

Punjab Horticultural Postharvest Technology Centre
Punjab Agricultural University, Ludhiana

PHPTC Newsletter

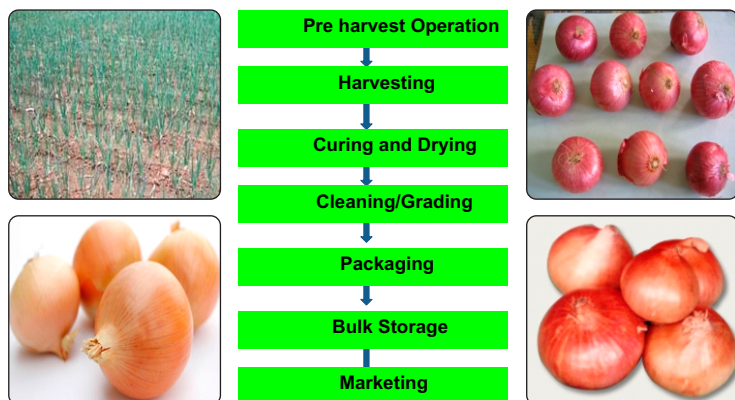
Issue No. 11

July-September, 2019

POSTHARVEST HANDLING AND STORAGE TECHNIQUES FOR ONION

Onion is one of the most important vegetable crops grown in India with second highest production in the world. It is valued for its bulbs having characteristic odour, flavour & pungency, which is due to the presence of a volatile oil-allyl-propyl-disulphide. Pungency is formed by enzymatic reaction when tissues are broken. As per database of National Horticulture Board, the area under onion cultivation is 12.85 lakh hectares with production of 23.26 million tons in India. The Major Onion producing states area Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana and Telangana.

However, the most vital issue with onion crop is the huge postharvest losses throughout the marketing process, which accounts for about 30-50%. This is due to lack of awareness about postharvest handling techniques and availability of good postharvest infrastructure at farm and market level. These factors result in instability in prices and monetary losses to farmers.



Postharvest operation for onion handling

Export potential: There is a lot of demand of Indian Onion in the world. India has exported 21.83 lakh. MT of fresh onion to the world for the worth of Rs. 3467.06 crores/ 497.94 USD Millions during the year 2018-19 (APEDA,2018). The major export destinations are

Bangladesh, Malaysia, U Arab Emts, Sri Lanka and Nepal.

Important steps for careful handling of onion are as under:-

Maturity/ Harvest Stage: Onions are ready to harvest when the necks are reasonably dry and the tops fell over or usually when 25-80% of tops have fallen. The other indication of maturity is to pull on the individual plants, if they easily come out of the ground, they are ready for harvesting.

Harvesting and Bulb Handling: Mostly manual harvesting is the common practice. The harvesting is carried out by levering the bulbs with khurpi to loosen them and pulling the tops by hand. Harvesting is done when weather is dry. The irrigation is also ceased about a week prior to harvesting in order to allow bulb maturation, hardening of outer scales and neck thickening. This practice will reduce the storage losses due to high moisture content. During harvesting, the improper handling of the bulbs causes mechanical injuries that will severely affect the quality of bulb and reduces their storage life.

Curing and Topping: In traditional small-scale operations, onion drying is carried out in the field in a process commonly called 'windrowing'. It involves harvesting the mature bulbs and laying them on their sides (in windrows) on the surface of the soil to dry for 1 or 2 weeks. Both curing and drying remove excess moisture from the outer layers of the bulb prior to storage. The dried skin provides a surface barrier to water loss and microbial infection, thereby preserving the main edible tissue in a fresh state. In wet weather, the bulbs can take longer time to dry and may develop higher levels of rots during storage. The side of the bulb in contact with wet soil or moisture may also develop brown strains or pixels, which reduce the appearance quality and value. Bulbs harvested for storage require

in total 14-20 days of curing or drying before being stored. For small scale, onions can also be cured by tying the tops of the bulbs in bunches and hanging them on a horizontal pole in well-ventilated shades. Curing in shade improves bulb colour and reduces losses significantly during storage. After curing, topping of each plant was done by cutting leaves 1-2 cm above the bulb.



Curing of onion

Cleaning: The cleaning may be carried out using air or by manually removing the unwanted materials on the cured bulb surface. The care should be taken to avoid any physical injury to the bulbs during this operation. Soil and other foreign materials should also be removed.

Grading: Onions after curing and cleaning are graded manually before they go for packaging and storage. The malformed bulbs like a thick neck, doubles, bolted, decayed and injured bulbs are picked out. The process of grading should also be done even after storage to remove sprouted and diseased bulbs to fetch more prices in the market. The different grades of onion specified by Directorate of Marketing and Inspection (DMI) are as under:

- ♦ Extra Large Onion (>7.1 cm dia.)
- ♦ Large (4.1-7.0 cm dia)
- ♦ Medium (2.1-4.0 cm dia.)
- ♦ Small (1-2.0 cm dia.)

