganisms.**
- **Easily applied and method can be readily mechanized.**
- **No loss of moisture and of weight in the cured cheese (In traditional ripening, loss may be 3-7%, even up to 12 %)**
- **Suitable for packaging small quantities, which make handling and retail trade easier.**
- **Cheap and convenient.**
- **Humidity control is unnecessary during ripening and storage.**
- **More cheese can be stored in a given volume.**
- **Permits “rindless curing” so that whole cheese can be eaten (When rind is formed in traditional method, loss can be as high as 10%).**

Demerits of Film Packaging

- Failure to obtain a perfect seal and remove all air may result in mold growth.
- Moisture content of cheese at packaging must be less than for traditional packaging and must be carefully standardized. Failure to do so may lead to growth of taint-producing organisms.
- Ripening process in some cheeses (Camembert) may be affected.
- Film does not always give the same mechanical protection to cheese as traditional methods.



Retail Packaging of Cheese

- Retail packaging is an important aspect which affects not only the shelf-life of cheese but also its marketability.
- Cheese is available in the form of slices, cubes, tubs, paper board cartons with foil overwraps etc. These are available in different retail sizes (100 g, 200 g etc).
- Active packaging and modified atmosphere packaging is being used for retail cheese packaging.

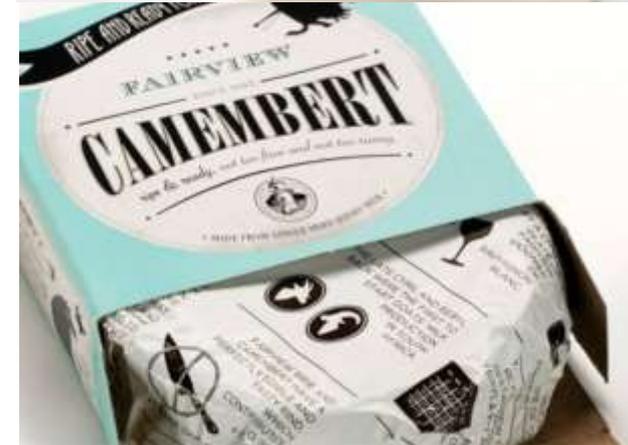


Developments in Packaging of Different Types of Cheese

1. Soft cheese

Special packaging requirements

- ✓ Packaging material requirements for soft cheeses differ considerably depending on whether the cheese concerned is a soft cheese with a mold formation (Camembert), blue veined cheese (Roquefort), or so called smeared cheese (Munster).
- ✓ Different bacteria and mold require packaging material with specific properties.



2. Fresh cheese

Special packaging requirements

Protection against light

- ✓ Metals are impervious to light.
- ✓ In fresh cheese packaging, the concern is first and foremost aluminium, whether in the form of lids to seal plastic containers or as deep-drawn containers.
- ✓ Imperviousness to light can be achieved through addition of carbon black or brown pigments (total transmission approaching 0%). As black cheese packaging is not acceptable to consumer, such light-preventing layers are usually produced as inner sheet of multilayer films by co-extrusion. This has not been done in dairy industry because of cost.
- ✓ Outstanding barrier property of aluminium is also found with vacuum metalized plastic films (polyethylene terephthalate polyester (PETP), cellophane or paper).

Protection against the effects of oxygen

- ✓ In order to avoid diffusion of oxygen, especially in packed fresh cheese with long shelf-life, the most impervious packaging material possible must be selected.
- ✓ Achieved using Al (foil/strips), metalized plastics or by means of O₂ resistant layers in plastic combinations (polyvinylidene chloride (PVDC), ethylene vinyl alcohol (EVAL) or polyvinyl alcohol (PVAL)).
- ✓ When selecting mono or multilayer combinations (bags or thermoformed containers), the data concerning gas permeability always refers to flat (unfolded) material measured at +23 C.
- ✓ When pack is formed, permeability may change significantly due to capillarity in sealed seam, thinning of material at the base of deep -drawn containers or fractures caused by bending in bags.

Protection against loss of moisture

- ✓ **Absorption of moisture is not of any significance for packaged fresh cheese.**
- ✓ **Fresh cheese with a long shelf-life must be protected against loss of moisture.**
- ✓ **In addition to specific properties of water vapor permeability of various packaging materials, the way they are processed into finished packs is also important.**

Protection against contamination

- ✓ **Apart from contamination through leaks in packs or lids, packaging material itself may be contaminated to some extent.**
- ✓ **Paper which is used as wrappers may be affected as a raw material or during production by bacteria and/or mold conidia.**
- ✓ **Due to high temperatures involved in processing, plastics are considered virtually bacteria -free.**

3. Hard cheese

Emmental cheese

- ✓ Pressed, block shaped Emmental Cheese (84 kg) is wrapped in cling film and stacked on a specially designed pallet, which can be mechanically turned during ripening/storage period.
- ✓ Smaller block shaped Emmental could be packaged mechanically in a Cryovac -BKIL bag. This type of packaging material is a laminate of different layers of plastics.



Cheddar and related cheese varieties



Pukkafilm

- ✓ This type of packaging material consists of a waxed cellulose laminate.
- ✓ First, the cheese block is wrapped with laminate; secondly, it is over-wrapped with waxed cellulose; thirdly cheese is placed in a chamber for sealing by the application of heat and pressure.

Unibloc system

- ✓ The pressed cheese is wrapped with a plastic film, e.g. Saran and over-wrapped with a layer of paper prior to packaging within six wooden slats.
- ✓ Cheese is compressed within slats by specially designed machine, and the pressure is maintained by placing four metal straps around cheese.

