



THE EFFECT OF DIFFERENT STORAGE METHODS ON THE PHYSICAL & CHEMICAL PROPERTIES OF ZAHIDI DATES

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Abstract

This study aimed at knowing effect of several canning ways like (freezing, vacating and freezing canning, canning at room temperature) on the physiochemical properties of polyethylene sacks canned Zahidi dates with volume 1 kg during storage period, 12 months. These properties and changes have been studied and comparison has been done among the three ways. Then information about the product quality has been collected after 12 month storage. The results showed that the freezing method of storage didn't affect largely on the physical characteristics of the products. There were not many differences on the length and width of the products along the storage period. However, increasing in the weight of vacating and freezing sample and freezing sample of dates noticed as well as increasing in product volume during storage noticed especially of the normal vacating and freezing sample. In the state of chemical properties, pH value didn't change in the freezing sample but it increased slightly in vacating and freezing canned sample and decreased slightly in canning at room temperature sample. Humidity decreased in the three ways of canning the freezing sample was the most, then vacating and freezing sample. Soluble solids value increased in the sample of canning at room temperature and decreased with slight ratio in the sample of vacating and freezing while it stayed stable in freezing sample. Total carbohydrates was low in vacating and freezing sample and high in canning at room temperature and freezing samples. The sensory evaluation for the stored dates sample was the best evaluation for taste and flavor in vacating and freezing sample, colour characteristic was the best in freezing sample, the appearance and texture were the best in vacating and freezing canning sample, whereas there was decreasing in texture in freezing sample.

Keywords: Freezing dates, canning dates by vacation, Zahidi type of date.

Introduction

There are many kinds of dates in Iraq but the known types, commercially, are very few although those types are not the best ones as there are types with better qualities but they are few in number and popularity, the most important commercial type is Zahidi (Sahan, 2016) which consider a famous commercial type. It is in the fourth stage in sense of its growth in wide land in Shatt-al-Arab region and in the first stage in the middle region and in the entire of Iraq in which the number of palm trees and the quantity of product. It considers the most important type which used in industry inside Iraq (Al-Agidi and Ahmed, 1985). Zahidi dates products went up in 2015 and it was the higher ratio 55.1% from the whole products of dates, the product quantity reached 332 thousand tons from the whole product 602348 thousand tons (Sahan, 2016). Dates storage consider from the important subjects, the losing of dates because of bad storage reach more than 50 % in some exporter countries (Al-Saa'd, 2003) so there is a big need to newer and affected storage methods in this field where the freezing method at lower degrees from 0 to -18°C can be used. Freezing maintain some fruit and vegetables because it decreases the water activeness and prevents microorganism growing and decreases the enzyme activeness which is responsible on the less of quality of most freezing fruit. The enzyme activeness lowers by reducing temperature, but the freezing caused chemical interactions motivated by enzymes because of the increase in salt concentrations (Marin and Cano, 1992). In addition to freezing, canning and packaging by vacating can be used which considers a modern method for packaging nutritional products as it involved taking the air out of the can and closed thoroughly. In this way oxygen will be out and all the chemical and biological pollutions and also riding of bacteria and decay that exist in air and which is in contact

with the product. Different degrees of vacating can be used according to canning and vacating machine. Any nutritional product saved in low temperature and clean environment maintain on colour, flavor and nutritional values for long time, in another word it maintains on quality and commercial value. These ways do not need large systems to achieve these results, however small and easy to use units can achieve good results.

Materials and Methods

Preparation of samples

This study was conducted on some cultivars dates in Babylon province for the agricultural season 2018. The samples were taken from the local markets at different stages of maturity which included (Khalal, Rutab, and date). The samples were stored at low temperatures from 0 to -18 °C. These samples were placed in 1 kg sealed plastic containers until the required laboratory tests were conducted. The weight of the fruit was approximately 500 g in each package.

Conducting chemical, physical and sensory analyzes on stored dates

Fruit weight:

The weight of the fruit was calculated by taking 10 fruits randomly from each replicate using a sensitive balance and the average weight for one fruit per gram was then calculated by dividing the total on the total number of fruits.

Fruit size

The size of the fruit was measured by the graduated cylinder method and the displaced distilled water at the average of 10 fruits per duplicate, The size of the distilled water was placed in the graduated cylinder and the fruit was immersed in the graduated cylinder. The volume was

measured by finding the difference between the water level in both cases and the average of one fruit was then extracted by dividing the size difference on the number of fruits, it was calculated by unit (cm^3).

