



Punjab Horticultural Postharvest Technology Centre Punjab Agricultural University, Ludhiana

PHPTC Newsletter

Issue No. 6

April-June, 2018

Packaging of Horticultural Produce

Fresh horticultural produce has limited shelf-life ranging from a few hours to few weeks at ambient temperature. Due to the perishable nature of fruits and vegetables, the harsh environmental conditions and the lack of adequate infrastructure huge loss of valuable produce occurs from farm gate to consumer. Packaging fresh fruits and vegetables is one of the most important steps in the long and complicated journey from grower to consumer for maintenance of quality. Bags, crates, hampers, baskets, cartons, bulk bins, and palletized containers are commonly used for handling, transporting and marketing fresh produce. Packaging is often used as a tool to extend shelf life by preventing or reducing water loss, especially in fresh produce. The function of a package is primarily to contain and protect the produce. It serves as a symbol of value addition, an assurance of quality and quantity.

Characteristic of good packaging material:

- Tolerance to high humidity during pre-cooling, transit and storage.
- Rigid enough to withstand rough handling during loading and unloading.
- Resistance to compression from overhead weight of other containers.
- Tough to bear impact and vibration during transportation.

Package Materials

Most commonly used package materials for horticultural produce are plastic crates, corrugated fibre board (CFB) boxes and jute sacks.

1. Plastic Crates

With increasing government regulation placed on food products, food-grade plastic containers have become crucial to the handling of fruit and vegetable material, as well as other food-grade applications. As more regulations are leveled, the wooden produce crates of yesteryear are being legislated into obsolescence. Modern agricultural containers are exceptionally durable and are light and easy to use. They are typically made of injection-molded plastics, which greatly reduces or eliminates the problems of their outdated wooden counterparts. This means no splinters, no nails, and no porous surfaces to house bacteria, contaminants, or insects. Packaging is used at every stage of horticulture supply chain. As products move along the supply chain from

producer to consumer packaging might be handled by staff, distributors, wholesalers, retailer & consumers. The international trend has switched towards the use of plastic crates and they are already in use for storage and shipping of fruits and vegetables.

Advantages

- Light weight, yet very durable.
- Easy to clean, sanitize, and maintain.
- Available in several different sizes for different types of produce.
- Stackable and easy to handle to improve safety.
- Efficient and waste-reducing.
- High- and low-temperature resistant.
- Space-efficient.
- As these crates are strong and rigid they can be used for many journeys, making the cost per journey relatively low.

It's no surprise that reusable agricultural containers, made of approved materials, have become the new standard for food material handling. They are cleaner, safer, greener, and all-around better.

These are usually made of HDPE or PP by injection moulding. Polyethylene has higher impact strength and a low degradation



Use of Plastic Crates for Packaging of Horticulture Produce

by ultra-violet radiation while polypropylene has a better scratch resistance. The performance of both materials can be improved by adding antioxidants and UV protectants (for sunlight protection).

These crates are either stackable, stack-nest or collapsible in design. Collapsible plastic crates are the most expensive crates followed by stack-nest and then the stacking crates. The collapsible crates reduce the storage space requirement and transport cost of empty containers. The normal capacity varies between 20 – 40 kgs.

2. Corrugated Fibre Board Boxes

The corrugated fibre board (CFB) boxes have revolutionized the horticulture industry in India. They are widely used as transport/ shipping containers for fresh produce such as apple, mango, citrus etc because of the following advantages:

- Low cost to strength and weight ratio.
- Good cushioning properties
- Smooth and non-abrasive surface
- Good printability on the outer surface of the board
- Easy to set up and collapsible for storage
- Reusability and recyclable
- Can be manufactured in high volumes
- Can be provided with ventilation by punching holes

Since the CFB boxes have poor wet strength, now-a-days they are laminated with plastic film like LDPE, PP or PVC. Both cold temperatures and high humidities reduce the strength of fiberboard containers. Unless the container is specially treated, moisture absorbed from the surrounding air and the contents can reduce the strength of the container by as much as 75 percent. New anti-moisture coatings (both wax and plastic) are now available to substantially reduce the effects of moisture.

Waxed fiberboard cartons (the wax is about 20 percent of fiber weight) are used for many produce items that must be either hydrocooled or iced. The main objection to wax cartons is disposal after use— wax cartons cannot be recycled and are increasingly being refused at landfills.

Holes are provided in most fibre board boxes to provide ventilation of product heat (respiration) and allow cold air circulation to the product. Your choice of package style will depend on what commodity you pack and how you intend to use the container throughout the postharvest system (during cooling, for long term storage, as a display).

Use of Package Inserts, Fillers and Liners

- Adding a fiberboard divider to a carton will increase strength.
- Using a polyethylene liner in a fiberboard carton can help protect produce and reduce water loss in commodities. Water vapor given off by the product is contained within the liner, increasing the RH around the product and decreasing the rate of water loss.
- The liner reduces abrasion damage that results from fruit rubbing against the inside of the box.



