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The Preservation Techniques of Onion

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Abstract

Onion storage is widely practised worldwide in accordance to their cultural and economical practice. In India, method of storage adopted mostly depends on the traditional knowledge and commonly practised methods are bag, pucca/room, tat storage, bamboo, chawl structure and the losses associated are quite higher. Sprouting, desiccation and microbial spoilage are often observed in ***Storage*** *and it compels to choose advanced techniques like modified ventilated structures. Modified Atmospheric (MA) and Controlled Atmospheric (CA) storage.*

The CA and MA storage reduces the application of chemicals for sprout inhibition by manipulating the gas composition to extend the storage period of the onions. Onion is stored at ***ambient*** *storage condition in most of the tropical countries where the storage losses are very high. It is estimated that 40 to 50% of the stored onion never reaches to the consumers because of various types of losses. Steppe (1976) estimated that 16 to 35% of onions were lost as post - harvest spoilage. In tropical countries, such losses may be higher than the estimates (Salunkhe and Desai, 1984). These losses are comprises of physiological loss in weight (PLW) i.e. moisture losses and* ***shrinkage*** *(30-40 %), rotting (10-12 %) and* ***sprouting*** *(8-10 %).The higher storage losses were due to physiological loss of weight occurring during the drier months when mean* ***temperatures*** *are high with lower* ***humidity****. The rotting losses are high in the high humid months. The sprouting of onion starts in later part of storage when the bulb dormancy is over and temperature dips below 20°C .*

Keywords. :- Dry-food , Moisture, Microbial, Sprouting, Atmospheric

INTRODUCTION.

Onion (Allium cepa L.) is one of the oldest bulb crops, known to mankind and consumed worldwide. It is one of the most important commercial vegetable crop grown in India and believed to be originated in Central Asia. It is valued for its distinct pungent flavour and is an essential ingredient for the cuisine of many regions. Onion is the queen of kitchen (Selvaraj, 1976). India ranks second in the production of onions next to China. It contributes about 19.25 % of total world production (FAO, 2012). The compound annual growth rate of production area, is steadily increasing from 1974-75 to 2011-12 by 3.36 per cent to 5.95 per cent, production by 4.94per cent to 7.07 per cent and productivity by 0.51 to 3.4 per cent respectively. The productivity of country is 14.35 t/ha which is at least 5 times less compared to Republic of Korea (66.16 t/ha), about 4 times less than USA (56.13 t/ha), Spain (55.21 t/ha), Netherland (51.64 t/ha) and Myanmar (46.64 t/ha) (Chengappa et al. 2012) Onion is cultivated throughout India; during 2012-13 the area of cultivation is 0.992 million hectares with production of 16.65 million metric tonnes. Maharashtra's stand alone contribution is 32.6 per cent in total production and the rest shared by Karnataka, Gujarat and Madhya Pradesh in India. Despite the achievements in production technology, the post-harvest losses during storage still pose a great problem. Onion is a seasonal crop and bulbs are usually stored until the harvest of next season crop or for longer period due to seasonal glut in the market. Significant losses in quality and quantity of onion occur during storage. Storage of onion bulbs has, therefore, become a serious problem in the tropical countries. The post-harvest losses, viz., sprouting, rotting and physiological loss in weight pose a great problem. Bhagachandani et al. (1980) reported that annual storage losses were over 40% and between 40 to 60% in India.

It is estimated that out of the total production of 41 lakh tonnes of onion, 40 to 50 per cent valued at more than Rs 600 crores are lost due to desiccation, decay and sprouting in storage (Kukanoor, 2005). This results in raise in their price to the tune of four to five times when they are in short supply. The situation can be improved by extending the storage of onions during lean periods. Keeping this in view, efforts are made to review all possible methods of onion storage and in this way it could be possible to quest for exact needed facility to reduce the rate of deterioration. This paper deals with two sections, application of spray chemicals or growth hormones prior to harvest and the effect of storage structures; methods on storability of onions.Seasons for cultivation of onions in India: India's climatic condition supports the growth of short day variety of onions. Crops are sensitive to temperature and rainfall pattern, northern part of country grows onion as rabi (winter) season crop, Whereas Tamil Nadu, Karnataka, Andhra Pradesh, Gujarat and Maharashtra grows both in rabi (winter) and kharif (rainy) seasons.

LITERATURE REVIEW.