Fruit length and its diameter

The length and diameter of the fruit were measured using the Vernier (cm) and the length and diameter of the fruit were then extracted by dividing the total on the number of fruits.

Humidity

The percentage of water content and humidity was estimated using the method in (AOAC, 1995) by drying 10 fruits per replicate in a vacuum oven at a temperature of 70 °C for 48 hours and at the constant weight, the percentage of the water content for the fruit is calculated.

Total Soluble Solids

Five gram of chopped fruit was added and 15 ml of distilled water was added and triturated in a ceramic mortar. which then filtered, The percentage of Total Soluble Solids was estimated using the Hand Refractometer by taking a drop of sap and placing it on the prism of device. The results were adjusted based on the optimum temperature of 20 °C.

pH

The acidity was estimated using the method found in (AOAC, 1995). The study concludes by taking 25 g of available sample (cut into small pieces and ground with blender), followed by adding 100 ml of distilled water and boiling for 1 hour, it was then filtered the resulting mixture and cooling it to 100 ml in a standard glass flask and then transferred to a cup Its capacity is 150 ml and then measure the PH number by using pH meter.

Total Soluble sugars

It was estimated by the method of (Joslyn, 1970) which conclude by weighing 200 mg of the sample, adding to it 8 mL of ethyl alcohol at a concentration of 80%, it was placed in a test tube and then placed in a water bath at 60 °C for half an hour. After that, the solution was taken to another flask. An 8 mL ethyl alcohol was added to the remaining precipitant at a concentration of 80% and leave in a water bath for half an hour. this solution was taken and collected with the solution from the previous stage and place in a centrifuge at 4000 rpm for 15 min. The slurry then transferred to the rotary evaporator to remove the alcohol. The remaining solution completed to 100 mL with distilled water and in which the total soluble sugars were estimated using the phenol method by taking 1 ml of the sample and adding 1 ml of phenol at a concentration of 5% and 5 ml of concentrated sulfuric acid, The model was left to cool down and the absorbance was measured at a wavelength of 490 nm and a standard glucose curve was used for this method.

Sensory evaluation for the storage fruits

The sensory evaluation test for dates was conducted by specialized professors in College of Food Sciences, where each professor makes a sensory evaluation of the samples, taking into consideration the taste, flavor, color, appearance, texture, general acceptance and then filling out the test form. The preference grade in the test model are then classified into figures as follows:

The excellent grade is given 25, a good grade is given 20, the medium grade is given 15, the poor grade is given 10, a Very poor grade is given 5.

