

Packaging types



Packaging may be looked at as being of several different types. For example a transport package or distribution package can be the shipping container used to ship, store, and handle the product or inner packages. Some identify a consumer package as one which is directed toward a consumer or household. Packaging may be described in relation to the type of product being packaged: medical device packaging, bulk chemical packaging, over-the-counter drug packaging, retail food packaging, military materiel packaging, pharmaceutical packaging, etc.

It is sometimes convenient to categorize packages by layer or function: "primary", "secondary", etc. * Primary packaging is the material that first envelops the product and holds it. This usually is the smallest unit of distribution or use and is the package which is in direct contact with the contents. * Secondary packaging is outside the primary packaging, perhaps used to group primary packages together. * Tertiary packaging is used for bulk handling, warehouse storage and transport shipping. The most common form is a palletized unit load that packs tightly into containers. These broad categories can be somewhat arbitrary. For example, depending on the use, a shrink wrap can be primary packaging when applied directly to the product, secondary packaging when combining smaller packages, and tertiary packaging on some distribution packs.

FRUITS and vegetables are an important sub-sector in the agricultural sector because they are valued as protective food. They are very rich source of minerals, vitamins providing more energy per unit weight than cereals. Pakistan has a wide range of agro-climatic condition, which allows the production of a variety of fruits and vegetables.

However, there is a wide gap between availability and the per capita nutritional requirement of fruits. Low availability of quality fruits and vegetables is mainly due to considerably high post-harvest losses, poor transportation, improper storage and low processing capacity with a growing population.

The increased production of fruits and vegetables and other agricultural produce will be fully realised only when they reach the consumer in good condition and at a reasonable price. The post-harvest losses could be considerably reduced by adopting improved packaging, handling and efficient system of transport.

Packaging of fruits and vegetables is undertaken primarily to assemble the produce in convenient units for marketing and distribution.

Requirements: The package must stand up to long distance transportation, multiple handling, and the climate changes of different storage places, transport methods and market conditions.

In designing fruit packages one should consider both the physiological characteristics of the fruit as well as the whole distribution network. The package must be capable of protecting the product from the transport hazards; preventing the microbial and insect damage; minimising the physiological and biochemical changes and losses in weight.

Careful packing of fruits and vegetables is necessary to keep the produce in place with minimum shaking. Fruits and vegetables are normally packed in layers in crates and in each layer products are packed alternately placing the

beak of one in between the shoulders of two. This method of packing is easy to follow and quick. It also provides enough room without compressing it.

The present packaging systems for fresh vegetables is unscientific. Uses of traditional forms of packages like bamboo baskets are still prevalent.

Other types of packages generally used are wooden boxes and gunnysacks. Use of corrugated fibre board boxes is limited. Baskets besides being unhygienic also do not allow adequate aeration and convenience of easy handling and stocking.

Considering the long-term needs of eco-systems and to achieve an overall economy, other alternatives available like corrugated fibre board boxes, corrugated polypropylene board boxes, plastic trays/crates /wooden sacks, moulded pulp trays/thermoformed plastic trays and stretched film and shrink wrapping would have to be looked into.

Modern packages are expected to meet a wide range of requirements, summarised below:

- * packages must have sufficient mechanical strength to protect the contents;
- construction material must not contain chemicals, which would transfer to the produce;
- package must meet handling and marketing in terms of weight, size and shape;
- packages should allow rapid coding of contents;
- security of the package or its ease of opening and closing might be important in some marketing situations;
- package should identify its contents;
- it must be required to aid retail presentation;
- package might need to be designed for ease of disposal, reuse or recycling;
- cost of the package should be as less as possible.

A great variety of materials are used for the packing of perishable commodities which include, wood, bamboo, rigid and foam plastic, solid cardboard and corrugated fibre board.

Ventilation: Reduction of moisture loss from the product is a principal requirement of limited permeability packaging materials. A solution to moisture loss problems from produce appeared with the development and wide distribution of semi permeable plastic films. Airflow through the ventilation holes allows hot fruit or vegetable to slowly cool and avoid the buildup of heat produced by the commodity in respiration.

Cushioning material: The function of cushioning materials is to fix the commodities inside the packages and prevent them from mixing about in relation to each other and the package itself, when there is a vibration or impact. Some cushioning materials can also provide packages with additional stacking strength.

