Potato Storage Practices in India

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ABSTRACT

Potato is a semi-perishable commodity needs immediate storage after its harvest and for that sake many storage practices are being followed at the grassroot level. By adopting best practices and advanced techniques, India can further strengthen its potato supply chain by ensuring both food security and economic benefits of farmers in the country. Still, there is a gap in storage requirement and its effective management practices that need astute standard operating practices for better efficacy in this direction.

INTRODUCTION

Potato is fourth major important crop in the world after rice, wheat and maize. More than one billion people around world use potato in their daily diet. Total potato production in world is around 383 million metric tons from the area of 16.8 million hectares (Pieterse, 2025). China and India shares maximum in potato production which was almost equal to their population share; simulates the importance of potato in their food basket and food security, as day comes. In the present context, Indian potato production reach around 60.12 MT in which Gujarat shares 4.02 MT (Singh & Dutt, 2024); however, the state says as the highest in potato productivity, is highly commendable.

More than 85 percent of the potato production in India takes place during winter season from October to March. So harvested potatoes must be stored in cold storage just before the advent of summer for the purposes to meet any future demand both at national and international level though country is a poor exporter of potatoes and only has a competitive advantage for seed potatoes Without a proper market, chances of post-harvest losses will be very high that signals the cold storage for enhancing shelf

life and quality of the produce. A substantial good amount of potato is essential with less moisture, reduce physiological breakdown and uniform tubers is needed for market and for processing plants. As per the latest data, there are 8,698 cold stores with a 395.96 lakh MT storage capacity in the year 2024.The majority of the nation's cold storage capacity (more than 80 percent) is utilized for storage of potatoes which touches more than 90 percent in some places in absence of desired storage facility near to the production center. A right kind of capacity utilization and efficient storage practices is required to make the potato cold storage a key infrastructure in potato value chain system.

History & Background

Potatoes were introduced to India by the Portuguese in the early 17th century and later promoted by the British, especially in the hills of Northern India and Sri Lanka. By 1675, Portuguese established potato as a Garden crop in Surat and Karnataka and by the late 18th and 19th century, potato became an important vegetable crop in both hills and plains. However, potato production remained limited, contributing less than 1percent of the global share by 1941, primarily due to the unsuitability of European potato varieties to India's short-day conditions, lack of proper infrastructure to store seed potato and lack of techniques regarding potato storage practices.

Potato storage practices in India

Proper potato storage is essential to maintain freshness and reduce post-harvest losses. In India, potato storage practices vary according to area, climate, use and scale (small vs large scale). There are two types of storage structures find in Indian conditions viz., traditional storage structure (small scale) and modern storage structure (large scale).

Traditional Storage Structure

In-situ storage structure: This method is useful in north-east part of country to store potato for 2 to 3 months. Farmers delay the harvesting of potatoes, there. In Upland area, Farmers use grass and in lowland area, they use paddy straw to provide shade to potato for the storage purpose.

Heap Storage: In this method, Farmers spray Mancozeb (0.3-0.5%) on soil/sand near to tree to reduce the chances of rotting. Then, they sorted out green, damaged and cracked potatoes from the lot before storage. Potatoes heaped under the shade of tree in the storage practices. About 6 to 30 tonnes of potatoes are stored under this method. Sometimes, they use polythene sheets to cover heaps for protection from rain.

Pit Storage: It is popular storage method in Madhya Pradesh. For the same, recommended temperature is 25.6 ^{0}C and relative humidity is 66 percent for the purpose. Preferably, diseased potatoes are stored in this method. Two types of pits are made in this particular method of storage viz., circular (4.2m diameter) and rectangular (4.5m length,3.6m width,14m depth).

Wooden Storage Structure: Small wooden rooms about 10 ft. heights are built in the field or near to residential area for the storage of potatoes. The walls are built horizontally with fixed overlapping wooden planks which help in preventing seepage in store and running off the rain water. The roof of the store is covered with tin sheet and a gap is left between the roof and the wall for aeration purpose of stored potatoes. Normally, seed potatoes also store using this method.