India is known as the second largest fruits and vegetables producer in the world followed by China. India, during 2017-18 has produced about 97358 Thousand MT fruits and 184394 Thousand MT vegetables in about 6506 Thousand Ha and 10259 Thousand Ha areas, respectively (Horticultural Statistics At a Glance, 2018, MoA&FW, GoI). Unfortunately, fruits and vegetables being perishable in nature get wasted to the tune of 20-30 per cent in the supply chain due to improper handling, transportation and poor post harvest management; and only 2 per cent are processed in to value added products and the rest is consumed as fresh. Therefore, processing of fruits and vegetables offers immense scope for wastage minimization and value addition; thus can generate significant income and employment in Indian agrarian economy.[1] The present storage capacity for onion is about 4.6 lakh tonnes. This is quite inadequate compared to our total production. Even most of the structures available are traditional and unscientific. If 40 % of the stocks are earmarked for scientific storage the potential for new storage structures is about 12.6 lakh tonnes. However, it has been projected by the Expert Committee on Cold Storage and Onion Storage that about 1.5 lakh tonnes on-farm capacity in production areas and 3.0 lakh tonnes capacity at APMCs and other market places are required in next 5 years. Thus there remains a vast potential to be tapped.[3]

Every agricultural commodity is required to be stored properly to prolong the availability with minimum qualitative and quantitative losses. Onion is not an exception. The onion bulb is a natural food store for the plant, but it is a living system undergoing a process of development towards sprouting, and is subject to decay by various disease causing organisms. The objective of storage technology is to maintain the bulbs for as long as possible in an unchanged sound condition with longer shelf life, and allow them to transport and market after removal from store without much losses.[4]

Recently the new initiative of Government of India “Operation Greens” has been launched with an allocation of Rs 500 crore. On the lines of Operation Flood. Operation Greens aims to promote farmer producers organisations (FPOs), agrilogistics, processing facilities and professional management. The operation aims to aid farmers and help control and limit the erratic fluctuations in the prices of Onions, potatoes and tomatoes. The idea behind Operation Greens is to double the income of farmers by end of 2022. Operation is essentially a price fixation scheme that aims to ensure farmers are given the right price for their produce.[5] Onion is the part of the daily diet in almost every house hold. It is one of the most important vegetable crop in India. Such valuable crop storage is having problems. Though NABARD is giving subsidy for making storage. A new kind of low cost onion storage facility developed by Shri Rohit Patel, a young farmer from Madhya Pradesh.[6]

OBJECTIVE .

The present work aims at “Prevention techniques of Onion”. The main intention of this project to Increase the life of onions by its proper preservation and taking care post harvesting.

- Literature review.
- Study of different preservation methods.
- Study of different types of storages.
- Study of Onion life and environmental effects on it.
- Designing of storage system.
- Design of component of system for preservation.
- Fabrication and assembly of total system
- Testing of system.

METHOD OF ONION STORAGE.

Practices of onion storage: In India, different storage methods are practiced by the farmers. Among those, Charches method of storage is practiced in the Ladakh and Odisha region of India.This method involves storage of fresh onion by hanging them from ceiling. The onion crop is harvested when the bulb is matured and leaves are green. For storage in charches, the bunch of onion is tied together in the form of knot with the help of green leaves. Long sticks strong enough to bear the load of the onion bunches are hanged parallelly on the ceiling of an unheated storehouse using rope hooks. Bunches of onions are carefully hanged on the sticks. Utmost care is taken to keep the onion untouched after hanging. Repeated hand touching and hard pressing spoils the bulbs. As per requirement the bulbs are plugged from one end without disturbing the entire lot. Hanging method of storage was effective for short period of storage (45 days), whereas cage method was effective for longer periods (90 days) in minimising bulb rots caused by Aspergillus niger). Storage structures.

MODELLING OF ONION STORAGE CHAMBER.

Above figure illustrate the complete chamber used for preservation of onions for the longer period. Model of chamber is drawn by using Solidworks modeling software. As per design of chamber we can store onions in chamber under the roof as well as a fresh air can be thrown amongst onion.

Overall Dimensions of Chamber = 914mm * 609mm * 762mm [l*b*h]
Ground clearance = 305 mm
Roof Dimensions = 1168mm * 863 mm [l*b]
Onion Storage capacity = 150 kg

we're making a small model of chamber for testing and conclusion purpose with the small mensions as per mentioned above. As roof is extended from overall body it can protect onions from in water.

EESTIMATED COST OF ACTUAL MODEL.

As per our design and calculation based on onion storage capacity we can expect a sound less amount of budget for this technique of onion preservation which is very less compared to other storage systems. We're focusing on good life of onions by making this project which contains mainly very less parts, which are Ventilation/Air circulation fan, Pipeline for ventilation throughout chamber and supporting structure where we can onions store.

The following table shows detailed costing for the demo model of Preservation of Onion for the 100 KG quantity.

CONCLUSION.

As we gone through overall study, India is leading country in production of Onion as well as leading in export of onion too. To meet the climatic conditions, demand and supply of market a small farmer cannot afford the loss and damage of onions due to its improper storage, huge cold storage or warehouse is out of the limit of a small farmer. Our prevention technique of onion can easily helpful for all type of farmers to store onions.

- Onions can be store upto 6-8 months.
- No chance of humidification in chamber.
- Quality can be maintained easily.
- Reduced cost of chamber compared to other techniques of storage.
- Easy to load and unload onions.
- Can be preserved from Rain due to overhanged roof.
- Eco friendly.

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