EFFECT OF DIFFERENT STORAGE CONDITIONS ON THE PROPERTIES AND QUALITY OF ONION BULBS

By

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B. Sc. Agric. Sci. (Agricultural Engineering), Fac. of Agric., Gezira Univ., Sudan, 1999
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APPROVAL SHEET

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DEDICATION

TO

SOUL OF MY FATHER

TO MY

MOTHER

CHILDREN

My WIFE

BROTHERS

SISTERS

WITH MY GOOD WISHES, IN

RECOGNITION OF THEIR efforts

AKNOWLEGEMENT

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Dr. Said Abdalla Shehata
Dr. Yousry Bayoumy Abdelhay
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ABSTRACT

Onion is one of the important commercial vegetable crops grown on a large scale in many countries. As the onion bulbs are to be stored for long period for use during off-season, a considerable loss occurs by way of deteriorating, sprouting, and moisture evaporation during storage. The objective of this study were to study the effect of storage conditions on the properties and the quality parameters of onion bulbs, in objective to keep quality, reduce losses, prolong shelf life, keep the price stable during the year. The properties of onion bulbs as affected by storage conditions are equatorial and polar diameter, compression strength, hardness, dry matter, total soluble solids and total carbohydrates. The quality parameters of the onion bulbs to be studied were weight loss, deterioration, sprouting and marketable percentage. The results indicated that, the average temperature in center of onion pile during the storage period ranged between 16.73 to 28.61 ˚C for the forced ventilation, where it was ranged between 18.18 to 31.03 ˚C for the natural ventilation, while in traditional storage system ranged between 19.52 to 32.93 ˚C. The highest mean of hardness value was recorded at natural ventilation (128.8 N) in the first season. Where the highest hardness value was observed at forced and natural ventilation in the second season (168.7 and 167.5 N, respectively), respectively. The highest dry matter percentage was recorded in natural ventilation 17.11% and the lowest dry matter percentage was recorded in the traditional storage system (16.52%), While, the dry matter percentage was insignificantly difference between treatments in the second season, The highest TSS percentage was recorded in traditional storage and natural ventilation (14.13 and 13.94%, respectively) in the first season, and 14.40% at forced ventilation in the second season. On the other hand, the highest carbohydrates percentage (7.48%) was recorded in natural ventilation in the first season. Whereas, the higher carbohydrates percentage was recorded in forced and natural ventilation (8.08 and 8.05% respectively) in the second season.

The bulbs stored under natural ventilation showed lowest moisture loss recorded in natural ventilation storage system (2.825 %) in the first season and (1.715%) in forced ventilation in the second season, and lowest percentage of deterioration (6.549%) was recorded in the first season, while forced ventilation recorded (0.813%) in the second season, whereas the lowest percentage of sprouting recorded in forced ventilation (1.470 and 0.3414%) in both season respectively. Also the highest marketable percentage was recoded in forced ventilation system 85.31% and the lowest percentage was recorded in traditional storage system (81.51%). The natural ventilation system obtained higher net return (922.27 LE/ton) in comparison with the net return in forced ventilation (466.50), whereas lowest net return of 461.30 LE/ton was obtained in traditional storage system. According to above results, natural ventilated with perforated pipes can be recommended for farmers.

Key words: storage systems, onion bulbs, temperature, relative humidity, forced ventilation, natural ventilation, traditional system, onion pile, deterioration, hardness, total soluble solids

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