

Punjab Horticultural Postharvest Technology Centre Punjab Agricultural University, Ludhiana

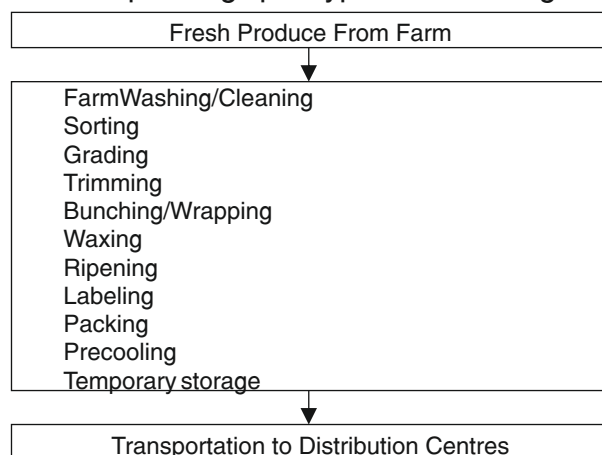
PHPTC Newsletter

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ESTABLISHMENT OF PACKHOUSE FOR FRUITS & VEGETABLES

The complete supply chain for postharvest handling of fruits and vegetables involves growers, packers, transporters, wholesalers/distributors and the retailers to maintain the quality of fresh produce during marketing. The ultimate beneficiaries are the consumers who get fresh produce for consumption. Though all the components of the supply chain have their importance yet the role of a packhouse is more significant. The packhouse receives fresh produce, applies certain processes and prepares the produce for distribution. The illustration below describes the packhouse operations depending upon type of fruits & vegetables.



Packhouse operations

The requirement for cleaning/washing, trimming/topping and recommended methods of pre-cooling are suggested as below:

Requirement of cleaning/washing for different commodities

Cleaning/Washing	Commodities
Wash before cooling and packing	Tomatoes, Cucumbers, Leafy greens
Wash to remove latex, reduce staining	Mangoes, Bananas
Wash after storage	Sweet Potatoes, Potatoes, Carrots
Dry brush after curing or storage	Onions, Garlic, Kiwifruit
Do not wash	Green beans, Melons, Cabbage, Okra, Peas, Peppers, Summer squash

Requirement of trimming/topping for different commodities

Trimming / Topping	Commodities
Remove older outer leaves	Cauliflower, Head lettuce, Swiss chard and other leafy crops
Remove tops	Radishes, Carrots, Beets, Turnips and other Root vegetables
Trim excess tissue (mostly for appearance or ease of packaging)	Long leaves from green onions (although oriental food markets prefer the entire plant), tough stems from asparagus spears.

Recommended pre-cooling methods for different commodities

Methods of pre-cooling	Commodities
Room Cooling	Potato, Dry onion, Garlic, Apple, Citrus fruits, Winter squash, Radish, Tomato, Beans.
Forced Air-Cooling	Grapes, Berries, Pears, Peach, Oranges, Strawberries, Tomato, other tropical and sub-tropical fruits, Mushrooms, Cucumber, Brinjal, Okra, Summer squashes, Peppers, Melons etc.
Hydro Cooling	Mango, Peach, Cherry, Sweet Corn, Asparagus, Green onion, Artichoke, Root crops, Watermelon, Muskmelon, Beans etc.
Package Icing	Broccoli, Brussels sprout, Green onion, Peas, Carrot, Radish, Turnip etc.

1) High Tech Integrated Packhouse To perform the packhouse operations efficiently, the required infrastructure should include a building of appropriate size to house equipment for loading/unloading, washing, sorting, grading, waxing, labeling, packing, pre-cooling, ripening rooms, cold rooms for temporary/long term storage. Each component of packhouse is discussed below:

(i) Site Selection: The packhouse should be easily approachable by road and should be centrally located in the produce growing area. The shorter transportation times from farm to packhouse help in reducing postharvest losses and maintenance of freshness of

produce. The environment around the packhouse should be free from all sorts of pollution like air, water and soil pollution. There should be easy access to electric supply for meeting the water, lighting and power requirements of the equipment.

(ii) Internal Layout: This is the prime factor for deciding the overall dimensions of the packhouse structure. All the machines and other utilities should be arranged in such a manner so that the space use is optimized. A typical packhouse should provide space for the following utilities:

- For receiving the produce
- Washing, grading, sorting lines (Mechanical or manual)
- Various treatments (fungicide, hot air/water etc.)
- Pre-cooling equipment –forced air coolers, hydro cooler, etc.
- Packing
- Storage of packing material, crates, bins, pallets.
- Cold rooms for temporary storage.
- Ripening rooms (optional) in case the packhouse receives unripe produce.
- Loading the produce for transportation.
- Toilet and change rooms for workers
- Offices
- Maintenance room or workshop
- Passageways for movement of personnel and produce. (Fork lift trucks or hand carts).

