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Effect of use of natural biologically active substances on shelf life of pomegranate fruits

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Abstract: In this article, research on the effect of biologically active substances on the shelf life of pomegranate fruits and scientific data on various diseases, storage temperature, and relative humidity changes of pomegranate fruits during storage are presented.

Keywords: Pomegranate, "Achik-dona", "Kzyl uluchshennyy", "Ak-dona", "Kazake-anar", "Tuya tish", quality indicators of pomegranate fruit, biologically active substances.

Introduction

Today, there are different ways of preserving pomegranate fruits around the world . The main focus of research on increasing the shelf life of fruits is to slow down the process of rotting them, in which drugs and methods that do not have a negative impact on human health and the environment are a priority.

Also, special attention is being paid to providing the population with high-quality food products, increasing the volume of production, their assortment, and the export potential. Pomegranate fruits are an important component of the human diet. However, it is of great importance to preserve these fruits and provide the population with continuous supply throughout the year.

Methods

Preparations and methods made of biologically active substances are designed to preserve the quality of pomegranate fruit, increase its shelf life with minimal weight loss, and are aimed at preserving human health and environmental cleanliness.

Studying the impact of the use of environmentally safe natural biologically active substances on the shelf life and shelf life of pomegranate fruits can be divided into the following stages:

Correct and timely organization of product collection - picking time. Special attention is paid to harvesting the product in the cool part of the day . Harvesting is best done from 6:00 a.m. to 8:00 a.m. At this time, the day is bright enough, and at the same time cool. This is a very important factor. Because the pomegranate has cooled down as a result of the night's coolness, there is no temperature difference during cooling in warehouses. This increases its preservation properties. In practice, many cases of poor storage of the harvested crop during the heat of the day have been observed..

Results and Discussion

During the experiments, the daytime air temperature was 28-32°C, and at night it was 15-20°C. In turn, the pomegranate temperature is almost the same as the air temperature. Since the main storage temperature of pomegranate fruit is +1 - +5°C, during the initial cooling process of pomegranate, the energy and time spent to lower it by 2°C from the temperature of 28-30°C is 2.5 times less compared to lowering it at 15-20°C. ldi (see Figure 1). Also, if the pomegranate is cooled from a high temperature, it will have a negative effect on its mechanical properties and its shelf life will decrease.

