Ministry of Food Processing Industries
Government of India

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

PACKAGING OF LIQUID MILK

AATMANIRBHAR BHARAT

PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme)

INTRODUCTION

As per FSSAI, “Milk is a whole, fresh, clean lacteal secretion obtained by complete milking of one or more healthy milch animals excluding that obtained within 15 days before calving or 5 days after calving. Market milk must possess the pre-determined percentage of milk fat and SNF (Solid Not Fat).”

FACTORS INFLUENCING KEEPING QUALITY OF MILK

a) Temperature of storage: must be stored at refrigerated temperature.

b) Initial acidity must be less

c) Exposure to metals: Metals like, iron and copper act as catalytic agents for oxidation.

d) Exposure to light / sunlight causes oxidation of milk.

e) Method of packaging: Higher the air-content in the head-space resulted in the lower keeping quality.

DESIRABLE CHARACTERISTICS OF PACKAGING MATERIAL FOR MILK

a) Must compile Food Safety and Standards (Packaging and Labelling) Regulations, 2011

b) packaging material should not react with milk

c) available at low cost

d) non toxic packaging material

e) should not allow printing ink to penetrate into the product

f) protect against tempering

g) protects against spoilage causing agents

h) withstand wear and tear during transportation

i) convenience in use

j) should be reuse or recyclable

k) compatible with the packaging machine

PACKAGING

- Packaging is an important part of food manufacturing process. It protect the food products from physical ,chemical, biological damages.
- Without packaging, materials handling would be a messy, inefficient and costly exercise and modern consumer marketing would be virtually impossible.
- Packaging Institute International defined packaging as the enclosure of products, items or packages in a wrapped pouch, bag, box, cup, tray, can, tube, bottle or other container form to perform one or more of the following functions: containment, protection, preservation, communication, utility and performance. If the device or container performed one or more of these functions, it was considered a package.

NEED OF PACKAGING

- **CONTAINMENT :** protecting the environment from the myriad of products that are moved from one place to another.
- **PROTECTION :** to protect its contents from outside environmental influences such as water, water vapor, gases, odors, microorganisms, dust, shocks, vibrations and compressive forces.
- **CONVENIENCE :** Products designed to increase convenience include foods that are prepared and can be cooked or reheated in a very short time, preferably without removing them from their primary package.

NEED OF PACKAGING

- **COMMUNICATION**

Packaging contains a lot of information such name of its manufacturer, product name, terms and uses, date of manufacturing, best before. nutritional information thus helping the consumer to be more informed.

TYPES OF PACKAGING

- **PRIMARY PACKAGING :** Primary package are those package which directly came into contact with food products. It provides first or initial layer of protection to the food products. Examples of primary packaging includes parchment paper, greaseproof paper, paperboard cartons, and plastic pouches.
- **SECONDARY PACKAGE :** Secondary package are those package which surrounds or contains the primary package. Ex. Corrugated case, Boxes
- **TERTIARY PACKAGE :** It contains number of secondary package together. Mainly used for bulk handling of food products.

PACKAGING MATERIAL FOR FLUID MILK

Packaging of fluid milk is mainly done to protect milk from outside environment, especially after the completion of process so that milk can retain moisture, flavor, freshness for a longer period of time.

PACKAGING MATERIAL FOR FLUID MILK

1. LDPE

- Low-density polyethylene is heat sealable, inert, odour free and shrinks when heated.
- It act as a barrier to moisture and has high gas permeability
- It is less expensive, therefore widely used.
- Has ability of fusion welded to itself to give good, tough, liquid-tight seals.

PACKAGING MATERIAL FOR FLUID MILK

2. PET

PET can be made into film by blowing or casting.

