Organic Postharvest Technology for Onions

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Abstract

The study was conducted in Pudoc Centro, San Vicente, Ilocos Sur to determine the efficiency of the methods used in preserving dried onions and to compare the treatments used in the post harvest of dried onions. T, dried onions were hung and air dried, T – dried onions were hung above an earthen native stove, and T; -- dried onions were applied with ashes covered with rice hay.

Australian dried onions were used in the experiment. Treatments were laid out following the Randomized Complete Block Design (RCBD) with three replications.

Results of the study showed highly significant differences in the survival rate of the different methods used in preserving dried onions. T or "smoked" onions gave the highest computed mean weight of 19.5 kg and a survival rate of 97%. This was followed by T (application of ash with hay) with the computed mean of 18.4 kg. and a survival rate of 92%. T, (air drying) gave the least with a computed mean of I6.5 kg and a survival rate of 82%, respectively. I is only fitting and proper that in preserving onions they should be kept in a place wherein smoke is utilized to remove the remaining moisture content of the bulbs.

Introduction

Background of the Study

Onion *(Allium cepa)* is one of the most profitable crops in the Ilocos region. With proper irrigation, appropriate fertilizer application and traditional culturing practices, fanners are likely to get high income from the venture. The storage life of onions can be prolonged with the use of different post harvest techniques. Proper storage involves maintaining low moisture to keep the outer skin of the bulbs dry, thus, preventing the rotting of the necks and roots of the onion bulb during the storage. **It** involves keeping bulbs dormant, thereby, sealing the bulb against infestation **and** reducing respiration that may cause undue gennination during storage.

This study seeks to determine the most efficient methods of survival rate used in preserving dried onions. With these efficient methods on hand, the onion farmers may delay the marketing of the dried onions to wait for higher prices or for planting purposes. Consequently they will gain more profit.

Objectives

I. To determine the efficiency of the methods used in preserving dried onions.

2. To compare the treatments used in post harvest of dried onions.

Review of Related Literature

The study of Palcon and Borillo (2002) and Ramirez and Ambeguia (1998) enumerated the post harvest practices in Central Nueva Vizcaya:

a. Onion curing. Few bulbs are placed in the racks like bamboo or wooden slats for a week.

b. Vacuum packaging system in use for over 20 years. It gives very good results like lengthening the storage life and decreasing loss of weight and dessication. The system needs a vacuum packaging machine and special vacuum bags. The vacuum bags are most important in this system because the whole system is prone to leaks and will not produce the expected results.

The Philippine Science Encyclopedia Vol. VI (1986) on storage of onions cited that when onions are not processed or marketed right after packaging, they should be stored in a cold room. Ideal storage conditions are at temperatures of 0°C with 70-75 % relative humidity and good air circulation.

Onions are matured when neck tissues begin to soften and the tops have fallen or nearly ready to fall even when the leaves are still given.

BPI (1986) and PCARRD (1995) directed the following measures to be done:

a. For long-term storage. Bulbs should be allowed to mature fully in the field. Trim the onion roots and the leaves right after harvest or after filing them under the sun. Use a sharp knife or a scythe and cut above 65 cm. from the bulb. Dry onions in cool, clean, dry place with good air circulation for 1-2 weeks or until the necks are properly placed. Abrupt drying results to high moisture content of

stored onion and creates a wet and warm condition favorable for the development of rot organisms and black powder fungus.

b. For ordinary storage. Store in shed with ordinary compartments with bamboo slats flooring to provide better ventilation.

c. **For cold storage.** Use wooden crates or bags arranged with enough space to allow free circulation of cold air to reach the onions in all sides and to facilitate inspection and monitoring. Ideal temperature is 2-5°C for Yellow Granex and 1-3C for Red Creole. Investment in cold storage enables farmers and traders to avail better pricing for onion and circumvent the effects of seasonal gluts.

Methodology

The field experiment of the study was conducted in Pudoc Centro, San Vicente, Ilocos Sur.

Each treatment in every replication is 20 kg of a recommended variety of cleaned and dried onion (Australian) with medium size bulbs were used. The treatments were: TI- dried onions were hung and air dried in bamboo poles to provide better air movement (outdoor); T2 - dried onions were hung above an earthen native stove and the smoking process was done three times a day; and T3– dried onions were applied with ashes in layers wherein rice hay served as the bedding and covering material. Treatments were laid out following the Randomized Complete Block Design (RCBD) with three (3) replications

Ocular inspection was done twice a month until the termination of the experiment which lasted for four (4) months.

