RELEVANCE OF BERRY STORAGE USING COOLING

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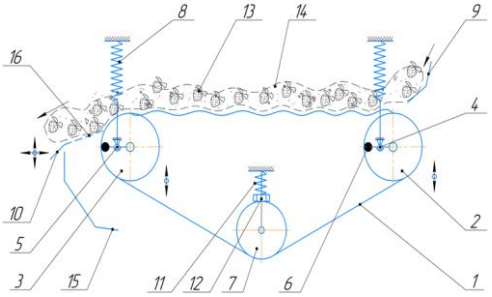
Purpose of the research: Today, there are various ways of storing and processing fruits, vegetables, berries, and berries. But the priority directions in the development of modern agro-industrial economy are the storage of fruit and vegetable products in fresh form and quick freezing, because in this case, fruit and vegetable products retain their useful and organoleptic properties as much as possible [1]. When selling fresh products, the question of the need to cool berries after picking arises. At the same time, if the crop is sold through trade networks or is placed in storage, cooling is simply necessary. Biochemical processes aimed at preparing for further reproduction do not stop in freshly picked berries. In order to reduce the speed of these processes, it is necessary to create certain conditions: prevent over-ripening of berries by collecting them selectively and regularly; stack the berries immediately upon collection in a small container, avoiding their further stacking and sorting; and (very important) pre-cool as soon as possible after collection.

If the conditions of correct collection, pre-cooling, sorting and packaging are met, then further storage at the required temperatures will have a good result.

The main research materials: We offer a device for vibration-shaking freezing (Fig.1), which includes a load-carrying belt 1, supporting rollers 2, 3, feeding tray 9, unloading tray 10, processed products 13, unbalanced vibration exciter 6, moving shafts 4,5, tensioning device 7, spring supports 8, the elastic element 11 of the tensioning device, the adjusting nut 12 of the tensioning device, the mass of the snow coat or finely crushed ice 14, the tray 15 for removing the particles of the snow coat or finely crushed ice, the vibrating screen 16 for separating the particles of the snow coat or finely crushed ice from the products [2].

As a result, it is possible to use the vibro-shug freezing device in the product freezing shop, where the load-carrying belt 1, supporting rollers 2, 3, feeding tray 9, unloading tray 10, unbalanced vibration exciter 6, moving shafts 4, 5, tensioning device 7, spring supports 8, elastic element 11 of the tensioning device, adjusting nut 12 of the tensioning device, tray 15 for

removal of particles of snow coat or finely crushed ice, vibrating sieve 16 for separating particles of snow coat or finely crushed ice from products. After the start-up and adjustment works, the product 13, which is processed together with the mass of snow coat or finely crushed ice 14, is fed through the feeding tray 9 to the load-carrying belt 1, where its horizontal and vertical movement begins and a fluidized bed is formed under the action of the unbalanced vibration exciter 6, support rollers 2,3, mounted on moving shafts 4,5 and spring supports 8. The tensioning device 7 is equipped with a spring 11 and an adjusting nut 12 of the tensioning device stabilizes the movement of the load-carrying belt 1. Freezing of the product 13 occurs due to the mass of the snow coat or finely crushed ice 14 in a fluidized layer formed due to the horizontal and vertical movement of the conveyor belt 1, which gently throws it up, preventing injury or damage, as in the prototype. The mass of snow fur or finely crushed ice 14 is removed through the tray 15, due to its separation in the vibrating screen 16 from the products 13 being processed. Product 13, frozen and cleared of snow, goes to the next operation. Then the cycle repeats.



1 – load-carrying belt; 2,3 – supporting rollers; 3 – valve; 4.5 – moving shafts; 6 – vibration exciter; 7 – tension device; 8 – elastic supports; 9 – feeding tray; 10 – unloading tray; 11 – elastic element; 12 – adjustable nut; 13 – products; 14 – finely dispersed ice; 15 – tray for removal of snow fur particles.

Fig. 1 – Scheme of the device of vibro-shock freezing

The storage temperature is selected taking into account the biological characteristics of the culture, variety, degree of maturity and purpose: it should be one for fresh consumption, the second for processing, and the third for use for seeds. For the storage of most types of berries, the

temperature from 0 to 8°C is considered optimal [1,2,3].