Atmospheric packaging: The normal composition of air is 78 per cent Nitrogen, 21 per cent Oxygen, 0.03 per cent Carbon dioxide and traces of other noble gases. Modified atmosphere packaging is the method for extending the shelf-life of perishable and semi-perishable food products by altering the relative proportions of atmospheric gases that surround the produce.

Controlled atmosphere: This refers to a storage atmosphere that is different from the normal atmosphere in its composition, wherein the component gases are precisely adjusted to specific concentrations and maintained throughout the storage and distribution of the perishable foods.

Controlled atmosphere relies on the continuous measurement of the composition of the storage atmosphere and injection of the appropriate gases or gas mixtures into it, if and when needed. Hence, the system requires sophisticated instruments to monitor the gas levels and is therefore practical only for refrigerated bulk storage or shipment of commodities in large containers.

Modified atmospheric packaging: Unlike controlled atmospheric packaging, there is no means to control precisely the atmospheric components at a specific concentration in modified atmospheric packaging (MAP) once a package has been hermetically sealed. Modified atmosphere conditions are created inside the packages by the commodity itself and/or by active modification.

Commodity generated or passive modified atmosphere (MA) is evolved as a consequence of the commodity's respiration. Active modification involves creating a slight vacuum inside the package and replacing it with a desired mixture of gases, so as to establish desired equilibrated modified atmosphere (EMA) quickly composed to a passively generated EMA.

Vacuum packaging: Vacuum packaging offers an extensive barrier against corrosion, oxidation, moisture, drying out, dirt, attraction of dust by electric charge, ultra violet rays and mechanical damages, fungus growth or perishability etc. This technology has commendable relevance for tropical countries with high atmospheric humidity.

In vacuum packaging, the product to be packed is put in a vacuum bag (made of special, hermetic fills) that is then evacuated in a vacuum chamber and then sealed hermetically in order to provide a total barrier against air

and moisture. If some of the product cannot bear the atmospheric pressure due to vacuum inside the package then the packages are flushed with inert gases like nitrogen and CO₂ after evacuation.

Edible packaging: An edible film or coating is simply defined as a thin continuous layer of edible material formed on, placed on, or between the foods or food components. The package is an integral part of the food, which can be eaten as a part of the whole food product.

Selection of material for use in edible packaging is based on its properties to act as barrier to moisture and gases, mechanical strength, physical properties, and resistance to microbial growth. The types of materials used for edible packaging include lipids, proteins and polysaccharides or a combination of any two or all of these.

Improved packaging will become more essential as trade has expanded after globalisation. Standardised packaging of sized and graded produce that will protect the quality during marketing can greatly aid transactions between sellers and buyers.

Better packaging should be of immediate value in reducing waste. Much background research on packaging of perishable products and flowers is needed simulating the actual handling conditions expected during marketing.

The changes in transportation of fruits and vegetables such as cardboard crates being used in place of wooden crates, etc. Reasons for above changes. Disadvantages of wooden crates- Deterioration

* After wooden pallets are used several times, the wood begins to wear. It

splinters, cracks and even breaks under the pressure of continued use. The deterioration is natural and occurs eventually, even if the wood is treated to repel moisture and to strengthen it. This disadvantage leads to replacement much sooner than with plastic pallets. Infestation

* Wooden pallets are more susceptible to infestation by termites, ants and other insects that make their home inside the wood. Pallets stored outdoors are more likely to succumb to infestation than the ones kept within a warehouse. The insects burrow into the wood, eating away at it and thus weakening what should be a support structure.. Cleanliness

* In addition to germs, wooden pallets are collectors of dirt and debris. Cleaning them becomes more and more difficult over time as the pallets age. They must be heat-treated to get rid of the contamination and washed to be rid of dirt and debris. However, the heat accelerates deterioration, and the water, if improperly dried, can feed mold spores that thrive on wood and harm the vegetables and fruits inside it.

Advantages of cardboard crates- Protects Items

* As packaging, cardboard protects vegetables being shipped or moved. Corrugated cardboard often has multiple pieces of cardboard placed on top of each other to cushion soft vegetables. Cheap Material