- ✓ Melting point of PET is higher than PP which is around 260°C and due to the manufacturing conditions does not shrink below 180°C.
- ✓ PET is ideal for high-temperature applications.
- ✓ It also act as good barrier of oxygen and water vapor

PACKAGING MATERIAL FOR FLUID MILK

3. HDPE or PP

High density Polyethylene or Polypropylene container has been also used for packaging milk. The benefits include:

i. Weather-resistance

ii. Malleability

iii. Light-weight

iv. Cost-effective

v. Hygienic

vi. Recyclable

vii. FDA-approved

PACKAGING MATERIAL FOR FLUID MILK

4. Glass Bottle

Glass containers come in the form of bottles, jars, jugs and tumblers. They may be plain and transparent or coloured and opaque.

While the plain glass bottle provides the advantage of direct viewing of the product contained in it, it has the disadvantage of exposing the milk to ultra violet rays that deteriorate it.

- ✓ Strong, inert material
- ✓ Good closure and decorative options
- ✓ Raw materials easily available
- ✓ Recycling possible
- ✓ Excellent gas and water barrier properties
- ✓ Good internal pressure resistance

SOME RECENT TRENDS IN PACKAGING

ASPECTIC PACKAGING

- Aseptic packaging is the filling of sterile containers with a commercially sterile product under aseptic conditions, and then sealing the containers so that re-infection is prevented; that is, so that they are hermetically sealed.
- **Aseptic packaging are used for :**
  - ✓ To take advantage of high temperature.
  - ✓ Increase shelf life of food products at normal temperature.
  - ✓ In package sterilization.

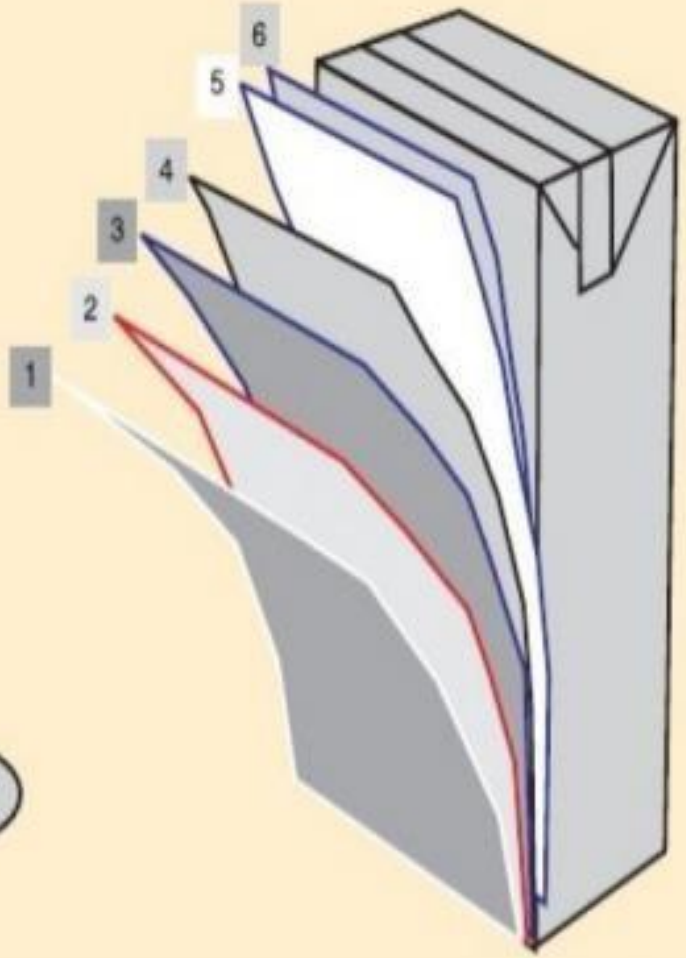
TYPE OF PACKAGE FORMS

In India, Tetra Pak offers the following packaging systems currently:

- TBA: Tetra Brik Aseptic
- TCA: Tetra Classic Aseptic
- TFA: Tetra Fino Aseptic
- TWA: Tetra Wedge Aseptic

COMPOSITION OF TETRAPAK CARTON

1. Polyethylene: Protects against moisture
2. Paper: For stability & strength
3. Polyethylene: Adhesion
4. Aluminium: Oxygen, flavour & light
5. Polyethylene: Adhesion
6. Polyethylene: Seals in the liquid



6 Layers Providing Total Protection

PACKAGING MATERIAL FOR FLUID MILK

(Tetra Brick): The basic operation in aseptic packaging consists of:

1. Heating the product to sterilization temperatures (140-150°C for 0-few seconds).
2. Maintaining the sterility of the products till they are cooled/packed.
3. Filling into sterile containers and sealing aseptically.