When freezing berries in a directed fluidized bed, the duration of technological processing is also affected by a group of factors caused by the peculiarities of transporting berries with the help of a directed flow of the cooling medium. The rate of movement of the fluidized bed depends both on the type and properties of the raw material, and on the direction and speed of the air flow, which, in turn, determines the coefficient of heat transfer in the product layer, and therefore the time of its freezing. This allows, on the basis of the pre-selected technological mode of processing, to achieve advantages due to its rational implementation from the hydrodynamic and thermophysical points of view [3,4].

Conclusions: Shock freezing technology opens up new opportunities for manufacturers. It takes the business to a higher level of its development. Quick freezing makes it possible to postpone the sale of agricultural products in time and move the place of sale in space. For farms, for example, it is an opportunity to freeze part of their products and sell them directly to the consumer at a higher price than fresh, anywhere and at any time.

The cited studies have shown that the issue of using berry freezing technology is very relevant today. So, all this proves the expediency of using this property for freezing as energy-saving equipment.

Thus, for each type of product, its own method is chosen and certain requirements are applied, which must be taken into account during storage in order to achieve the best result until the product is sold.

References:

1. Verkholantseva V Scientific achievements in enviromental and life science Polish Ukrainian cooperation. Scientific monograph/ Lesya Zbaravska1, Olha Chaikovska1, Oleg Ovcharuk1, Serhii Kiurchev Монографія Scientific monograph. Vol. II. Монографія ISBN: 978-83-65180-20-9, Kraków, 2018, p.141.

2. Optimization of technology of freezing of fruit and vegetable production: Monograph / V.F. Yalpachik, N.P. Zagorko, S.V. Kiurchev, V.G. Tarasenko, L.M. Kiurcheva, S.F. Budenko, O.V. Grigorenko, M.I. Struchaev, V.O. Verkholantseva. - Melitopol: Publishing House of the Melitopol City Printing House, 2018. - 214 p.

3. Serhii Kiurchev, ValentynaVerkholantseva, Oksana Yeremenko, Faten Al-Nadzhar.. Research and changes in berries using technology of freezing during storage / Latvia University of Sciences and Techologies Faculty of Engineering // Jelgava, May 2020. P. 997 -1002.

4. Kiurchev S.V., Verkholantseva V.O., Kiurcheva L.M., Samoichuk K.O. Using the technology of freezing berries // Proceedings of the Tavriya

State Agrotechnological University: scientific professional publication / TSATU; Goal. ed. Ph.D., prof. VM Kyurchev.- Melitopol: TSATU, 2020. - Issue. 20, item 2. p. 115-123.-67.

USE OF ENERGY-EFFICIENT EQUIPMENT IN DRINKING MILK TECHNOLOGICAL LINE

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Purpose of the research: Today, the question of using energy-efficient equipment in various industries, including the processing and food industries, is quite relevant [1]. Homogenization is one of the most important and energy-consuming operations at milk processing plants. Homogenization is used in the production of drinking sterilized and pasteurized milk, fermented milk products, ice cream, milk preserves, and cheese production. The quality of products using homogenized milk is much higher. The use of homogenization in the production of drinking milk helps to improve organoleptic indicators, increase stability and viscosity, the absence of fat residues on the walls of the apparatus, and improve the digestibility of the product by reducing the size of milk fat particles. However, valve homogenizers, which are most often used at enterprises, can hardly be called energy-efficient, since they consume quite a lot of electricity (more than 7 kW/t) to obtain high-quality milk. Therefore, the development of new, more effective methods of homogenization or the improvement of already existing ones, with the aim of reducing the energy consumption of the homogenization process and increasing the degree of dispersion of milk fat and researching their effectiveness in the technological line of drinking milk production, is a very relevant issue today.

The main research materials: A large number of works are aimed at reducing the size of the dispersible particles of the dispersed phase by improving the existing equipment for homogenization [2]. However, technical and technological solutions for improving homogenizers have reached their limits. The most promising in this sense is the pulse homogenizer, which allows you to obtain high-quality homogenized milk with much lower energy consumption for the process.