

Packaging of Fat rich dairy products

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Introduction

- Cream, Butter and ghee contains a high percentage of fat
- They are very susceptible to spoilage.
- So packaging material used should be selected in such a way that it possesses

Good grease resistance

Barrier properties against oxygen and moisture.

Cream

Cream is the concentrated form of milk fat

Characteristics of cream

- Cream contains a high % of milk fat and is very susceptible to spoilage.
- Moisture loss can occur if not properly packed .
- Prone to oxidative and lipolytic rancidity.
- Can absorb flavours

Characteristics of packaging material required for cream

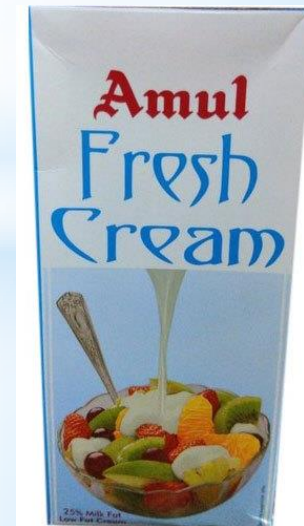
1. Prevent light passage
2. Prevent water loss
3. Prevent oxygen transmission
4. Shall offer resistance for microbial contamination



- * In early 20th century waxed paperboard cartons were used as containers for cream.
- * Now a days creams is packed in similar packages used for milk
- * Newer cream packaging materials are made up of linear polyethylene, polystyrene or polypropylene with a peelable lid or snap-on cover.
- * Tin plate containers have also been used for larger sizes.
- * Whipped cream and synthetic formulations are sold in aerosol cans and polyethylene tubes.



- * Imitation cream made from soybeans and vegetable oils is often marketed in wax coated paper board cartons.
- * PE extruded or wax coated paperboard tubs are used to pack single portion cream.
- * Sterilized/UHT cream is packed in similar lines to that of UHT milk.



Butter

Butter consists primarily of about 80% milk fat, 15% moisture and in table butter up to 3% common salt.

Because of high moisture content butter is susceptible to mould growth and lypolytic rancidity

Characteristics of butter

- Due to high moisture content butter unlike solid fats is susceptible to mold growth.
- Flavour and odour are easily absorbed by butter from its environment.
- Deterioration of the butter may take place due to rancidity.
- Butter has tendency to lose Moisture.

Requirement of packaging

- Non toxic, not harmful to consumer's health.
- It should be grease/moisture proof.
- Shall be barrier for Oxygen.
- Low metallic content as metals favour oxidation of fat.
- Shall not transmit light.



Packaging Material Used

- * In India, butter is packed in bulk as well as in retail packages.
- * For bulk packaging there is no standard method, and generally polyethylene bags/parchment paper along with corrugated boxes are used.
- * Al-foil 0.09 mm thick, surface treated with lacquer for protecting against corrosion: Al foil/ parchment or glassine paper (40-42 gsm): PVC or cardboard with a parchment insert can be used.
- * Indian Standard 2034 - 1961 specifications has been given for tin cans of 200 g and 400 g capacity that are to be used for package of butter.
- * Though tinplate containers are the best for product protection, owing to their high cost very little quantity of butter is packed in the tin containers.

- * Flexible packaging materials like vegetable parchment paper or grease proof paper, aluminium foil, and paper board cartons which together give similar protection to the product are more commonly used.
- * Indian Standard 7161 - 1973 gives specifications for vegetable parchment paper or Grease Proof paper/ Aluminium foil laminate for wrapping butter.
- * As vegetable parchment paper has good wet strength, generally paper of 45 gsm and above and aluminium foil above 0.009 mm thickness are used.
- * As butter is highly susceptible to foreign odour, care must be exercised while choosing adhesive and printing inks used in the manufacture of the laminates.

- * There is also another IS: 8113-1976 standard for primary cartons for packaging of 100 g, 200 g and 250 g. butter slabs.
- * Cartons protect butter while handling after packaging in primary Wrapper, in the distribution system.
- * Since butter is stored in the refrigerator, cartons may be waxed on each side though it is not mandatory.
- * Paperboard can be extrusion coated with PP. Injection-moulded pots and tubs of PP can also be used for packaging of the butter.
- * High-impact polystyrene or HIPS is also used in multilayer sheet extrusion with a variety of other polymers, like PE, PP, PET, PVDC and EVOH.

- * Large packs of 10, 20 and 50 kg butter are packed formerly in wooden barrels/boxes or parchment paper lined corrugated boxes.
- * For better handling, easier storage, more efficient use of storage space and economy Fibre board boxes are introduced which are lined with parchment paper.
- * Latest packaging material that are being used are Shallow, 1-2 mil thick Al-foil trays with heat sealable PVDC-cellophane or other suitable barrier material.
- * Aluminium PVDC/PS cups can also be used for butter.
- * Butter chiplets are packed in lacquered Aluminium foil.



The standards for vegetable parchment paper used for the butter packing are:

- * Grammage: 41-45
- * Bursting strength: 1.8 ± 0.2 kg/cm²
- * Wet strength: 0.8 ± 0.2 kg/cm²
- * Grease resistance: Should pass the turpentine oil test
- * Acidity: 0.02% as H₂SO₄
- * pH of H₂O extract: not less than 5.0
- * Brightness: 79.



Ghee

- * It is usually 100 per cent fat with little moisture ($< 0.3\%$), obtained by boiling butter at 110°C till all water is evaporated with a grainy texture and a characteristic flavour.
- * The product needs to be protected from chemical spoilage and rancidity caused by oxygen, light, heat, moisture and metal ions.

Characteristics of ghee

1. Easy to absorb flavour from its environment
2. Easily prone for oxidation
3. Prone for adulteration.

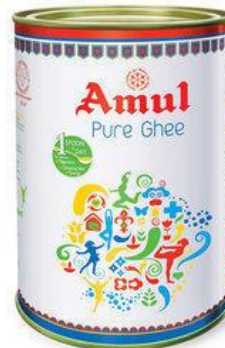


Packaging material should have

1. Good fat resistance
2. Barrier properties against oxygen and moisture.
3. It shall be temper proof.

- * A major portion of ghee is packed in lacquered tins of capacities ranging from 250 litres to 15 litres / kilograms.
- * Since the product is very sensitive to oxygen, the tin containers are filled to the brim without any air gap.
- * Ghee packed in tin containers is fairly stable and has a shelf-life of about one year.
- * For shorter shelf-life, 200 ml, 500 ml and 1 litre capacity pouches made of polyethylene film, multi – layer co-extruded films of LDPE/HDPE are used, which are economical.

- * Aluminium foil laminate pouches are also commonly used for packaging ghee.
- * IS: 11352-1985 specifications for flexible packs for the packing of edible oils and vanaspati have been recommended for this purpose.
- * For long – term storage, stainless steel containers or tinfoil cans are desirable.
- * Ghee is also marketed in lined cartons with flexible laminated plastics as inner liner materials and in tetrapaks.
- * In both these packs long shelf-life is achieved.
- * Laminated pouches of metallised polyester based films are also used.



- * Seven layer Nylon containing self standing pouch with closure is used.
- * A laminate of HDPE / LDPE is used for packing of ghee.
- * Another form is consisting of a multi-ply collapsible bag with a tap which can be housed in a rigid outer container. The container can be a box, a crate or a drum whose capacity varies between 3 and 200 liters. The bags and boxes are in collapsible form.
- * Nylon/ Styrene-based laminates, EVOH are also being experimented as these materials could provide a fairly long shelf-life.



THANK YOU