Use of Corrugated Fibre Board (CFB) Boxes for Packaging of Horticulture Produce

Precautions

- It is important to keep produce cool to prevent damage in cartons lined with polyethylene due to gas composition changes related to increased respiration rates.
- Never use unperforated plastic bags to store onions or garlic- the relative humidity (RH) inside the bag is too high for proper handling and storage. Losses due to sprouting and postharvest decay will increase dramatically.
- When locally made containers have sharp edges or rough inner surfaces, a simple, inexpensive liner such as news paper can be used to protect produce from damaging during handling.

Labeling

Labeling packages helps handlers to keep track of the produce as it moves through the postharvest systems, and assists wholesalers and retailers in using proper practices.

For produce exporters the knowledge about International regulations is must. Labeling of consumer packages is mandatory under FDA regulations. Labels must contain the name of the product, net weight, and name and address of the producer, packer or distributor.

Tips for packaging high quality produce

The packages should be sturdy and capable of standing up to handling, cooling and storage conditions.

- Rough packages such as baskets and wooden crates should be lined with cardboard inserts.
- Packages used for heavy produce should be reinforced with corner supports or folded dividers.
- Avoid using very large packages since the produce suffers more damage during handling of large packages.
- For delicate produce such as berries, grapes, summer squash and ripe stone fruits, use shallow packages having single layer or double layers.
- Avoid overfilling or underfilling packages.

- For adequate ventilation of packages about 5% of the surface area per side should be vented.
- For immobilizing the produce in a package, use packaging materials such as trays, cups, wraps, liners and pads.
- To decrease the rate of water loss from produce, perforated plastic film liners should be used.
- Using netted bags for garlic and onions which will provide the lower humidity environment required for proper handling.
- Take care while using fillers and liners in packages so that the ventilation holes are not blocked.
- Labelling containers with your logo or farm name help in creating a brand name for quality produce.



Wrong method of packing

3. New Trends in Fresh Produce

Modified Atmosphere Packaging (MAP): Modified atmosphere packaging is an optimal blend of pure oxygen, carbon dioxide and nitrogen that is different from atmospheric gas composition within a high barrier package. The resultant in-package gas mixture helps to increase shelf life of the produce by slowing down the respiration process without the addition of chemical preservatives. The gas mixture used depends on the type of produce.

PHPTC Activities

i) Visit of Sh. Viswajeet Khanna, IAS, Additional Chief Secretary (Dev)-cum-Chairman, PHPTC

Sh. Viswajeet Khanna, IAS, Additional Chief Secretary (Dev), Chandigarh visited PHPTC on 23rd March, 2018 and interacted with the faculty of PHPTC. Dr. B.V.C. Mahajan, Director, PHPTC conducted the visit of ACS (Dev) in different laboratories of the Centre. Sh. Viswajeet Khanna took keen interest in different research and training activities of the Centre. He appreciated the efforts of scientists in developing and disseminating the various technologies useful to the farmers & entrepreneurs.



ii) Approved packaging of fruits and vegetables:

Punjab Agricultural University has approved the shrink packaging of fruits and vegetables such as kinnow, tomato, peach, pear and capsicum. This practice can reduce shrinkage, improve shelf life, protect the produce from damage and provide good cosmetic appearance to the produce in the market



Shrink Film Packaging of Kinnow, Pear, Tomato and Capsicum

For tomato packaging, plastic crate of 10 kg capacity (465 mm x 290 mm x 140 mm) has been recommended by PAU as safe packaging option during transport. CFB boxes of 2 kg (340mm x 220mm x 100 mm), 4 kg 340 mm x 220 mm x 190 mm and 10 kg (420mm x 235 mm x 210 mm) for packaging of litchi fruit has also been developed at PHPTC and approved by PAU.



Tomato Plastic Crate 10 kg Packaging Box for Litchi 2 kg and 4 kg

iii) Trial for bio-efficacy and residual analysis of Chlorpropham 50% HN in stored potato

As a sponsored project by UPL Company, the Centre is conducting the trial on bio-efficacy and residual analysis of Chlorpropham 50% HN in stored potato. The trial is being carried out in collaboration with Department of Entomology, PAU, Ludhiana to study the effect of Chlorpropham on quality of stored potato.



कृषी, बागवानी
एवं डेअरी,
उद्योग के लिये सर्वोत्तम उत्पाद
निलकमल
की ओर से



उत्पाद की सुरक्षा, गोदाम की संचयन और मजदूरों की उत्पादन क्षमता में वृद्धि

प्लास्टिक क्रेट्स (कृषी, बागवानी एवं डेअरी)

प्लास्टिक पैलेट्स

मिल्क कॅन्स

आईस बॉक्सेस

मटेरिअल हैंडलिंग उपकरण

कोल्ड स्टोरेज एवं राइपनिंग चेंबर

स्टोरेज सिस्टिम्

For more details please contact:

1800 1219 115

marketing@nilkamal.com

Nilkamal Limited

C-3, 1st floor, Red Star Tower, Dandi Swami Road,
Civil lines, Ludhiana - 141001.

Tel. No.: 9646123219 / 9646123212

Published by : Director, Punjab Horticultural Postharvest Technology Centre, PAU, Ludhiana
Email : phptc@pau.edu Website : www.phptc.org Phone No. : 0161-2405257