The packhouse should be designed in a logical manner so as to achieve a high degree of efficiency. Some packhouses operate on single crop and the crop arrives during a fixed time of the year, for instance packhouses for oranges, apples, pears etc. Certain packhouses can handle a number of vegetable crops throughout the year. It is advisable to keep the building, machines and workers occupied for whole of the year to make the enterprise viable.

(iii) Constructional details: Packhouse building is like any other building having floor, roof and walls. The floor should be high quality concrete having good strength to bear the load of processing machinery. A minimum 0.5° slope should be provided for adequate drainage of wash water. Provision should also be provided for sufficient under floor drain lines having drain points at appropriate locations to facilitate cleaning.

The modern packhouses are steel framed structures having prefabricated insulated wall and roof panels

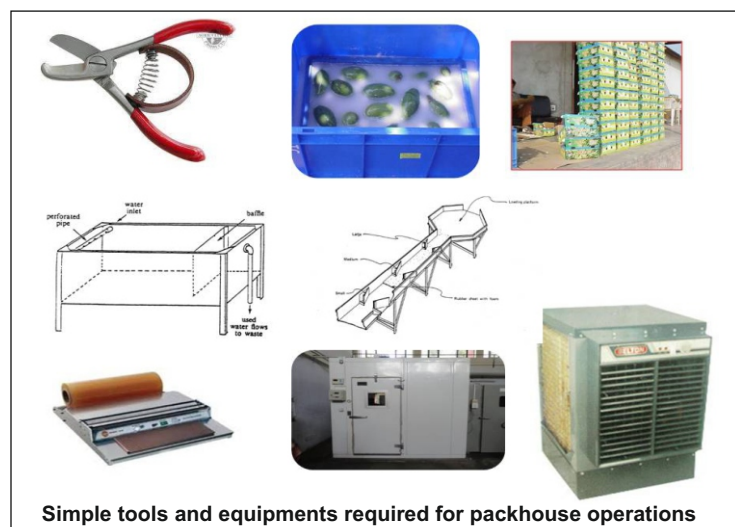
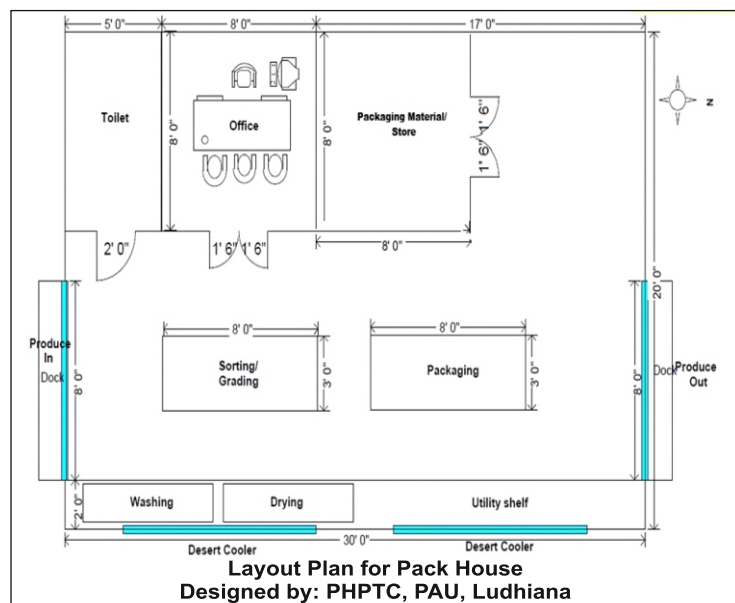
which use polystyrene or polyurethane foam insulation (PUF). PUF panels are expensive but possess better structural strength and insulation properties. The packhouse should be well lit with sufficient number of tube lights especially around manual sorting lines.

The most modern packhouses having air conditioned environment require special decks for the loading or unloading of vehicles. For the movement of forklift trucks between air conditioned and unconditioned sections usually hanging polyethylene curtain doors are provided so as to minimize infiltration. Packhouse should have shaded shelter for loading/unloading of vehicles to protect the produce against sun and rain.

