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DEVELOPMENT OF TECHNOLOGY FOR COMPLEX PROCESSING OF GARLIC ONIONS

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Abstract: This article presents the results of a study aimed at determining the expected economic efficiency in the production of various biologically active oddes and food additives by complex processing of garlic onions for storage from seasonal periods in unknown periods. During the study, innovative technological parameters of high-efficiency combined (sublimation and convective) drying of garlic onions for complex processing were developed.

Keywords: garlic onion, combinatorial, convective, sublimative, drying, nutritional supplement, quality, complex, parameter.

Introduction. In the world, a number of studies are being carried out on the socio-economic development of food industries to determine the areas of application of the technological parameters of the processing of secondary raw materials resulting from agricultural processing, including in the following priority areas, in particular, obtaining environmentally pure juices as a result of pressing, To develop optimal technologies for drying garlic and onion secondary pressed mass, to obtain a wide range of pharmaceutical products and to implement production technologies into practice.

In the process of combined (convective and sublimative) drying of the primary and secondary mass of garlic onions, the technology of treatment with citric acid was used, and the advantages of this technology were shown. Since this process takes a very long time, many biologically active substances are lost and a certain portion of protein, carbohydrates, loses their nativity.he process of combined (convective and sublimative) drying of the primary and secondary mass of garlic onions, the technology of treatment with citric acid was used, and the advantages of this technology were shown. Since this process takes a very long time, many biologically active substances are lost and a certain portion of protein, carbohydrates, loses their nativity. In addition, traditional sun-dried fruits can take 2-3 days to regenerate their natural properties, i.e., to regenerate. This indicates low quality indicators of food products.

The authors ' work used ascorbic and citric acid processing technology in the process of convective and sublimation drying of the primary and secondary mass of vegetables and showed the advantages of this technology. According to it, it is usually

dried by traditional methods such as processing and canning most foods, including vegetables, processing with various thermal agents, and convective drying. Since this process takes a very long time, many biologically active substances are lost and a certain portion of protein, carbohydrates, loses their nativity. In addition, traditional sun-dried vegetables can take up to 4-5 days for the process of returning to their natural state, that is, the process of rehydration. This is a sign that the quality indicators of food products are low [3].

Study objects and research methods

On the basis of the above, the production process at FRUITS DRIED INNO TECH, SUNNY LAND PRODUCTS LLC, which is calculated from new modern enterprises in the Republic of Uzbekistan, and the existing problems in it, were blamed.

As a result of processing garlic onions, a raw material with two different shapes becomes a dressing; 1-the mass of the raw material after pressing the inside of the main mass and squeezing the juice, and the mass of the secondary Mez is a dressing.

We divided the results of the study into different forms and separated them into a mass obtained by pressing. The secondary mass was separated into primary and secondary masses by pressing the juice contained in it;

We conducted organoleptic and sensory studies in various ways to determine whether the juice extracted from the secondary mass of the mass can be included in the diet. Figure 1 below shows a technological scheme for the complex processing of garlic and onions.

According to the technological scheme presented in Figure 1 above, by processing garlic into secondary pulp without destroying its mass, food, pharmaceutical and confectionery products with high nutritional value are obtained, in particular, the range of natural pure drinks, children's ingredients and confectionery products is increased and the future generation is ensured a healthy lifestyle.