Storage in Baskets: In north eastern states, potatoes are stored in bamboo baskets of 10 to100 Kg of capacity. Here, smaller baskets are commonly known as "polo" which provides better aeration to the tubers. The

baskets are made of different size suitably for store and for carring potatoes in the fields. Some baskets are made here specifically with partially open bottom end to facilitate removal of potatoes for daily use.

These types of storage use are considered when farmers have to store small quantity of potatoes for less time. If farmers have to store large quantity of potato, they use modern structure of storage which increase storage time of potato.

Modern Storage Structure:

This is the most common method for potato storage. It is also known as storage at low temperature because in this method. We store potatoes in cold storages to provide control atmospheric conditions like temperature, humidity, and ventilation. At this stage, metabolic process of stored potato goes down and no sprouting takes place. We also fumigate the storage chamber with CIPC (isopropyl N-3-Chlorophenyl Carbamate) and H_2O_2 to prevent any rotting and fungal infestation. Now, we understand this method more precisely by using proper standard operating practices.

Standard Operating Practices to Manage Potatoes in Cold Storage

Pre-Storage Handling: After harvesting, potatoes should be cured for 2-3 weeks at a temperature of 15-20°C with a humidity of 85-95 percent to promote wound healing and to prevent excessive moisture loss. In this step, we clean all potato lots and ensure that potatoes are free from any kinds of soil and debrises. Then, sorting and grading of potatoes are done. That remove any damaged, diseased, or sprouted potatoes before storage the same in cold storage.

Cold Storage Conditions: In this stage, we provide suitable condition inside the potato chamber. Seed potatoes first store at 2-4°C while table and processing purposed potato store at 8-10°C in the same or different cold storages. We also pull-down temperature at the rate of 0.5-1°C to achieve this holding temperature. To maintain a relative humidity of 90-95 percent is necessary for keeping potatoes in good conditions. It is ensured to maintain adequate air circulation against any build up moisture and carbon dioxide. For processing potatoes, it is necessary to adhere requisite CIPC treatment after the first 30 days of storage to prevent sprouting and fungal infection.

Storage Practices: In this step, we arrange potato bags in different racks inside the storage chamber. It is essential to monitor temperature, humidity, and air circulation regularly to ensure optimal storage conditions. It is necessary to implement a pest and disease control program to prevent any storage losses. It is desired to maintain accurate records of potato storage to ensure efficient inventory management system. It is needed to rotate the potato stock to ensure FIFO (first come first out) for better efficiency and management.

Post-Storage Handling: The storage period for potatoes can vary depending on the varieties and storage conditions. But generally, potatoes can be stored for 6-8 months in the cold storage. Once storage duration is completed, proper grading and packaging is carried out according to the prevailed market conditions. After this, it is ensured to have proper handling and transportation of stored potatoes against any kinds of damage.

Documentation: It is desired to maintain detailed records of all storage procedures, including temperature, humidity, air circulation, CO_2 levels and any treatments used in it. There are also desired to keep records of farmers name, their store variety, storage date, quantity stored, variety name, and chamber location or stake number.

CONCLUSION

Potatoes play a vital role as a staple food globally. Proper storage is essential to maintain quality, prevent post-harvest losses, and ensure a year-round supply. While traditional storage methods are still in use for small-scale farmers, modern cold storage solutions provide better efficiency and longer shelf life. With over more than four fifth of India's cold storage space dedicated to potatoes, any improvements in handling, storage conditions, and documentation can significantly enhance storage efficiency and reduce losses. By adopting best practices and advanced techniques, India can further strengthen its potato supply chain by ensuring both food security and economic benefits of farmers in the country.

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Some Photographs

(Wooden Storage Structure)

(Heap Storage)

(Storage in Baskets)

(Pit Storage)