Results and Discussion

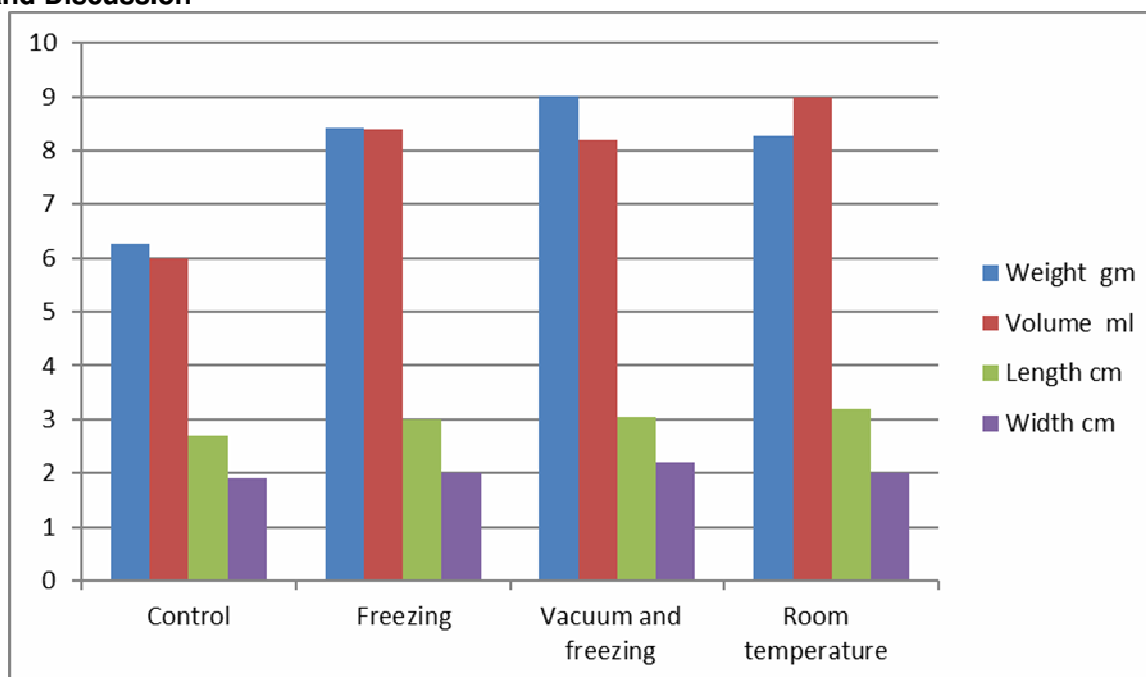


Fig. 1 : Shows the physical properties of stored Zahidi dates

Fig. (1) Shows the physical properties of the stored Zahidi dates where there were increasing in the weight of date storage in the three mentioned methods. Freezing and vacating sample recorded higher weight then freezing sample

and finally canning at room temperature sample, however Aleid and Elansari (2014) found decreasing in weight during storage. Volume property has gone up too in the three methods of storage, canning at room temperature sample was

the most increased sample then freezing sample and finally freezing and vacating sample. In terms of length and width

property a slight increasing was noticed in comparing with other properties.

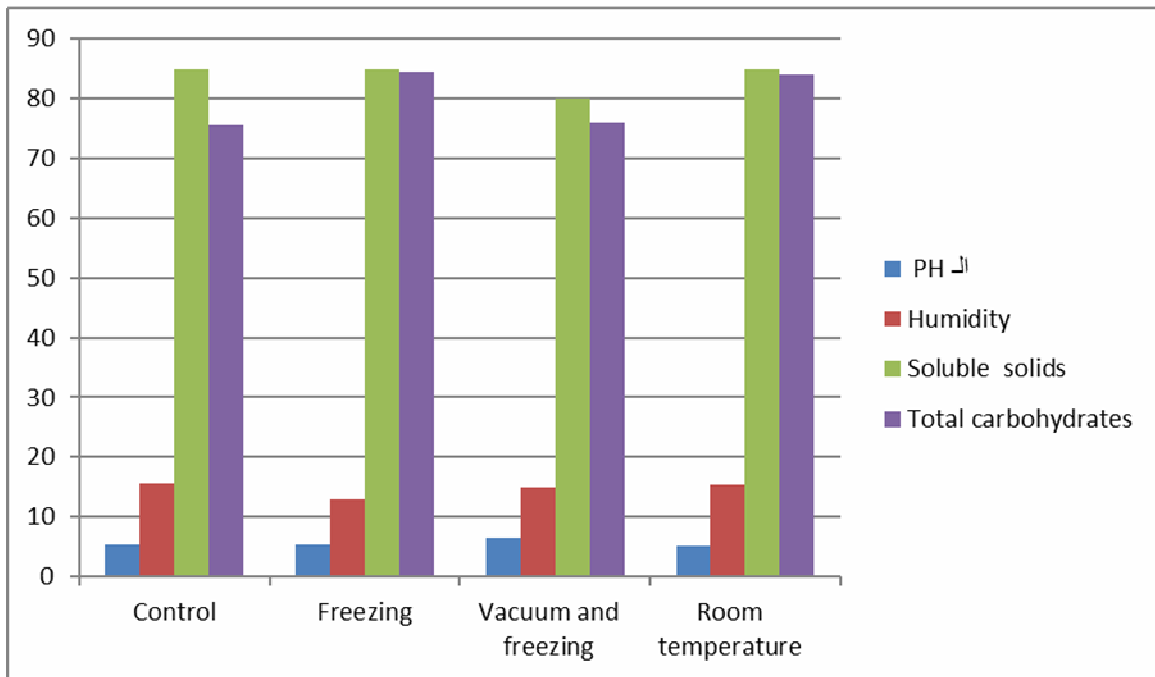


Fig. 2 : Shows the chemical properties of stored Zahidi dates

Fig. (2) Shows the chemical properties of the stored Zahidi dates by the three methods of storage where pH value didn't change in freezing sample, but it increased slightly in canning in freezing and vacating sample and decreased in canning at room temperature sample slightly. Humidity decreased in the three methods generally where freezing sample was the least humidity then freezing and vacating sample. There was increasing in soluble solids ratio in canning at room temperature sample and decreased in freezing and vacating sample whereas staid stable in freezing sample. (Wahid *et al.*, 2005) found that dates fruit stored at low temperature had high soluble solids and total carbohydrates values in comparing with stored dates in

