Ministry of Food Processing Industries
Government of India

NIFTEM
KNOWLEDGE • INNOVATION • OUTREACH

PACKAGING OF MUSSELS

AATMANIRBHAR BHARAT

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

BASIC FUNCTIONS OF PACKAGING

- **Protection** : to prevent mechanical damage during handling and deterioration by climate during distribution and storage.
- **Containment**: to hold or keep its contents intact from the time of packaging to till that of consumption
- **Presentation :** promotion of sales, instruction for handling and storage, display etc.
- **Identification / Information** : It must identify the content
- **Convenience** : it should be easy to handle and carry
- **Compliance**: meet the legal requirements and comply to the requirements of the country

TYPES OF PACKAGING SYSTEMS

- Air packing
- Vacuum packaging
- Retort Packaging
- Blister packaging
- Aseptic packaging
- Portion packaging
- Shrink packaging
- Skin packaging
- Stretch packaging
- Inert packaging
- Modified atmosphere packaging

TYPES OF PACKAGING

Primary Packaging – is the material that first envelops the product and holds it and is in direct contact with the product

Secondary Packaging- is outside the primary packaging, used to group primary packages together

Tertiary Packaging – is used for bulk handling, warehouse storage and transport shipping

MATERIALS FOR PACKAGING

Natural

- Paper- Kraft and parchment
- Metal- tin, Aluminium, TFS cans,
- Aluminium foil, Metallised films.
- Glass
- Earthern pots

PAPER BASED PACKAGING

- Paper or paper based materials are widely used for packaging and storage of foods.
- Paper packaging is low cost, easy available and versatile
- Paper is highly permeable to gases, vapour and moisture and loses its strength when it gets wet.
- Ordinary paper is not grease and oil resistant, but can be made resistant by mechanical processes.
- Thicker paper is called as paper board which is used for making duplex casrons and corrugated fibre board cartons

MATERIALS FOR PACKAGING CONTINUED…

Synthetics Materials

- Polyethylene- LD, HD, LLDPE
- Polypropylene
- Polyester
- Polyamide (PA) or Nylon film,
- Poly vinyl chloride (PVC)
- Polystyrene

Synthetic materials or plastics are light in weight, flexible and offers resistant to cracking, possess excellent physical properties such as strength and toughness.

HIGH DENSITY POLYETHYLENE (HDPE)

- Harder and has higher softening point than LDPE.
- Barrier and mechanical properties are superior to those of LDPE.
- High molecular weight, high density polyethylene (HM-HDPE) has very good mechanical strength, and environmental stress crack resistance.

LOW DENSITY POLYETHYLENE (LDPE)

- Most commonly used packaging material
- Transparent in nature with heat sealing property
- Water vapour impermeability
- Chemically inert and economical.
- Oxygen and carbon dioxide permeability high
- Poor grease barrier property.
- Can withstand temperature between - 40 to 85^{o}C.

GLASS

- Strong, rigid and chemically inert.
- Does not appreciably deteriorate with age and offers excellent barrier to solids, liquids and gases.
- It also gives excellent protection against odour and flavor and product visibility.
- Glass can also be moulded to variety of shapes and sizes.

METAL CANS

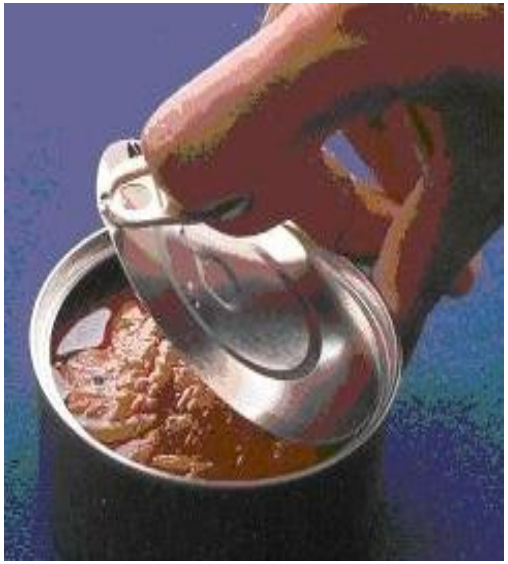
- Tin plate – 98% steel 2% tin coating
- Basically 4 types – L , MR, MC and M.
- Cold reduction & hot reduction
- Can making quality steel,
- Corrosion depends on the copper and phosphorous
- Tinned foods lose natural colour
- Lacquer protects the steel
- Can be processed at high temperatures

