



Short Communication

Effect of curing methods on shelf life of *Kharif* onion

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Abstract

The present investigation was carried out at the Experimental Farm of Krishi Vigyan Kendra, Bilaspur, Himachal Pradesh for two consecutive years 2017-18 and 2018-19 to study the effect of curing methods on shelf life of onion bulbs, harvested at their physiological maturity, cured with and without leaves and dried in shade in a well ventilated airy room. The *Kharif* onion bulbs kept for curing alongwith 12-15 cm tops, dried from top towards bulbs, leading to retaining their proper shape, size and bulbs remains compact which leads to prolonged shelf life of bulbs, whereas, 40 per cent sprouting was observed in bulbs kept for curing without tops and they become loose and cannot be kept for further storage.

Key words: *Kharif* onion bulbs, shelf life, curing methods, sprouting.

Onion (*Allium cepa* L.) is one of the oldest bulb crops, having year round demand in almost every household. It is preferred mainly because of its green leaves, immature and mature bulbs, used either raw or cooked as vegetable. The bulb used in soups, sauces, condiments, spices, in medicine, seasoning of many foods and for the preparation of value added edible products. Since it is seasonal crop sometimes with excess production, bulbs are subjected to long storage or farmers will sell in low price due to the post harvest and storage loss. Being a semi-perishable crop, onion is subject to deterioration during storage. Rotting, sprouting and physiological weight loss causes storage loss of onion bulbs. Patel *et al* (2009) reported that storage losses in onion could be as high as 66 per cent. Traditionally, onion is cultivated during winter months, i.e., sowing in November-December and harvesting in April-May under North Indian plains as *rabi* onion. The April-May harvested crop of this region has to meet the market demand till the harvesting of next year crop, which results in sky rocketing prices from October to March, because till October, *rabi* crop can be stored with about 40 percent storage loss due to sprouting and rotting (Joshi *et al.*, 2012 and Som *et al.*, 2003).

Therefore, *Kharif* onion had played a major role in enhancing the production, supply and reducing the price rise as most of the onions marketed this time in North Indian plains are brought from Maharashtra and

southern parts of the country. Varieties have been developed to produce onion during rainy season as *Kharif* onion in North Indian condition, with a few supplemental irrigation, which caters the need of the domestic demand and also fetches good market price. However, production of *Kharif* onion across India is limited due to non-availability of location-specific varieties and suitable production methodology. The *Kharif* onion crop is raised through sets to produce onion bulbs for their availability during lean period i.e. October to March under North Indian conditions. Its sets are planted in the 2nd fortnight of August and green onion will be available by the end of October onward (Anon. 2018, Biswas, 2010 and Patel *et al.*, 2009). Upto December end, the bulbs attain their physiological maturity but due to low temperature, their proper curing will not be possible as a result they sprout as and when their tops are removed from the bulbs. The purpose of curing is to remove excess moisture from onion scales and neck, thereby reducing infection from disease carrying organisms and minimizing shriveling by removing moisture from the interior. Therefore, an investigation was conducted for two consecutive years 2017-18 and 2018-19 to study the effect of curing intervals on sprouting of onion bulbs harvested at their physiological maturity, cured with and without leaves and dried in shade in a well ventilated airy room.