Storpac

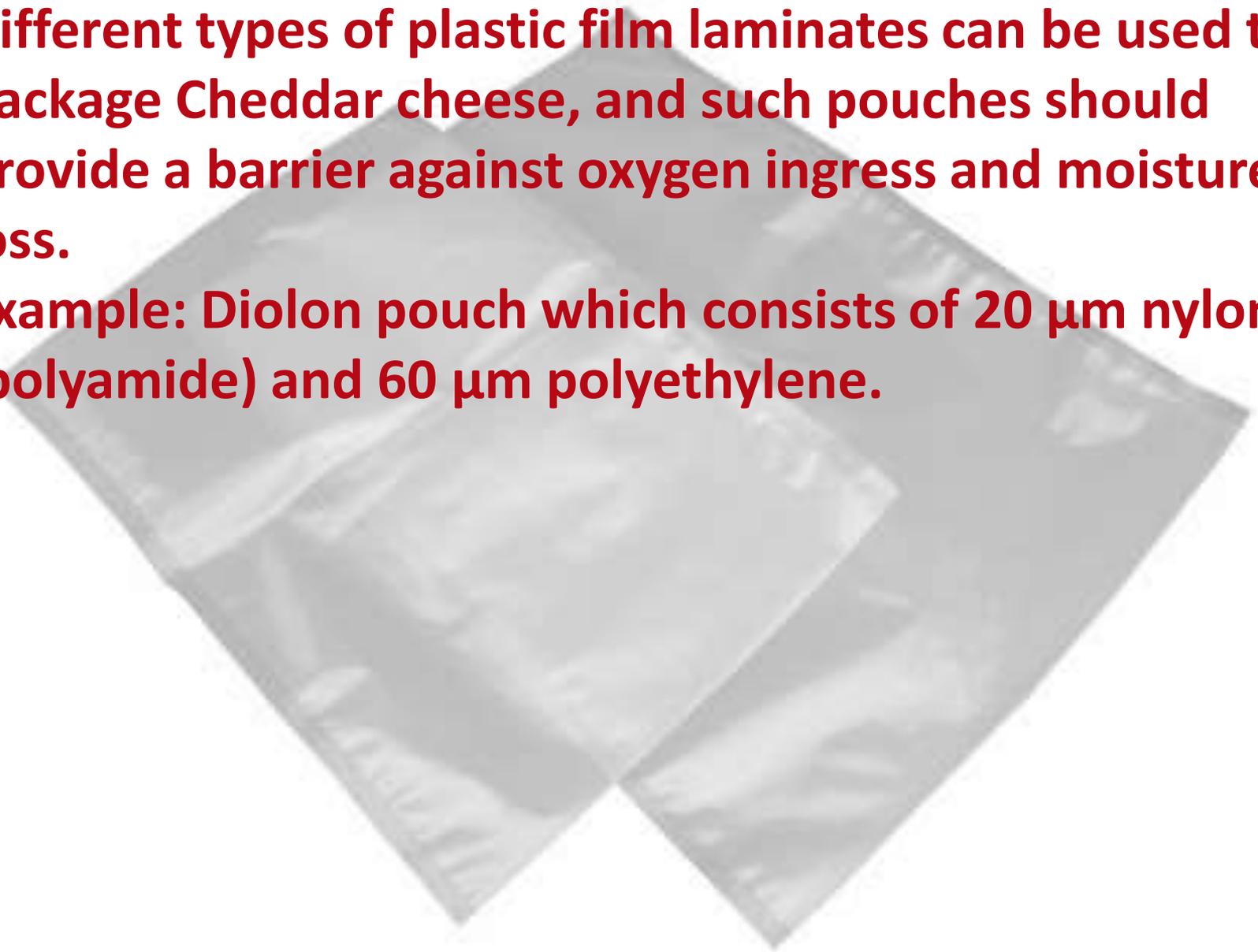
- ✓ **Packaged cheese, e.g. in a vacuum pouch or heat-shrink bag is wrapped in a thin cardboard box (optimal) and is placed in a wooded box with a loose cover. The latter piece is held onto the box using a plastic band for strapping. On dispatch the strap is removed from these boxes which are retained in the factory.**

Heat-shrink bags

- ✓ **Example of such bag: Cryovac-BB4L bag, which consists of three main layers: polyolefine, a PVDC barrier layer against oxygen and moisture and a cross -linked polyolefine.**
- ✓ **Gas production in Cheddar cheese during maturation period is a serious problem, and a quick remedy is to package the cheese in carbon dioxide permeable material, e.g. Cryovac -BKIL bag.**

Vacuum pouch

- ✓ **Different types of plastic film laminates can be used to package Cheddar cheese, and such pouches should provide a barrier against oxygen ingress and moisture loss.**
- ✓ **Example: Diolon pouch which consists of 20 μm nylon (polyamide) and 60 μm polyethylene.**



Gouda, Edam and related cheeses

- ✓ **After brining, cheese is plasticized twice to prevent mold growth during ripening period, and this process is repeated several times if the cheese is to be stored for long periods.**
- ✓ **Prior to dispatch, cheese is washed, dried and coated with paraffin wax and over-wrapped with red cellophane film.**
- ✓ **Mechanical handling of cheese in the store and waxing equipment are of great concern.**
- ✓ **Alternative approach for packaging of loaf, block or round Dutch cheeses is to wrap the product in a heat-shrink bag, which is then either sealed by heat with a metal clip.**
- ✓ **Various packaging materials are used in combination to give the desired shelf-life of cheese eg., Plastic combinations, Al -foil/paper laminates, cellophane/paper combinations.**
- ✓ **MAP increases packaging speed and thus reduce the cost.**