ALUMINUM CANS

- Availability of material and low cost of production
- Good corrosion resistance
- Easy to fabricate
- Light in weight, can be made into any shape and size
- Good recycle value
- Heat processing requires special attention

POLYMER COATED TFS CANS

- Electrochemically chromium coated cans
- Lacquered with polyethylene terephthalate
- Base steel has 0.15mm thickness and total thickness is 0.19 mm.
- 2 piece, draw and redraw process.
- Lids are of EOE , of thickness 0.28 mm
- Has a neoprene rubber sealing compound to get a hermetically seal after double seaming
- Universally used



VACUUM PACKED FRIED MUSSEL

- Vacuum packaging involves the removal of air from the package and then the application of a hermetic seal.
- This prevents chemical reactions like oxidation caused by oxygen present in the package
- It also retarts the growth of bacteria and reduces spoilage
- Vacuum packaging can considerably extend the viable shelf life of many cooked foods.
- Vacuum packaging must be used under strict conditions of hygiene and control, and not as means to forgo proper sanitation.

VACCUM PACK….

- Foods maintain freshness & flavor longer than with conventional storage methods, because of lack of O_2
- Foods maintain their texture & appearance, because microorganisms cannot grow in a vacuum.
- Freezer burn is eliminated, because foods no longer become dehydrated from contact with cold, dry air.
- Moist foods won't dry out, because there's no air to absorb the moisture from the food.
- Dry foods won't become hard, because they can't absorb moisture from the air. Fatty foods won't become rancid.
- Insect infestation is eliminated, because insects require oxygen to survive.

MODIFIED ATMOSPHERE PACKAGING

- Modified atmospheric packaging is a process by which the shelf life of mussels is enhanced by enclosing it in an altered atmosphere.
- This slows down the degradation by microorganisms and development of oxidative rancidity.
- Raw mussel meat can be packed in an atmosphere of carbon dioxide and other gases like oxygen and nitrogen
- MAP chilled mussel is an attractive proposition both to the retailer and to the consumer
- MAP mussels have an extended shelf life compared to air packed samples under chilled storage.

DRIED MUSSEL AND MUSSEL CHUTNEY POWDER IN FLEXIBLE POUCHES

- Flexible films like low density polypropylene, polypropylene are used for packaging for short duration
- Laminated pouches made of polyester polythene or metallised polyester laminated with LDPE for longer duration.

Advantages:

Light in weight, requires less storage space

Easy to use, seal and open

Easy to dispose

Disadvantages:

Consumes much packaging time

Causes environmental problems

Mussel chutney Powder

Dried mussel

CONDIMENT INCORPORATED READY TO COOK MUSSEL MEAT IN THERMOFORMED TRAYS

- Condiment incorporated mussels can be packed under vacuum in trays and marketed in the chilled or frozen forms
- High impact polystyrene trays or high density polypropylene trays can be used
- LDPE or multilayer laminated films can be used for packing such mussels
- Multilayer films have low oxygen and water vapour barrier properties and will preserve the product

PACKAGING FOR CONDIMENT INCORPORATED RTS FRIED MUSSEL

- Multilayer films or laminates are advised for fried mussel packaging
- The material should provide a barrier against oxygen to reduce fat oxidation
- Retard chemical and bacterial spoilage
- Prevent permeation of external odours

