



CARROT DRYING TECHNOLOGY

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| Article history: | Abstract: |
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| Received: 6 th February 2022 Accepted: 6 th March 2022 Published: 18 th April 2022 | Carrots have a rich chemical composition, due to which they can have a regulatory effect on the metabolism in the human body. Carrots contain proteins and carbohydrates. The content of carbohydrates increases depending on the degree of ripening of the root crop. This vegetable contains little cellulose, so carrots can be used in dietary nutrition. The vegetable is rich in vitamins (B1, B2, B6, C) and minerals (potassium, sodium, calcium, phosphorus, iodine, iron, etc.). It contains a lot of carotene, which is converted into vitamin A in the body. |

Keywords: Carrot, minerals, method, quality, technology, vegetable.

INTRODUCTION

Supplying the body with nutrients contained in carrots prevents the occurrence of various diseases. Carotene is the most important of these. Especially valuable is the use of carrots in winter. Therefore, there is a storage problem. The storage process negatively affects many useful substances of carrots, which decompose to maintain oxidative respiration processes. You can store this root crop frozen or canned. However, the opinion that frozen vegetables retain vitamins and minerals does not fully correspond to reality. The best option for preserving vitamins is drying technology. Drying will help prevent or slow down the physicochemical, biochemical and other processes that lead to a decrease in the nutritional value of carrots¹.

Drying carrots at home can occur both naturally - in the open air, and artificially - using dryers. The advantage of artificial drying of carrots, compared with natural drying in the open air, is a much shorter cycle of the entire process. The drying process is the removal of moisture from food by converting it from a liquid to a vapor state using heat.

The most relevant method of artificial drying of carrots is the use of infrared radiation. The penetration depth of infrared rays will reach 6-12 mm, they can have a stronger effect on products due to a significant penetration depth and due to the effect on the molecular structure. Applying this method to drying carrots is the best way to preserve carotene.

The higher the quality of the prepared raw material, the better the quality of the dried product.

Dried carrots made from unripe fruits will be worse than those made from ripe ones. However, at the same time, overripe fruits are not suitable for drying. Therefore, the fruits must be in a state of maturity. Medium-sized bright orange carrots are suitable for drying. The preparation of raw materials begins with sorting and sorting and fruits. They reject rotten vegetables, damaged, ugly, in addition, they are sorted by size in order to dry separately. Prepared fruits are washed thoroughly. To wash off the remnants of pesticides from the surface of the carrot, it is washed in water with soda - dilute a teaspoon per liter of water or with the addition of vinegar - a tablespoon of vinegar per liter of water. After that, the skin is cleansed².

Before drying carrots in the oven, they must be blanched - boiled in boiling water for 20 minutes and cooled in cold water. You can dry carrots at home without blanching, but such carrots will quickly lose their taste and useful qualities. After blanching, the carrots are cooled and cut into circles of 3 mm thick, into cubes or rubbed on a coarse grater. Carrots prepared in this way are poured onto a baking sheet in a thin layer and dried at 60-80° C for 4-6 hours. Properly dried carrots should have a bright orange color. Store it in a dry and dark place in an airtight container.

RESULTS AND DISCUSSION

Slicing

¹ Filonenko G.K., Grishin M.A. Technology of drying food and plant materials. - M: Food industry, 2011.

² Omarov M.M., Saidieva A.A. Study of drying apricots with infrared emitters SF&4. Bulletin of DagGTU. Technical science. - Makhachka & Ia, 2015, v. 1, no. 7.



You can choose any form of cutting, circles or squares, straws, small cubes, you can even grate on a coarse grater. The main thing is that the thickness of the workpiece does not exceed 0.5 cm.

If you plan a different form of cutting, it is better to prepare containers for their separate packaging. So it will be much more convenient to choose a product suitable for cooking any dish.

As for the methods of drying itself, you can apply different methods, to choose from.

How to dry carrots outdoors

The most simple and cost-free method of drying in the open air, in the sun. You will need to choose a place that remains unshaded throughout the day. Naturally, it should be located away from the road, playground and other potential sources of dust.

You will also need a large sieve or spacing lined with gauze. The blanks should be laid out in one layer, closer to each other, left in the air.

How to dry carrots in a dryer

In the dryer, the moisture removal process is much faster, depending on the dryer and the set temperature (recommended + 50 C), it will take 8 to 18 hours to be ready³.

Prepared pieces of the blanched product are laid out on non-mesh pallets, the temperature is set to no more than +50 C +55 C.