(iv) Equipment and Machinery: The packhouse is normally equipped with machines and equipment to accomplish all the unit operations starting from unloading of produce, cleaning, washing, sorting grading, waxing (or any other treatment), labeling, pre-cooling, packaging, storage and loading for transportation. The state-of-the-art packhouses are equipped with automatic washing, cleaning, sorting and grading lines which are equipped with electronic sensors and operate through computer softwares. The supporting equipment with these grading lines include-large bin tippers, pallets, fork-lift trucks, controlled atmosphere (C.A.) stores and cold rooms. The capital investment for such machinery is too high and is only recommended for export quality produce where returns match with the investment. Most of the packhouses in the developed countries involved in the international trade are built from prefabricated PUF panels and are equipped with such equipment.

2) Farm level pack house For local trading at a small level where a simple shelter from sun & rain and having wire mesh guards against insects and simple manual equipment should be provided. For instance hand carts in place of fork-lift truck, sorting tables, tubs/tanks for washing, hand brushes for dry cleaning, simple hand held or tilt table type seizers etc. The packaging material, especially the corrugated fibre boxes (CFB), tissue papers, paper shreadings as fillers and card board dividers have to be arranged locally as per requirements. Many small cardboard manufacturing units are available in all parts of the country which can meet the requirements. For local distribution stackable plastic crates should be preferred. For the farm level packhouses of dimension 30'x20', it is advisable to provide a desert cooler, especially in hot and dry weather so as to minimize moisture loss from the

produce. In the absence of electric supply, the use of zero energy evaporatively cooled stores can help in maintenance of freshness of perishables for a shorter duration. It is a low cost option for temporary storage of produce and is recommended for beginners. The layout plan of farm level packhouse is given below:



PHPTC Activities

Training Programmes on Postharvest Management of Horticultural Crops : Punjab Horticultural Postharvest Technology Centre (PHPTC) organized 3 training programmes in collaboration with Directorate of Horticulture, Punjab for farmers of district Barnala, Sangrur, Bathinda, Fatehgarh Sahib, Nawanshahar, Gurdaspur, Pathankot, Patiala and Mansa in the month of January, 2019. A group of 40-50 farmers in each batch attended the training programmes. These

training programmes covered wider aspects of different techniques involved in harvesting, precooling, grading, packaging, storage, marketing and food safety regulations of perishable produce.



Farm level cold room (Coolnext): A research project entitled, "Development and Testing of Farm Level Cold Room (Coolnext) for Storage of Vegetables and Fruits" was jointly handled by experts of PHPTC, PAU, Ludhiana, Centre of Excellence for Vegetables Kartarpur and AgNext Technologies Private Ltd, Mohali, Punjab. The project report was submitted to Sh. Sabin C., IAS, Managing Director, PAGREXCO, Chandigarh. M/s. AgNext Technologies Pvt. Ltd. provides services for installation and commissioning of farm level cold room.



Visit to Bangladesh: A delegation of officials of APEDA, New Delhi, PAGREXCO, Chandigarh, PHPTC, Ludhiana and progressive Kinnow farmers of Punjab visited Dhaka (Bangladesh) from 27-11-2018 to 30-11-2018 to explore the possibilities of export marketing of Kinnow fruits from Punjab to Bangladesh.

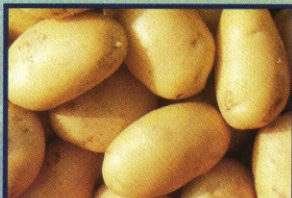


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TECHNOLOGIES

We are an engineering company specializing in the design, construction and commissioning of projects in post harvest management of horticulture produce.

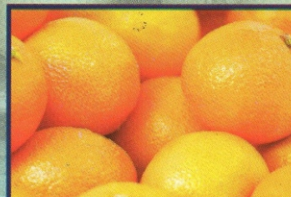
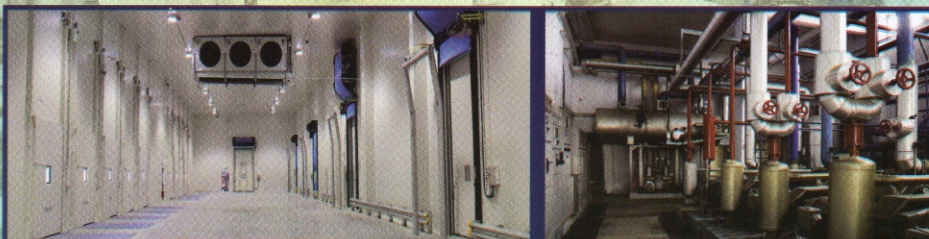
Services for design, construction and commissioning of projects on turnkey basis in post harvest management of horticulture produce such as:

- **Multi Commodity Cold Stores**
- **Banana Ripening Chambers**
- **Controlled Atmosphere (C A) Stores**



We offer following imported, high-tech equipments for the following system :

- **Electrical**
- **Refrigeration**
- **Instrumentation**
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- **Air Purification**
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