BREADED AND BATTERED MUSSEL

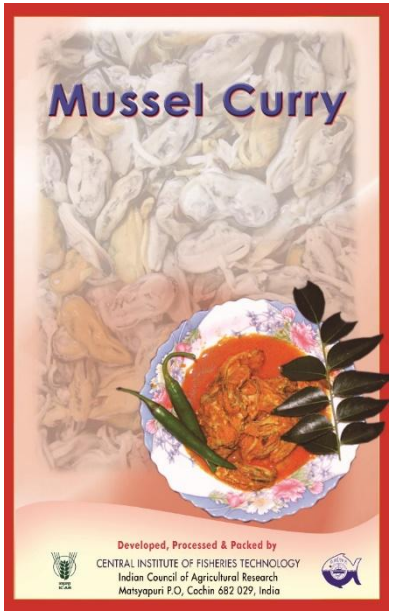
- They are value added products in a convenience form wherein the battering and breading increase the bulk of the product.
- Major changes occurring during frozen storage of the product is desiccation, discoloration and rancidity .
- Flexible packaging films alone may not provide enough protection to the products during handling and transportation.
- Trays made of materials like high impact polypropylene (HIPP) and high density polyethylene (HDPE) are unaffected by low temperature of frozen storage.
- The trays have high impact strength , resistance to cracking at low temperatures, inert and have good barrier properties.

HALF SHELL FROZEN MUSSELS IN TRAYS AND FILMS

- Half shell mussels can be air packed in HIPP, HDPE trays for frozen storage.
- Mussel meat is also marketed in the vacuum sealed forms
- Packaging helps in minimising dehydration and moisture loss from the surface of the product
- Laminated or coextruded pouches are advised since the shell of the mussel can damage monolayer packaging.

READY TO EAT MUSSEL PRODUCTS IN RETORTABLE POUCHES

- Retort pouches are multilayer packaging materials.
- 12 µ polyester/ 12 µ Aluminium foil / 70 µ Cast polypropylene
- Outer PES is 12 µ thick - protects the foil & provide the laminate with strength & abrasion resistance
- Aluminium foil – gives water, gas, odour and light barrier properties. Foil thickness is normally 12 µ.
- Polypropylene inner ply - to provide strong heat seal & for food contact. Thickness depends-50 µ (for soft liquid containing products) & 70µ (for hard products)
- Prevents any metallic taste and avoid discoloration
- Maintain high vacuum



READY TO EAT MUSSEL PRODUCTS IN RETORTABLE POUCHES…

Basic requirements for retort pouch film are as follows.

Low gas (Oxygen) permeability & Low WVTR

Resistance to temperature from below 0°C to 121°C to cover possible storage & minimum sterilization

Resistance to penetration by food components & low migration of film components

Heat sealability and capability of being handled on automatic fabricating and filling equipment.

Physical strength to resist any handling abuse during manufacturing and during distribution cycles.

READY TO EAT MUSSEL BIRIYANI IN THERMOFORMED TRAYS

- EVOH based trays or multilayered PP trays are used for thermal processing of mussels.
- The trays are top sealed in a vacuum sealing machine.
- Trays ensures uniform exposure to the heating medium.
- Trays can be used for heating and serving the product

PACKAGING AND LABELLING REQUIREMENTS TO BE FOLLOWED FOR THE GIVEN PRODUCT AS PER FSSAI

Food Safety and Standards (Packaging) Regulations, 2018

General Requirements

- Every food business operator shall ensure that the packaging material used shall be in accordance with these regulations: Provided where Indian Standards are not available, then relevant International Standards may be complied with.
- Any material which comes in direct contact with food or likely to come in contact with food used for packaging, preparation, storing, wrapping, transportation and sale or service of food shall be of food grade quality.
- Packaging materials shall be suitable for the type of product, the conditions provided for storage and the equipment for filling, sealing and packaging of food as well as transportation conditions.
- Packaging materials shall be able to withstand mechanical, chemical or thermal stresses encountered during normal transportation. In case of flexible or semi-rigid containers, an overwrap packaging may be necessary.

