

Punjab Horticultural Postharvest Technology Centre Punjab Agricultural University, Ludhiana

PHPTC Newsletter

Issue No. 21

April-June, 2022

Message from Chairperson

Sarvjit Singh, IAS

**Additional Chief Secretary (Development)
Punjab cum-Chairman, Punjab Horticultural
Postharvest Technology Centre, PAU Ludhiana**

Horticulture sector has become one of the major drivers of growth in agriculture sector. In Punjab horticultural crops occupy an area of about 3.98 lakh hectares and produces about 81 lakh MT of fruits and vegetables. However, being perishable nature of fruit and vegetables, the postharvest losses during supply chain are the major challenge, which not only discourages the farmers or entrepreneurs to produce more but also affect their socio-economic conditions by disturbing the income and profit ratio. More importantly, lack of proper storage and marketing facilities, and seasonal gluts force the farmers to sell their hard-earned produce at throw-away prices. These losses can be minimized by adopting appropriate postharvest technologies such as harvesting, grading, packaging postharvest treatments and storage of fruit and vegetables. Reducing post-harvest losses is increasingly being referred to as one sustainable way to achieve global food security and is a distinctive strategy where natural resources used to produce food are conserved. Therefore, the development of cold chain infrastructure is of utmost importance and will play a vital role in minimizing the postharvest losses, and increasing the farmer income.

In order to provide impetus to this sector, Government has taken several initiatives. The major scheme----Mission of Integrated Development Horticulture (MIDH) is being implemented in the country by adopting end to end approach by increasing the production of horticultural crops and reducing the postharvest losses. Department of Horticulture in Punjab state facilitates the farmers and entrepreneurs as a one stop access to understand government schemes and support. I am delighted to know that PHPTC has developed number of protocols for the postharvest management and value addition of horticultural crops for the benefit of farmers and entrepreneurs.

I trust this issue of Newsletter "Precooling of fruits and vegetables" will update the knowledge of farmers and entrepreneurs. I convey my best wishes for the success of this Newsletter and further hope that PHPTC would continue to develop cost effective postharvest technologies for the minimizing the postharvest losses of horticultural crops.

PRECOOLING TECHNIQUES FOR FRUITS & VEGETABLES

Precooling is considered to be a critical process in the supply chain of fruits and vegetables. It is usually the first step in postharvest operations of fruit and vegetables and is done as soon as possible after harvest. Fruits which are harvested at relatively high temperatures contain large amount of field heat which leads to moisture loss due to continuing physiological processes of the harvested fruit, resulting in loss of quality. The field heat, if not properly removed after harvest, causes water loss, wilting and shriveling leading to an undesirable damage in the appearance and quality of produce.

Various precooling techniques such as hydro-cooling, forced air cooling, room cooling, icing, cryogenic cooling and vacuum cooling are now being used in the horticultural industry.

Hydrocooling

Hydrocooling is a simple low cost method which quickly lowers the temperature of the product. It utilizes chilled or cold water for lowering the temperature before further packaging of the product.



Forced Air Cooling

Forced air or pressure cooling is a modified type of room cooling and is accomplished by exposing produce packages to high air pressure on one side than other.

Room cooling

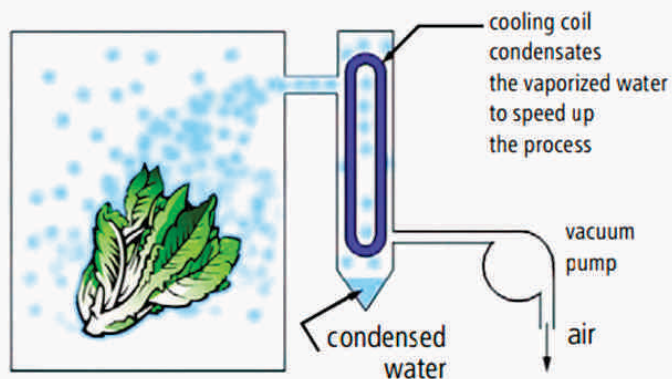
Room cooling is an effective method to precool the produce that is sensitive to free moisture or surface moisture and the produce that does not deteriorate rapidly. Room Cooling is simply placing the produce to be cooled in a refrigerated room in order to cool the product to the desired temperature. It is very slow method of precooling and therefore recommended for crops



that decay slowly.

Vacuum Cooling

Vacuum cooling uses a negative pressure (vacuum pump) to allow evaporation to occur. The moisture within the product evaporates at this low pressure, which cools the product. The main drawback of vacuum cooling is that it dehydrates the product to some degree. Lettuce is commonly vacuum cooled.



Ice Cooling

Ice cooling (or ice injection cooling) is the method of mixing ice and water into a slurry that is "injected" into the product packaging and cools by direct contact.



