AgriCos e-Newsletter
ISSN: 2582-7049
Volume : 01 Issue : 08 December 2020 Article No: 13

Onion Storage: Factors Responsible For Post Harvest Losses

Wale V. D., Patil P. V., Desai Y. S. and Dhamal S. D.
Assistant Professor, Shramshakti College of Agriculture, Maldad, Tal. Sangamner, (M.S.)

SUMMARY

Onion is important vegetable consumed in India almost every day in every house. The genetically controlled factors include dry matter content, pungency, number of scales and dormancy period of the variety influence the storage performance. The cultural practices include manures, fertilizers, quality and quantity of irrigation water, the time and method of harvesting, curing, storage environment and storage methods have effects in the storage life, weight losses, rotting and sprouting of onions during storage.

INTRODUCTION

Onion (*Allium cepa L.*) has been valued as a food and a medicinal plants since ancient times. It is widely cultivated vegetable bulb crop known to most cultures and consumed worldwide (FAO, 2012). Their requirement is daily in the kitchen and therefore, augmentation of daily supply in the market at reasonable prices for both producers as well consumers is highly essential. Onion is grown in three seasons *i.e. kharif* (June-July), late *kharif* (August-September) and *rabi* (November-December) and harvested during October-November, February-March and April-May respectively. There is no next harvest till November or there is a gap in production during June to October. Hence onion is stored to fulfill countrywide demand and export during this period and if farmers sell onion during April to July, they get less prices, hence, to add value on it they need to store their produce. Therefore, storage of onion becomes inevitable for regular supply to consumers as well as value addition for farmers and exercising control over price fluctuations.

Factors Effecting Storage Life of Onion

Genetic Actors

The inherited qualities, which lead to give good storage life of onion, are high dry matter content, high total soluble solids, high pungency and long dormancy. The red coloured varieties have the highest storage potential, followed by the yellow skinned varieties and the white ones had the lowest storage potential (Abu-Goukh *et al.*, 2001).

Manures and Fertilizers

The excessive nitrogen application has increase the rotting in storage and it is associated with thick neck. The application of nitrogen in the early stages is important for vigorous vegetative growth, excessive nitrogen towards harvest time can lead to increased levels of fungal and bacterial rots and promotion of early sprouting. The application of higher doses of nitrogen particular in the later stage off growth should be avoided. There must not any application to nitrogenous fertilizer after 60 days of transplanting. The application of additional quantity of potassium (30 kg/ha), sulfur (50 kg/ha) and organic manures has been beneficial in increasing storage life in onion.

Irrigation

The late irrigation results in higher level of neck rot. The irrigation should be stopped 2-3 weeks before harvest. The quality of water should be good if overhead irrigation system is used for irrigation. The storage losses are lower in drip irrigation (Tripathi *et al* 2017) and higher storage losses in overhead irrigation (Brice *et al* 1997).

Use of chemicals

Pre-harvest sprays of borax and copper oxychloride (2.5g/l) increased skin thickness, decreased weight loss and enhanced colour. The seed treatment with bavistin or benomyl (2g/kg) seed before sowing and spraying of benomyl and procymidone (0.2%) four weeks before harvesting reduces the neck rot disease and helps in reduction of losses in storage.

Use of sprout suppressants

The use of sprout suppressants such as maleic hydrazide 2-4 week before harvesting have been successful in control of sprouting in storage. Maleic hydrazide is less effective when temperatures exceed 26^{o}C as crystallize on leaf surfaces. The maleic hydrazide should be applied to the plants with nearly mature bulbs and yet with green foliage (5 to 8 green leaves per bulb), because too early application produced puffy or spongy bulbs and because green leaves were required for absorption and translocation of maleic hydrazide.

Harvest time and method

Onion should be harvested when 50% plants show neck fall. Further the delayed harvest may result in reduction in skin quality, sprouting, rooting and reduction in firmness, weight loss, and incidence of watery scales and storage rots of bulbs. Under wet soil conditions complete drying of leaves seldom occurs. Onion is harvested manually by hand uprooting, but in hard soil, hand hoe is used for harvesting.

Field curing and removal of leaves

Curing is a surface drying process to improve the keeping quality of onion bulbs and reduces the chance of infection by disease causing organisms in storage. The field curing allows drying of leaves and translocation of growth inhibiting hormones to bulbs which enhances the dormancy of the bulbs. The onion should be dried with intact leaves for 3-4 days after harvesting. while cutting the leaves, 2-3 cm long neck should be kept along with the bulbs. These bulbs should be kept under shade for 2-3 weeks for proper drying of bulbs before contemplating storage. The removal of leaves is generally done 3-4 days of field curing. The removal of leaves facilitates easy grading, packing and marketing.

Shade curing

Shade curing in shade helps in development of colour and more number of scales. Shade curing normally takes from 15 to 20 days and done in well ventilated curing sheds. Also, shade curing is done in field by covering the heaps of onions with dried leaves of onion. Excessive exposure to sunlight causes sloughing off of the outer scales (baldness), sunburn and excessive shrinkage of the onion.

Size and Neck thickness of bulbs

The medium size (50-60 mm diameter) and thin necked onion performed better storage than bigger and smaller onions. The large bulbs sprouted at faster rate than small ones in storage but that small onions lost weight more rapidly. The physiological weight loss was higher in small size bulbs (25-40mm) while it was less in medium (40-60 mm) and bigger bulbs (more than 60 mm) (Tripathi 2008). The thickness of bulbs influences the storage of onion bulbs. The thick neck bulbs shows more decay and sprouting. There was no effect of neck thickness on physiological weight loss but rotting was less in those bulbs having less than 3 mm neck thickness.