FOOD SAFETY AND STANDARDS (PACKAGING) REGULATIONS, 2018

General Requirements

- Food products shall be packed in clean, hygienic and tamper-proof package or container.
- The sealing material shall be compatible with the product and the containers as well as the closure systems used for the containers.
- Tin containers once used, shall not be re-used for packaging of food.
- Plastic containers of capacity 5 liter and above and Glass bottles, which are reused for packaging of food, shall be suitably durable, easy to clean or disinfect.
- Printing inks for use on food packages shall conform to IS: 15495.
- Printed surface of packaging material shall not come into direct contact with food products.
- Newspaper or any such material shall not be used for storing and wrapping of food.
- In case of multilayer packaging, the layer which comes in direct contact with food or layers likely to come in contact with food shall meet the requirements of packaging materials specified in Schedule I, II and III of these regulations.

FOOD SAFETY AND STANDARDS (PACKAGING) REGULATIONS, 2018

General Requirements

- The materials listed in Schedule I, II and III of these regulations shall be compatible with their intended use as a packaging material so as not to alter the quality and safety of the food product.
- Every food business operator shall obtain the certificate of conformity issued by NABL accredited laboratory against these regulations, for the packaging material, which comes in direct contact with food or layers likely to come in contact with food to be used.

PLASTIC MATERIALS INTENDED TO COME IN CONTACT WITH FOOD PRODUCTS

Migration

All packaging materials of plastic origin shall pass the prescribed overall migration limit of 60 mg/kg or 10 mg/dm^2 when tested as per IS 9845 with no visible color migration

Plastic materials and articles shall not release the substances in quantities exceeding the specific migration limits (mg/Kg)

Barium 1.0, Cobalt 0.05, Copper 5.0, Iron 48.0, Lithium 0.6, Manganese 0.6, & Zinc 25.0

SCHEDULE – IV: LIST OF SUGGESTIVE PACKAGING MATERIALS

Fish and fish products or Seafood

- Glass jars with plastic (PP or High-density polyethylene (HDPE) caps
- Metal Containers with metal lid (lacquered tin containers)
- Polyethylene terephthalate (PET) punnets or containers with plastic caps
- Plastic-based multi-layered flexible laminates heat sealed pouches
- Plastic tray with overwrap

FOOD SAFETY AND STANDARDS (LABELLING AND DISPLAY) REGULATIONS, 2020

Labelling Requirements

(1) The Name of Food: Every package of food shall carry name of the food, which indicate the true nature of the food contained in the package, on the Front of Pack

(2) List of Ingredients

(3) Nutritional information.-

(4) Declaration regarding Veg or Non veg

Non-Vegetarian Food: The symbol shall consist of a brown colour filled triangle inside a square with brown outline

(5) Declaration regarding Food Additives
(6) Declaration of name and complete address
(7) FSSAI logo and license number

fssai

Lic. No. XXXXXXXXXXXXX

FOOD SAFETY AND STANDARDS (LABELLING AND DISPLAY) REGULATIONS, 2020

Fortified food & Organic food

Fortified with....
SAMPOORNA POSHAN
SWASTHA JEEVAN

.... से फोर्टिफाइड
सम्पूर्ण पोषण स्वस्थ जीवन

Jaivik Bharat

(8) Net quantity, Retail Sale Price and Consumer Care details
(9) Lot/Code/Batch identification
(10) Date Marking
(11) Labelling of Imported Foods
(12) Country of Origin for Imported Foods
(13) Instructions for use: Example- 'Refrigerate after opening'
(14) Declaration regarding Food allergen
Crustacean and their products (To be declared as Crustacean)
Fish and fish products (To be declared as Fish)
(15) Every package of food material sold in retail but which is not meant for human consumption shall bear a declaration to this effect by a symbol-A black colour cross inside a square with black outline

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