WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 6, June, 2022

TECHNOLOGY OF INDUSTRIAL STORAGE OF CARROTS

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Annotation
Carrots belong to the type of crops that are equally well applicable for the fresh market, and for storage, and for processing. Especially for storage, late varieties or hybrids of carrots are grown, which are subject to the following requirements: the correct shape of the root crop, high yield, good storage capacity. Due to the low level of keeping quality of table carrots, during long-term storage, part of the crop may be lost. But under certain conditions (temperature 0-1 ° C, humidity 95-100 %), the storage period of carrots can be from 4 to 8 months.

Keywords: root crop, preservation, harvesting, quality requirements, storage temperature, relative humidity.

Introduction

Carrots are an agricultural crop, indispensable fresh, able to be stored for a long time and used for processing. Its roots are a valuable source of carotene, vitamins C, B1, B2, PP, phosphorus, carbohydrates and other elements. It is not easy to grow carrots and preserve all their taste and useful qualities until the moment of sale: they are susceptible to damage from diseases and pests. Thus, the average loss is about 30%, but it can reach 100%. Yield losses can be significantly reduced if you start working on a solution to this problem even before planting the crop. The storage of carrots is influenced by a number of factors, such as variety, growing conditions, quality of harvesting, etc.

Carrots make high demands on the conditions of their storage due to the lack of a strong peel on the surface of root crops. Root crops of a conical shape (Chantane type) have a higher keeping quality than cylindrical root crops (Nantes type). Carrots do not withstand even light freezing. After thawing, damaged tissues lose cell sap, become mucilaginous and are easily affected by microorganisms. For long-term storage, it is recommended to use only specific hybrids with high confirmed keeping quality.

By the time of harvest, carrots should be fully formed and ripe, a sign of which is the blunt tip of the root crop. When harvesting, the tops are cut off at the level of the head without damaging the shoulders of the root crops.

Healthy, high-quality carrots can only be obtained by following the principles of an integrated production organization that strictly reflects all aspects of carrot cultivation. Strict control over the condition of the soil, selection of varieties, care of crops, control of weeds, pests and diseases - all these activities underlie the preservation of quality products. Carrots are harvested at full maturity, as carrots are less susceptible to browning caused by excess oxygen at this time.

Harvesting is carried out mechanically, using various types of harvesters. Often, before harvesting, carrots are cut off the tops. Special requirements are placed on cleaning equipment. It is recommended to wash the combine harvester after harvesting and when moving from one field to another. This will prevent the spread of diseases.

After harvesting, carrots are subjected to post-harvest commercial processing, which consists in cutting off the tops and removing impurities. If carrots are harvested from heavy, highly moistened soils, then it is not advisable to mechanically clean them from adhering soil.

As experience shows, carrots with adhered soil are stored better. It is not recommended to wash root crops before storing them, while after storage it is not contraindicated and even necessary. Careful handling during and after harvest ensures successful storage.

Carrot root crops stored for storage must be dense, healthy, not prone to sprouting, not frostbite, and without mechanical damage. Such root crops are well adapted for successful and long-term storage in large quantities during autumn and winter. Carrots keep best when harvested at a cooler temperature.

If the harvest was carried out in wet weather, the carrots should be dried before storage for the time necessary for this, preventing the root crops from wilting.

Carrots are well stored in pits, cellars, piles, but the most reliable long-term storage is provided by a room with artificial cooling, which maintains a constant air temperature and high humidity.

Of great importance for the further high-quality storage of carrots in refrigerators is the speed of laying root crops in storage (no more than a day should pass from the moment of collection to the moment of laying).

Carrots should be cooled immediately after harvesting to a temperature of 0 ... + 1 ° C for no more than a day, then the temperature is maintained within these limits until the end of storage. In practice, cooling takes more than a day, since the storage is filled quickly, and the cooling system for such a period is quite expensive, plus there is a limit on the speed of air movement, on which the time to reach the temperature directly depends.

Relative humidity in the chamber should be 90-95%.

grown Soaking carrots in soil enriched with nitrogen can have a negative effect on keeping quality during storage.

Ways to store carrots in storage:

• in bulk;
• in containers;
• in box pallets;
• in boxes;
• in bags.

If carrots are placed in bulk, then the height of the embankment should be taken depending on the strength properties of the carrot variety, the quality of the lot and the ventilation conditions. The recommended height of the embankment is 2-3 m. When storing carrots in bags, the maximum stack height is 3 m.

When storing carrots in box pallets, they are placed in chambers in stacks no more than 5.5 m high.

Air circulation makes it possible to intensify heat transfer, which is especially important for the initial cooling of products, and also contributes to the creation of a uniform temperature and humidity field in the cargo volume of the chamber and in the stacks of stored vegetables, and the removal of volatile substances toxic to plant tissues released during metabolism (metabolism).

Air circulation is quantitatively characterized by two parameters:

- multiplicity, which is expressed as the ratio of the amount of air supplied to the volume of the unloaded chamber;
- speed of air movement.

Air circulation must be sufficiently intense, i.e. from 100 to 120 m3/t*h, if carrots are stored in bulk, and the height of the embankment is close to the specified maximum value.

During the cooling period, the air circulation should be quite intense 50-70 m3/t*h, depending on the climate zone. During the main storage period (in winter), the ventilation intensity is reduced by 50%. The optimal speed of air movement during the period of cooling and storage, respectively, is 2.5-3 and 0.1-0.3 m/s.

Upon completion of cooling (5 days after reaching the specified temperature regime), circulation is carried out periodically for 30 minutes with a multiplicity of 6 volumes of an unloaded chamber in 1 hour with a total duration of not more than 3 hours per day.

Periodic circulation is carried out when the temperature and relative humidity of the air deviate from the set values.

