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A study on the effect of conventional storage practices on the losses of onions under ambient environmental conditions

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Abstract

India suffers 40-50% post-harvest losses of onions per year due to inadequate storage techniques. Indian farmers primarily employ conventional storage methods, which are influenced by the surrounding environmental changes (Tripathi et al., 2016, Dhabi et al., 2008, Prajapati et al., 2019). Depending on the choice of storage method, losses in conventional storage may vary and therefore, there is a need to find out best from the available options. Three commonly used storage techniques were studied, i.e., bunches of onions were kept hanging under a naturally ventilated shade, bags of onions were stored beneath a shade, and loose onions were kept on the floor inside a closed room. This study focuses on the effect of storage duration and ambient environmental conditions on the losses of onions among the adopted storage methods. The physiological weight loss, microbial spoilages (neck rot, black mold, and bacterial rots), and sprouting were the parameters studied during the storage to calculate the loss percentage, along with regular monitoring of the ambient temperature and relative humidity (RH). The performance of floor storage was worse, with 67.34% of total stored products found spoiled within 15 days of storage due to microbial spoilage. Bag storage showed a total of 56.67±2.07% of losses after the completion of 77 days of storage. Out of 56.67±2.07% of total losses, 41.16±1.14% and 5.27±0.67% were due to microbial spoilage and losses due to sprouting, respectively. The fluctuation of ambient temperature and RH during the period of floor storage was 5–20 °C and 10–50%, respectively, and in the case of bag storage, 3–20 °C and 35–85%, respectively. The experiments on floor storage and bag storage were stopped after 15 days and 77 days of storage, respectively, because product losses in both cases exceeded the 50% mark within the aforementioned storage period. Hanging storage outperformed floor storage and bag storage. In hanging storage, physiological weight loss was found to be 37.6±2.1%, losses due to sprouting were 3.6±0.82%, and microbial spoilage was determined to be 14-15%. Microbial spoilage was found to be started after 35 days of storage. Cumulative losses of onions in hanging storage were found to be 55.74±1.17% after the completion of 114 days of storage. The

ambient temperature and RH fluctuation in the case of hanging storage was equivalent to the conditions mentioned for bag storage. To select a better alternative, farmers need to be aware of the variations in losses between conventional storage practices. Based on their needs for storage duration, resource availability, and the quantity of the items to be stored, farmers can use the findings of this study to select a feasible storage option. However, cumulative losses of more than 50% were seen for all three conventional storage methods between 15 and 114 days of storage, which is undesirable from an economic standpoint and will adversely influence the country's export markets and internal supply and demand ratios. Using a better storage method will therefore be a preferable choice for longer shelf life and minimal losses.

Keywords: Onion, Conventional storage practices, Storage losses

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