Counting of the damaged bulbs was actually done during the scheduled dates to determine which of the treatments had the most and the least damages.

Gathering of Data

Onion bulb size. Medium size dried Australian onions were selected, bundled and weighed. Each bundle weighed two (2) kg and was used. Ten (10) bundles of onions were used for each treatment.

Actual bulb performance. On every 15th and 30th of the month, the stored onion bulbs were inspected thoroughly to find out which of the three methods in preserving dried onions can give the best performance as far as method efficiency is concerned.

Survival rate of bulbs. After four (4) months of storage, destroyed bulbs from each treatment taken from the different methods were discarded inorder to weigh again the onions and to compute for the survival rate of bulbs.

Results and Discussion

The result of this experimental study is shown in the following tables:

Table 1. Survival rate of the different methods used in preserving dried onions

Treatments	RI		RII		Rlii		As a Whole	
	kg	%	kg	%	kg	%	kg	%
Tl	16.8	84	16.2	81	16.5	82	16.5	82
T2	19.6	98	19.3	96	19.5	97	19.5	97
T3	18.4	92	18.5	92	18.3	91	18.4	92

The survival rate of the different methods used in preserving dried onions in three replications during the storage period is shown in Table I.

The different treatments that are presented in the table are as follows: Ti- air drying, *T*- smoking above an earthen native stove and T- application of ash with hay.

- As shown in Table I, T gave the highest number of kilos with a mean of 19.5 kg. This means that the survival rate is 97%. T was the next with a mean of 18.4 kg. with a survival rate of 92% and the least was T with a mean of 16.5 kg and the survival rate is 82%. This means that the onion bulbs treated with smoke had the highest performance due to the fact that the heat has something to do with the nature of the bulb. The heat removed the remaining moisture content of the onions because high moisture contents are attractants of molds. Smoke also served as a preservative agent, thus, making the bulbs more tolerant to insects damaging bulbs or in other words, the smoke is an insect repellant.

Table 2. ANOVA table on the differences among the treatments on the efficiency of the different methods of preserving dried onions

Source of Variation	Sum of Squares	Df	MSS	F-ratio	Critical Value	Interpretation
Between groups	330.67	2	165.335	135.52	5.14	Highly significant
Within groups	7.33	6	1.22			
Total	338.00	8				

Table 2 presents the ANOVA result among the treatments on the efficiency of the different methods. Statistical analysis revealed that highly significant mean differences were obtained from between and among the treatments.

Table 3. T- test of significance difference of the different methods between the treatments

Treatment Comparison	Mean Difference
T1 vs T2	13.87
T1 vs T3	9.83+
T2 vs T3	7.93

-Significant at 0.05 level of significance
+—Highly significant at 0.05 level of significance

When treatment means were further subjected to the T-test of significance as shown in Table 3, it was found out that the mean differences between T vs. T and T, vs. T were highly significant and slightly significant differences occurred between T, vs. T,.

Conclusions

Based on the results of the experimental study on the organic postharvest technology for onions, the following conclusions are drawn:

I. The most efficient method is that of T, with the least bulb damage. Every treatment is good, but the smoking method is the best.

2. The performance of bulbs significantly differed using the right kind of method in post harvest of dried onions.

3. The storage period of the onion bulbs was four (4) months and no germination of bulbs took place. According to onion growers, seven (7) months is the longest storage period so that bulbs that germinated by that time will be discarded since they are not appropriate for planting due to improper maturity.

4. Stored bulbs are rotten due to abrupt drying which creates wet and warm conditions favorable for the development of rot organisms and black powder fungus.

Recommendations

1. Proper post harvest practices for onions such as air drying (outdoor), hanging above an earthen native stove and application of ash with hay should be adopted to minimize losses and to extend the onion's shelf life and preserve its quality. This measure stabilizes supply as well as prices, and ultimately generates income.

2. For long-term storage, bulbs should be allowed to mature fully in the field to lessen damages.

3. A follow-up study of the methods used in the post harvest treatment of dried onions should be conducted again using other kinds of treatments.

4. Further studies using lagundi *(Jitex negundo)* and kakawate *(Gliricidia sepium)* as storing materials for onion bulbs are also recommended

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