The present investigation was carried out at the

experimental farm of Krishi Vigyan Kendra, Bilaspur, Himachal Pradesh for two consecutive years, i.e., 2017-18 and 2018-19. The experiment was laid out in Randomized Block Design (RBD) with four replications. The sets (small onion bulbs) of *Kharif* onion Agrifond Dark Red variety (AFDR) were planted in the second fortnight of August during both the years. By the end of December, the bulbs attain their physiological maturity but their foliage remains green due to prevailing low temperature. The crop was harvested and stored after removal of tops. As a result, 40-50 per cent bulbs sprout which leads to poor shelf life (Singh *et al.*, 2015). So in the present investigation, the bulbs harvested at their physiological maturity were cured with and without tops for enhancing their shelf life. In the first case, tops of onion bulbs were removed from the neck, whereas, in second case, 12-15 cm tops were retained alongwith bulbs. For curing, fifty bulbs were sorted based on uniformity with absence of defects and further grouped into four equal lots, each representing a replicate. The bulbs were kept for curing in a well ventilated airy room at weekly interval, starting from first to fourth week of January. After harvesting and before curing, the average fresh weight of bulbs was recorded. The fresh weight of 50 bulbs kept with leaves was 7143g and 7692g, whereas, weight without leaves was 6250g and 6400g during 2017-18 and 2018-19, respectively.

After one month of curing, the data were recorded on sprouting and weight loss of bulbs during curing, kept without leaves as well as drying of leaves from bulbs and weight loss of bulbs during curing kept with leaves during both the years of investigation. Bulbs sprouted when kept for curing without leaves, whereas, leaves dry and no sprouting was observed in bulbs kept with leaves. The data were pooled and analysis was

done by following the standard statistical procedures (Gomez and Gomez 1984). Their percentage was determined by the following formulae:

$$\text{Bulbs sprouting percentage} = \frac{\text{Number of bulbs sprouted}}{\text{Total number of bulbs}} \times 100$$

$$\text{Bulb weight loss (percent)} = \frac{\text{Initial bulb weight} - \text{weight after curing}}{\text{Initial bulb weight}} \times 100$$

It was observed that sprouting took place in those bulbs which were kept without leaves, whereas, there was drying of foliage in those bulbs which were kept for curing with leaves. The sprouting percentage increased from 28.8 to 40.0 when bulb were kept without leaves, whereas, sprout length increased significantly from 9.1 to 27.5 cm with increase in curing interval (Table-1). Similar trend was observed for weight loss of onion bulbs kept without leaves. The drying of foliage increases with increase in curing interval when bulbs were kept for curing alongwith tops. Their drying percentage was 27.4 per cent after first week of curing which increases upto 78.3 per cent after fourth week of curing. The bulb weight loss was also observed which ranges from 7.08 to 21.65 per cent from first week to fourth week of curing (Table-2). Similar findings were also reported by earlier workers Satodiya and Singh (1993). It is concluded from the above investigation that *Kharif* onion bulbs kept for curing alongwith 12-15 cm tops, dried from top towards bulbs, leading to retaining proper shape, size and bulbs remains compact which leads to prolonged shelf life of bulbs, whereas, 40 per cent sprouting was observed in bulbs kept for curing without tops and they become loose and cannot be kept for further storage.

Conflict of interest: There is no conflict of interest among the authors.

Table 1. Effect of curing interval on sprouting of onion bulbs kept for curing without leaves

Bulb curing interval (weeks)	Sprouting of bulbs kept without leaves		Weight loss of bulbs during curing kept without leaves	
	Sprouting (%)	Length of sprout (cm)	(g)	(%)
1 st (1-7 Jan.)	28.8	9.1	435.0	6.88
2 nd (8-14 Jan.)	33.2	15.5	837.5	13.24
3 rd (15-21 Jan.)	36.7	21.8	1190.0	18.82
4 th (22-28 Jan.)	40.0	27.5	1441.5	22.80
CD (P=0.05)	7.1	4.1	101.1	2.50

Table 2. Effect of curing interval on sprouting of onion bulbs kept for curing with leaves

Bulb curing interval (weeks)	Drying of leaves from bulbs kept with leaves (%)	Weight loss of bulbs during curing kept with leaves	
		(g)	(%)
1st (1-7 Jan.)	27.4	525.0	7.08
2nd (8-14 Jan.)	39.5	966.0	13.05
3rd (15-21 Jan.)	55.2	1358.5	18.37
4th (22-28 Jan.)	78.3	1598.5	21.65
CD (P=0.05)	10.2	101.0	2.40

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