Fumigation and Irradiation

The fumigation of bulbs with sulphur before storage decreases the infection of black moulds. Gamma irradiation was effective in preventing the sprouting losses in all onion varieties irrespective of colour. A dose of 5 to 15 krd of gamma irradiation shortly after harvest effectively inhibited sprouting of onions.

Storage Environment and Storage Methods

There are two temperature ranges *i.e.* 25-30ºC (high temperature) and 0-2ºC (Low temperature) and one humidity range *i.e.* 65-70% has been recommended for onion. Best results under both the temperature regimes are obtained when humidity is maintained at 65 to 70%. The storage losses in high temperature conditions (25-30ºC) are high but storage cost is low. While in low temperature conditions (0-2ºC) or cold storage conditions losses are minimum and storage period is longer but storage cost is high. Higher temperature (more than 30ºC) in ambient storage structures lead to higher weight loss while lower temperatures (less than 10ºC) enhance sprouting losses. Higher humidity (more than 70%) coupled with higher temperature enhance storage diseases, while lower humidity enhance weight loss. The temporary, semi permanent and permanent storage structure are used for the storage of onion. Various types of onion storage structure i.e. traditional single row storage structure, traditional double row storage structure, bottom ventilated single row storage structure, modified bottom ventilated storage structure, modified bottom ventilated storage structure with chain link on side, top and bottom ventilated storage structure, low cost bottom ventilated single row storage structure were designed and constructed at National Research Centre for onion and Garlic, Rajgurunagar.

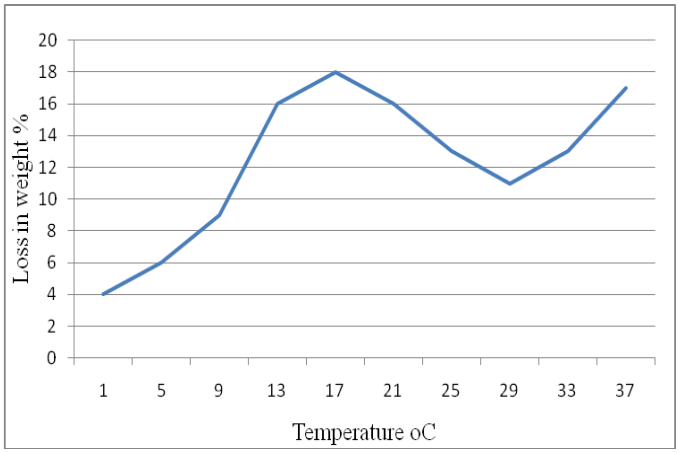

Fig. 1 Storage Losses and Temperature

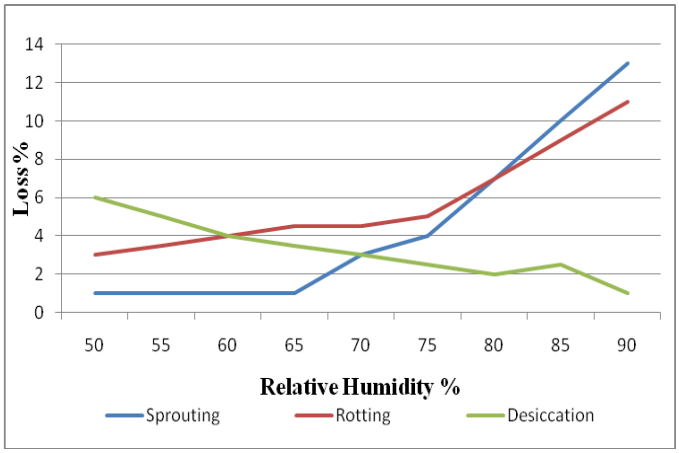

Fig. 2 Storage Losses and Humidity

CONCLUSION

Storage is a function of genotypes, cultural practices and storage environment maintained during storage time. Low nitrogen more of sulphur, moderate irrigation through drip, withholding of irrigation 15-20 days before harvest, field curing of bulbs along with tope, cutting of tops with long neck, shed curing for 15 days and proper storage environment and storage methods enhance the storage life of onion.

REFERENCES

Abu-Goukh, A. A., Hassan, I. M. and Asim, F. A. (2001). Post harvest quality and storability of twenty onion varieties at "Jabal Marra" Area Sudan. Uni. Kahartoum J. Agric. Sci. 9(2):236-253.

Brice, J. Currah, L., Malins, A. and Bancroft, R. (1997). Onion storage in the tropics: A practical guide to methods of storage and their selection. Chatham, UK: natural Resources Institute.

FAO (2012).World onion production. Food and Agriculture Organization of the United Nations. http://faostat.fao.org, accessed. February 27, 2017.

Tripathi, P. C., Dhumal S. S. and Lawande, K. E. (2008). Effect of irradiation and low temperature storage on post harvest losses in Onion. Indian Food Packers. 62(4):53-56.

Tripathi, P. C., Sankar, V. and Lawande, K. E. 2017. Micro irrigation in onion (*Allium cepa*) and garlic (*A. sativum*). A Review. Current Horticulture, 5(1): 3-14.