canning at room temperature sample. Total carbohydrates were low in freezing and vacating sample and high in canning at room temperature sample and freezing sample, because freezing storage leads to increasing glucose and fructose and to decreasing sucrose till the end of freezing storage period (Abdullah Alhamdan *et al.*, 2018). However previous studies noticed decreasing reduced carbohydrates of date fruit at the end of six months of frizzed storage (Mikki & ALtaisan, 1993). Fruit carbohydrates has a big effect on maintaining the fruit quality and pointing the nutritional state (Akhatou & Angeles, 2013) aside from types that contain more than 75% carbohydrates basis on dry weight (AL-Mashhadi *et al.*, 1993).

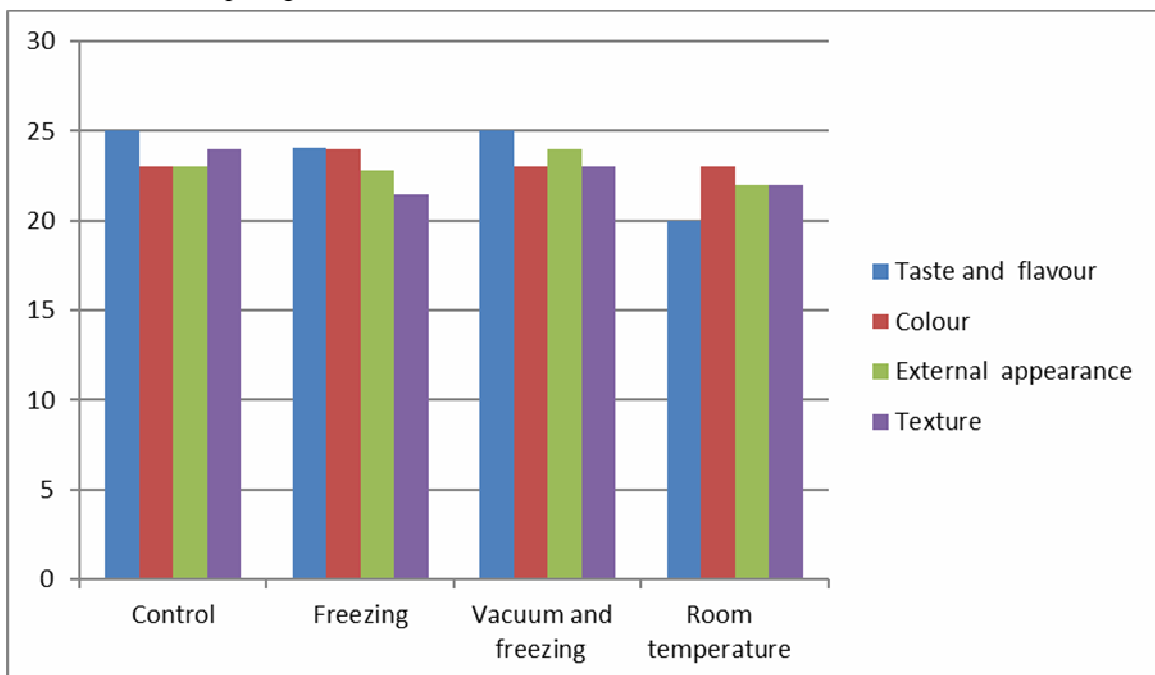


Fig. 3 : shows sensory evaluation of stored Zahidi dates

Fig. (3) Shows the sensory evaluation of the stored Zahidi dates. The best sensory evaluation was for taste and flavor in canning by freezing and vacating sample, colour characteristic was the best to freezing sample and the external appearance and fruit texture was the best for canning by freezing and vacating whereas there was a decrease in texture property in the freezing sample. Al-Shammari *et al.*, (2016) found that the fruit quality in terms of taste and appearance was very bad to the sample stored in the lab. and was very good to the freezing and vacating sample. The textural properties of fruit affected by the increase of activeness of polyphenol oxidase and peroxidase enzymes which lead to decreasing the quality of fruit especially with the increase of storage period in freezing method (Abdullah Alhamdan *et al.*, 2018).

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