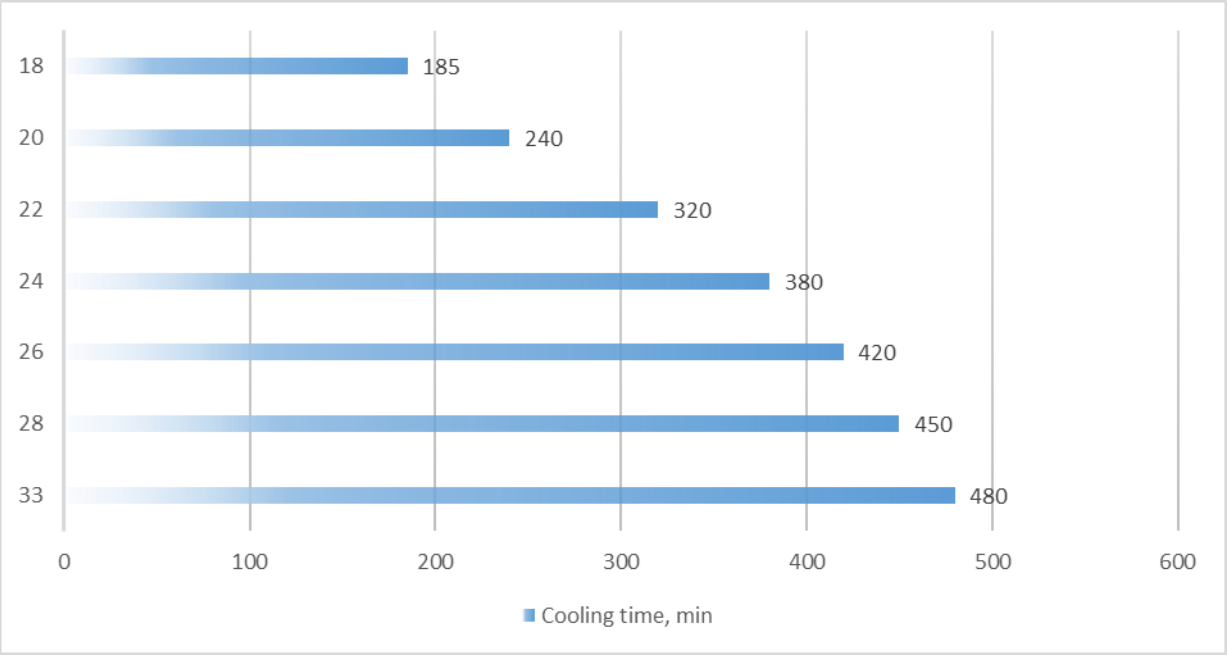

Figure 1. Temperature of Pomegranate Fruits in Storage Precooling Time Standard in Warehouse

The product is sorted during packaging (diseased, infected and damaged ones are removed). In this case, the product is placed in containers in two rows, the flower is not allowed to fall. This process is one of the important stages in the preparation of export-oriented products. Mechanically damaged products lose their shelf life. Therefore, this stage is one of the most important. The process of delivering pomegranate fruits picked in the field to the cooling warehouse for packaging . Collected pomegranates are delivered to a refrigerated warehouse in special trucks. The cargo compartment of the special truck must be closed, and at the same time have good ventilation (see Table 1). The loaded product will have to be delivered to the cold storage in a short period of time. Therefore, it is advisable to build the cooling warehouses near the fields

Table 1. The condition of the fruit composition during the transportation of pomegranate

Air temperature is 25°C	When the sun is right	When the top is closed
Fruit temperature	35-40 °C	20-25 °C
Fruit consistency	Stability is disturbed	It will be in a turgor state
Delicious	Will change	The initial state is preserved
Appearance	Changes to the negative side	The initial state is preserved
Color	Will change	The initial state is preserved

above table, proper organization of the transportation process in delivering the harvested pomegranate fruit to the storage warehouse is of great importance to achieve efficiency. In the organization of this process, direct exposure of the pomegranate crop to sunlight and avoiding precipitation and delivery to the destination as soon as possible have been proven to be important factors that ensure the quality of the subsequent processes.

Sorting process. In this process, the pomegranate from the field is fully inspected. Damaged and undersized fruits are removed. The removed part is then sent for juice extraction or processing. The sorted part is sent to refrigerated warehouses for packaging.

Preparation of ecologically safe natural biologically active substances. The following preparations were prepared based on the compounds of chitosan and its derivatives with organic edible acids (vinegar, amber), and the supramolecular complex of chitose formed with a solution of glycyrrhizic acid in ethyl alcohol:

1. Chitosan 0.1% acetic acid 0.1% (1:1 ratio);

2. Chitosan 0.2%, acetic acid 0.1% (1:1 ratio)

3. Chitosan 0.2%, succinic acid 0.25% (1:1 ratio);

4. Chitosan 0.2%, glycyrrhizic acid 0.01% (1:1 ratio);

5. Chitosan 0.1%, succinic acid 0.25% (1:1 ratio).

Packaging process. Sorted pomegranates are placed in containers of different sizes (plastic, wooden and cardboard) according to the customer's request. In order to increase the shelf life of pomegranate, the use of environmentally friendly biologically active substances and polyethylene bags is widely introduced. However, there were also cases of not paying attention to the change of its taste indicators, keeping only the external appearance. Currently, in many countries, the organoleptic indicators of the product have been negatively affected as a result of the improper use of preservatives.

Conclusion

According to the results of the research, the use of environmentally safe biologically active substances of pomegranate fruits has a positive effect on the shelf life of the stored product. properly organize harvesting for storage and carry out until the temperature reaches 20-21℃; choose "Chitosan-0.2% and acetic acid-0.1% (1:1)" and "Chitosan-0.2% and glycyrrhizic acid-0.1% (1:1)" for pomegranate preservation; It is recommended to reduce the temperature of the product to +4+5℃ by carrying out initial cooling processes in a short time (20-24 hours), and it is recommended to release the product for consumption as it has been determined in experiments that the effective working life of environmentally safe natural biological active substances in pomegranate storage is from 130 to 150 days. will be done..

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