PACKAGING MATERIAL FOR FLUID MILK

Aseptic Package (Tetra Brick): The main characteristics of aseptic packing which are essential are as following.

1. Low water-vapour transmission rate.
2. Low gas transmission rates, especially to oxygen.
3. Good physical or mechanical strength.
4. Good sealing characteristics to prevent entrance of external contaminants.
5. Resistance to withstand the temperatures encountered during filling of the product as well as during storage and distribution.
6. Economical in cost in comparison to the packaged product and readily available in the market.

PACKAGING MACHINES

MILK POUCH PACKING MACHINE

- ✓ Automatic FFS (form fill and seal) machine.
- ✓ Filling Range: 200ml, 250ml, 500ml & 1ltr
- ✓ Filling System: Gravity filler
- ✓ Packing Material: LDPE film width:324±2mm
- ✓ Filling Range: 200ml, 250ml, 500ml
- ✓ Pouch length: Mechanical adjustment
- ✓ All contact parts: Stainless Steel

PACKAGING MACHINES

AUTOMATIC MILK FILLING MACHINE

- ✓ Piston fillers are a great option for packaging liquids.
- ✓ Filling Range: 500ml to 1 liter
- ✓ Filling Speed: 500 bottle per hour or more
- ✓ All contact parts Stainless Steel

PACKAGING MACHINES

ASEPTIC PACKAGING MACHINE

- ✓ Tetra Brik® Aseptic is one of the world's most efficient beverage carriers. Using no unnecessary material, weight, space or energy, its rectangular package shape stacks neatly on pallets, in transport containers, on supermarket shelves and at home.

PACKAGING & LABELING LAWS - FSSAI

General requirement for packaging:

- A utensil or container made of the following materials or metals, when used in the preparation, packaging and storing of food shall be deemed to render it unfit for human consumption:—
- (a) containers which are rusty;
- (b) enameled containers which have become chipped and rusty;
- (c) copper or brass containers which are not properly tinned
- (d) containers made of aluminium not conforming in chemical composition to IS:20 specification for Cast Aluminium & Aluminium Alloy for utensils or IS:21 specification for Wrought Aluminium and Aluminium Alloy for utensils.

PACKAGING & LABELING LAWS - FSSAI

Labeling should contain following information

- ✓ Name of the food product.
- ✓ List of ingredients.
- ✓ Nutritional information.
- ✓ Declaration of VEG and NON VEG.
- ✓ Declaration of added food additives.
- ✓ Name and address of manufacturer.
- ✓ Batch Number
- ✓ MRP

PACKAGING & LABELING LAWS - FSSAI

- ✓ Net quantity
- ✓ Code number
- ✓ Lot number/ Batch number.
- ✓ Date of manufacturing.
- ✓ Best before date
- ✓ Country of origin.
- ✓ .Number of pieces
- ✓ Bar Code
- ✓ Brand Name etc

STORAGE OF MILK

- ✓ Ideal storage temperatures for milk and dairy products are 2-4°C.
- ✓ Under ideal refrigeration, most pasteurized milk will remain fresh for 2-5 days after its sell-by date. Once opened, pasteurized milk should be used as soon as possible for best quality and taste.
- ✓ UHT milk or long-life milk has a typical shelf life of six to nine months at ambient temperatures if unopened. Once opened, it should be refrigerated and used within seven days.

For More details Contact:

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