Other Precooling Tips

- Do not load pre-cooling facility beyond its optimum capacity.
- When stacking produce, allow adequate air-circulation to ensure all vegetables or fruits can be evenly cooled.
- Use proper vented boxes and baskets for forced-air cooling, and waxed cartons or Styrofoam boxes for hydro-cooling.
- Transfer produce out from the pre-cooling facility immediately after pre-cooling, to avoid overcooling or dehydration of the vegetables.
- Use potable water for hydrocoolers to minimise any food safety concerns.
- Separate ethylene-sensitive vegetables from ethylene producing ones.

Table 2: Cooling methods suggested for horticultural commodities

Commodity	Method of precooling	Remarks
Tree fruits		
Citrus	R, FA	
Stone fruits	FA, HC	Apricots cannot be HC
Pome fruits	FA, R, HC	
Subtropical	FA, HC, R	
Tropical	FA, R	
Berries	FA	
Kiwi fruit	FA	
Grapes	FA	Require rapid cooling facilities adaptable to SO ₂ fumigation
Fruit type vegetables		
Cucumbers egg plant	R, FA, FA-EC	Fruit type vegetables are chilling sensitive but at varying temperatures.
Melons		
Cantaloupes	HC, FA, PI	
Honeydew	FA, R	
Casaba		
Crenshaw		
Watermelons	FA, HC	
Peppers	R, FA, FA-EC, VC	
Summer squashes	R, FA, FA-EC	
Okra		
Sweet corn	HC, VC, PI	
Tomatillos	R, FA, FA-EC	
Tomatoes	R, FA, FA-EC	
Winter squashes	R	

Leafy vegetables		
Cabbage	VC, FA	
Iceberg lettuce	VC	
Kale	VC, R, WVC	
Leaf lettuces		
Spinach, Chinese	VC, FA, HC	
cabbage, bok choy		

KEY :

FA= Forced air cooling, R = Room cooling

FA-EC = Forced air evaporative cooling

VC = Vacuum cooling , HC = Hydrocooling

PI + Packaging Icing

PHPTC ACTIVITIES

- 1. Training of FPO (progressive farmers) from Tarantaran:** PHPTC organized one day training programme for FPO from Tarn Taran on 19-5-2022. The farmers were given hands-on-training on packaging of fruits and vegetables.



- 2. Online lecture:** Dr BVC Mahajan, Director PHPTC delivered online lecture on Advances in postharvest management of fruits and vegetables for graduate students of Wadala University of Sri Lanka on 20-5-2022.

- 3. Commercialization of Technology on whole Kinnow fruit utilization :** PHPTC has recently provided the Technical Know-How for processing of whole Kinnow fruit to Mr. Babanpreet Singh, S/o Sh. Dilbagh Singh, Jallalabad of District Fazilka for commercialization of processing technology of whole Kinnow fruit involving extraction of Kinnow peel essential oil, development of jaggery based Kinnow bar and nectar.



- 4. Training programme for Progressive Farmers and HDOs:** PHPTC Organized training programmes on Micro processing techniques in horticultural crops from 21-6-2022 to 23-6-2022 for farmers and HDOs in collaboration with PAMETI, Ludhiana. About 30 participants attended the course.



- 5. Training on Postharvest Management of Pear Fruits:** Pear Estate Amritsar organized a training programme for progressive farmers on postharvest management and value addition of Pear fruits on 29-6-2022. Dr. B.V.C. Mahajan delivered an expert lecture on harvesting, packaging and storage techniques of Pear fruits.



- 6. Visit of FarmKrisp Startup to PHPTC :** Mr. Gunkaran Singh and his team from FarmKrisp Startup, Chandigarh visited PHPTC, PAU Ludhiana. This visit was conducted by Dr. Nikhil Mehta from Punjab State Farmer Commission, Chandigarh. Dr. B.V.C. Mahajan, Director, PHPTC apprised them about latest techniques of packaging, storage and retail marketing of fruits and vegetables.



PHPTC gets NABL Accreditation for Heavy Metals in Drinking Water

		National Accreditation Board for Testing and Calibration Laboratories
CERTIFICATE OF ACCREDITATION		
QUALITY CONTROL LABORATORY FOR FRESH & PROCESSED FOODS		
has been assessed and accredited in accordance with the standard		
ISO/IEC 17025:2017		
"General Requirements for the Competence of Testing & Calibration Laboratories"		
for its facilities at		
PUNJAB HORTICULTURAL POSTHARVEST TECHNOLOGY CENTRE, PAU CAMPUS, LUDHIANA, PUNJAB, INDIA		
in the field of		
TESTING		
Certificate Number:	TC-10329	
Issue Date:	16/02/2022	Valid Until: 15/02/2024
This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL. (To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)		
Name of Legal Identity : PUNJAB HORTICULTURAL POSTHARVEST TECHNOLOGY CENTRE		
Signed for and on behalf of NABL		
	 N. Venkateswaran Chief Executive Officer	