Air exchange in the chamber is carried out through the ventilation system in the first week of storage daily, and in the subsequent period - every 3 days. The amount of added outside air is 2-3 volumes of an unloaded chamber per day.

Air exchange in storage facilities is associated with possible condensation of moisture on vegetables, which can cause diseases of vegetables and their rotting.

At the end of storage or when unloading carrots from the chamber, conditions are provided that exclude moisture condensation on its surface, for example, they blow carrots with warm air, bringing the temperature of its surface to values 0.5-1.5 ° C higher than the dew point temperature of the air in the room in which it is stored. unloaded.

When unloading carrots from the chamber directly into a refrigerated vehicle, its warming is not carried out.

The period of implementation of carrots after removal from storage is no more than 10 days.

Name Meaning

Artificial storage conditions

Storage temperature, °C 0...+1

Humidity, % 90-98

Estimated shelf life, days 180-270

REFERENCES

1. R.M.Nazirova, M.X.Xamrakulova, N.B.Usmonov. Moyli ekin urug‘larini saqlash va qayta ishlash texnologiyasi. O’quv qo’llanma. Фергана-Винница: ОО «Европейская научная платформа», 2021. – 236 с. https://doi.org/10.36074/naz-xam-usm.monograph

2. Nazirova R. M., Sulaymonov O. N., Usmonov N. B.//Qishloq xo‘jalik mahsulotlarini saqlash omborlari va texnologiyalari//O‘quv qo‘llanma. Premier Publishing s.r.o. Vienna - 2020. 128 bet.
3. Nazirova R. M., Qahorov F.A., Usmonov N. B.// Complex processing of pomegranate fruits. Asian Journal Of Multidimensional Research. 2021, Volume: 10, Issue: 5. pp. 144-149. https://www.indianjournals.com/ijor.aspx?target=ijor:ajmr&volume=10&issue=5&article=020
4. Мухтаровна, Н. Р., Ботиралиевич, У. Н., & ўғли, М. А. М. (2021). Особенности обработки озоном некоторых видов плодов и овощей для их долгосрочного хранения. Central Asian Journal Of Theoretical & Applied Sciences, 2(12), 384-388. Retrieved from https://cajotas.centralasianstudies.org/index.php/CAJOTAS/article/view/367
5. Mukhtarovna, Nazirova R., et al. "Study of the Influence of Processing on the Safety of Fruit and Vegetable Raw Materials." European Journal of Agricultural and Rural Education, vol. 2, no. 6, 2021, pp. 43-45. https://www.neliti.com/publications/378976/study-of-the-influence-of-processing-on-the-safety-of-fruit-and-vegetable-raw-ma#cite
6. Nazirova Rakhnamokhon Mukhtarovna, Qahorova Shohsanam Akram kizi, Usmonov Nodirjon Botiraliyevich//Biological Protection Of Plants. International Journal of Progressive Sciences and Technologies. Vol 27, No 1 (2021). http://ijpsat.es/index.php/ijpsat/article/view/3168
7. Nazirova Rakhnamokhon Mukhtarovna, Tursunov Saidumar Islomjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Solar drying of agricultural raw materials and types of solar dryers. European Journal of Research Development and Sustainability, 2(5), 128-131. Retrieved from https://scholarzest.com/index.php/ejrds/article/view/824
8. Nazirova Rakhnamohon Mukhtarovna, Sulaymonov Rustam Ismoilovich, Usmonov Nodirjon Botiraliyevich, Qosimova Komila Muhammadsoli kizi, & Abdullayev Dilmurod Dilshodjon ugli. (2021). Influence of storage conditions on preservation of potato. European Scholar Journal, 2(2), 68-70. Retrieved from https://scholarzest.com/index.php/esj/article/view/265
9. Nazirova Rahnamokhon Mukhtarovna, Akramov Shokhrukh Shukhratjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Role of sugar production waste in increasing the productivity of cattle. Euro-Asia Conferences, 1(1), 346–349. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/110

10. Nazirova Rahnamokhon Mukhtarovna, Akhmadjonova Marhabo Makhmudjonovna, & Usmonov Nodirjon Botiraliyevich. (2021). Analysis of factors determining the export potential of vine and wine growing in the republic of uzbekistan. Euro-Asia Conferences, 1(1), 313–315. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/99
11. Nazirova Rakhnamokhon Mukhtarovna, Holikov Muhridin Bahromjon ogli, & Usmonov Nodirjon Botiralievich. (2021). Innovative grain reception technologies change in grain quality during storage. Euro-Asia Conferences, 1(1), 255–257. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/79
12. Nazirova Rakhnamokhon Mukhtarovna, Tojimamatov Dilyor Dilmurod ogli, Kamolov Ziyodullo Valijon ogli, & Usmonov Nodirjon Botiralievich. (2021). Change in grain quality during storage. Euro-Asia Conferences, 1(1), 242–244. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/75
13. Nazirova Rakhnamokhon Mukhtarovna, Rahmonaliyeva Nilufar Nodirovna, & Usmonov Nodirjon Botiralievich. (2021). Influence of seedling storage methods on cotton yield. Euro-Asia Conferences, 1(1), 252–254. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/78
14. Nazirova Rakhnamokhon Mukhtarovna, Otajonova Baxtigul Bakhtiyor qizi, & Usmonov Nodirjon Botiralievich. (2021). Change of grape quality parameters during long-term storage. Euro-Asia Conferences, 1(1), 245–247. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/76
15. Nazirova Rakhnamokhon Mukhtarovna, Mahmudova Muhtasar Akhmadjon qizi, & Usmonov Nodirjon Botiralievich. (2021). Energy saving stone fruit drying technology. Euro-Asia Conferences, 1(1), 248–251. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/77