Packaging: Packaging is a co-ordinated system of preparing goods for transport, distribution, storage, retailing and end use. The packaging must be strong enough to retain the required bulb weight and allow



Packaging of onion

sufficient ventilation. APEDA has approved jute and leno bags for 15-25 kg bulk packing and 1-5 kg retail packing of onion. The detail specification of the packaging materials for onion and other fruit and vegetable is available on APEDA website: www.apeda.gov.in

Storage: Bulbs intended for storage must be free from cuts and handled with extreme care. Onions should not be dropped on to non-resilient surface from more than 6 feet height. If onions are to be stacked after packing in store, the better height is 2-2.5 meters. Losses due to rot is reported to be more if onions are stored in gunny bags than in loose or wooden crates. The ability to hold onions in long-term storage and deliver quality product months after harvest is directly related to advances in ventilation system design and management. The ventilation system is really the key to maximizing profits from storage. Once the onions are harvested and placed in storage, the ventilation system is the only tool we have to interact with the crop. Onions should not be stored unless adequately dried either in the field or by artificial means. It is necessary to dry the neck tissue and outer scales until they rustle when handled otherwise the bulbs will rot in storage.

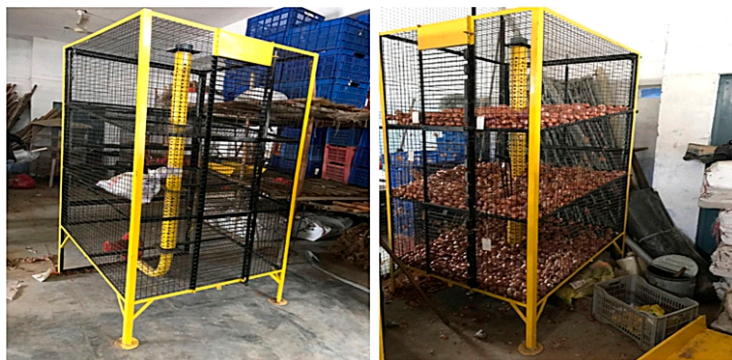
Sprouting in onion is controlled by temperature. The temperature between 5-25°C increases sprouting. Rotting is influenced by relative humidity (RH). More the relative humidity more is rotting. Weight loss is more when temperature is above 35°C. Under ambient conditions the onions are stored at a temperature of 30-35°C with RH of 65-70%. In cold storage, the optimum temperature is maintained at 0-2°C while the RH is kept at 65-70%.



Storage of onion in cold store (0-2°C & 65-70% RH)

A small scale onion storage structure developed by PAU: Mechanically ventilated mild steel onion storage structure of 1.25 ton capacity has been developed and

fabricated by Punjab Agricultural University, Ludhiana. The structure comprises of top cuboid portion of 1.2m x 1.2m x 1.2m and bottom triangular prism of 1.2m x 0.6m x 1.35m with 35° angle of inclination coupled with mechanical ventilation of air in the range of 0.75 m/s – 1.0 m/s. This storage structure can safely store onion up to five months with acceptable quality.



Onion storage structure developed by PAU, Ludhiana

PHPTC Activities

Training Programmes on Postharvest Management of Horticultural Crops : Punjab Horticultural Postharvest Technology Centre (PHPTC) organized 2 training programmes in collaboration with Directorate of Horticulture, Punjab for farmers of district Jalandhar, Mohali & Fatehgarh Sahib on 24th of September and 1st of October, 2019. A group of 25-30 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.



Seminar on Kinnow export at Kisan Bhawan, Chandigarh : Dr. B.V.C. Mahajan delivered a lecture on postharvest handling of Kinnow for export marketing on 8-8-2019 and discussed about nutritional importance and export requirements of Kinnow fruits. Sh. K.S. Pannu, Secretary, Agriculture, Government of Punjab chaired the Session and apprised the farmers about export potential of fruits and vegetables.



Exposure visit of farmers from Yamuna Nagar : Skill Development Centre, PAU, Ludhiana arranged a exposure visit of farmers from Yamuna Nagar. Dr. Swati Kapoor demonstrated the technologies of dehydration and packaging of vegetables. The farmers were made aware regarding benefits of drying of fruits and vegetables and technologies regarding the same were shared.



Training programme for mandi supervisors / auction recorder : The Centre organized training programmes for mandi supervisor and auction recorder on Handling and Operation of Moisture Meters from 1-8-2019 to 25-9-2019. The Centre calibrated about 2000 moisture meters received from different market committees of Punjab Mandi Board.



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