Do not forget that during the drying process, the product often loses a significant amount of its weight; from 9 kg of fresh carrots, about 900 g of dried carrots will be obtained.

How to dry carrots for soup in the microwave

The product is cut into small thin pieces, dried, laid out on one paper towel, covered with another. The bundle is placed in a microwave oven, a container of water is also placed there, a glass is enough.

Three minutes for processing will definitely be required, then the degree of shrinkage will have to be checked every 30 seconds. Monitor the condition of the water in the tank - it should not boil away.

Heat treatment in the oven and aerogrill.

The most commonly used drying method is in the oven. I lay out the prepared pieces on a baking sheet, the temperature is set from + 65 to + 80 C, it is advisable to periodically turn the pieces over.

You can use a little trick and significantly speed up the process by dividing it into 3 steps. After processing for 20 minutes at a temperature of +200C, the product is completely cooled, then proceed to the next stage of heat treatment.

³ Arapov, V. M. Change in the bond energy of moisture with a substance during drying. Text. / V. M. Arapov, M. V. Mamontov // Proceedings of the HIP reporting conference for 2014: at 3 pm / Voronezh, state. technol. academician, Voronezh. 2015. part 2. pp. 154-155

You can also use an air grill to dry vegetables. Pieces are laid out on grids in one layer. It is most convenient to use a steamer.

The blowing speed includes an average one, the temperature is within +120 C. It will take about 15 minutes to get the finished product.

The finished dried product should have approximately 15% moisture. But to determine by the eye of an inexperienced person this is beyond their power. Therefore, they resort to other control options, the pieces should not crumble, but at the same time they should be fragile.

If during the drying of the vegetable there was an effect of elevated temperature, then at the end of the process, the finished product is cooled to room temperature.

For storage, if desired, glass containers can be used, i.e. jars, tin, or bags made of natural fabric.

Similarly, you can store other dried vegetables and fruits: apples, cherries, plums, beets, herbs, including parsley and even green onion feathers.

How to dry carrot tops

Knowing about the healing properties of the tops, some housewives prefer not to throw it away, but to prepare it for the winter. For drying, only undamaged stems with leaves are selected. They are washed very thoroughly, changing the water several times.

Then they are dried on a canvas napkin and cut into small pieces, laid out on clean paper or cloth, placed in a dark place.

Some interesting facts about carrots

This vegetable is extremely loved and revered by Americans. In Holtville, California, they even have a carrot festival, with the election of a queen.

On this day, tourists and guests come to the city, local chefs, both amateurs and professionals, have the opportunity to compete in the skill of cooking dishes from a bright orange vegetable.

Battles where carrots are used as projectiles or weapons look no less picturesque.

Ancient Greek medical scientists knew about the enormous benefits of carrots for the body and recommended using it to their patients.

The Slavs used a mixture of carrot juice and cow butter to treat diseases of the digestive system⁴.

Drying carrots using infrared rays

When drying carrots using infrared cabinets of our production, you will save up to 95% of the usefulness of this product due to the penetration of infrared rays into the depth of the product. It is the best suited for drying carrots, you can dry both the tops and the fruit itself, and the first one after drying

⁴ Water in food. Text. / ed. R.B. Duckworth. Per. from English. — M.: Food industry. 2010. - 376 p.



contains more vitamins and minerals, after infrared drying the product will retain an attractive appearance and taste.

How to dry carrots in an infrared cabinet

Drying carrots in the dryer can be different, the vegetable can be dried in pieces or chopped in advance.

1. For drying in pieces, carrots need to be washed, peeled (in some cases, carrots are also boiled for 4-7 minutes, then put in cold water until cool)

2. After cut into pieces 2-4mm or columns 3x5x20mm

3. And put it out and put it in the closet (you need to find out the time in the closet).

Energy value:

Dried carrots - 221 kcal / 100 g.

Dried carrot tops - 35 kcal / 100 g.

Storage of carrots after IR - drying:

After infrared drying, this type of product can be stored for a long time, it is necessary in tin or glass vacuum containers, leaving carrots in a wooden box for 1-2 days in advance. A carrot shavings can also be stored.

CONCLUSION

Nowadays, the vegetable is used everywhere; it is an ingredient in most dishes from different cuisines of the world. Harvesting a dried product for the winter, of course, will be useful to every housewife. After all, it is simple, fast to use, and you won't need to spend additional money on vegetables that become more expensive in winter.

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