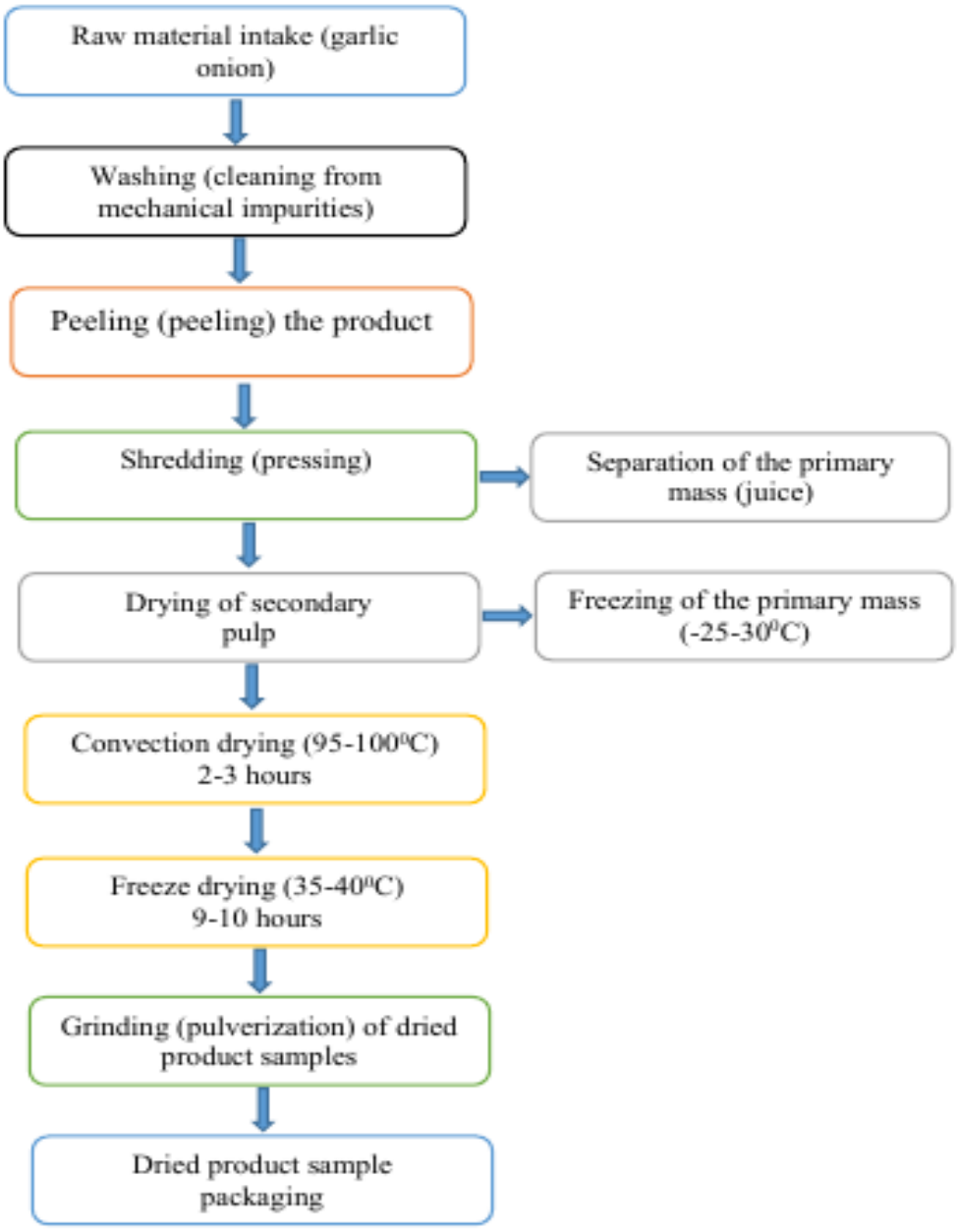

Figure 1. Technological scheme of complex processing of garlic and onions

Drying times depending on the temperature of the drying agent are given in Table 1.

Table 1. Technological parameters of sublimation drying of sliced and pressed garlic mass

Dried product Type	Residual moisture, %	Drying time hours 2	3	4	6	8	10
		Drying temperature range, ⁰C					
Garlic and onion paste	6	10	15	20	25	30	40
Garlic onion pressed secondary mezga mass	5	10	15	25	30	35	-

Table 1 above presents the technological parameters for drying garlic cloves for complex processing, including cutting raw materials into two different shapes and sublimation drying of the pressed garlic mass.

The optimal temperatures for freeze-drying garlic and onions, depending on the shape of the cut size and product samples, are as follows (depending on the type of raw material): - 15-35^{0}C.

The drying temperature of the product at different thicknesses is different: the highest heat agent is applied at the initial stage, and the lowest temperature is applied at the end of the drying period. The heat agent is often dried at a temperature above 35-40^{0}C to evaporate water vapor, so the heat causes the product cells to overheat. The solubility of the resulting dry products is 80-85%.

Vacuum drying evaporates water while maintaining the moisture content of the finished product, maintaining its quality and structure, because the drying process is carried out at a lower temperature than atmospheric conditions. Vacuum drying increases the rate of evaporation of moisture in the product, as it accelerates the escape of water vapor from the surface of the product and the surrounding chamber. The efficiency of this technology is also increased by the absence of heat loss with the exhaust air. Heat for moisture evaporation during vacuum drying, often by contact and treatment with ascorbic acid, accelerates the process of evaporation of moisture from the product.

Garlic is used to dry whole or pressed garlic cloves.

Treatment with citric acid prior to freeze-drying accelerates the drying process. The drying process during cyclic pressure changes depends on the nature, condition and osmosis parameters of the product being dried, as well as the efficiency of the cooling and vacuum systems.

In the sublimation drying technology, the main process is carried out in a cylindrical drying chamber. The chamber contains a desublimator and is connected to a vacuum pump. At the bottom, the chamber is connected to a discharge screw through a vacuum lock. The drying process of the product is monitored and controlled. During the drying process, the samples are subjected to a deep vacuum, due to the evaporation of moisture in the frozen state.

As a result of the research, it can be seen that the use of ascorbic acid during the drying process as a freeze-drying is highly effective.

The conducted research has studied the feasibility of short-term treatment with ascorbic acid, after the product washing process, before the freezing process. In this case, usually the objects being dried in the sublimation drying technology are pre-treated before the freezing process. This is especially true if the product is thermally treated. The reason is that the treatment of products after the freezing process achieves the transition of moisture in the frozen product to a water state.

Samples of products obtained by freeze-drying garlic can be used for drying delicatessen products. The price of such products should be economically viable, since the freezing process requires more than 20 hours, which leads to high energy and capital costs. Freeze-drying technology is an unrivaled method in terms of product quality, but

the high energy consumption negatively affects the cost of products dried using this method.

When carrying out the freeze-drying process, it is also possible to develop pre-treatment regimes with ascorbic and citric acid based on the specific properties of the product being dried. This is done by increasing the ascorbic acid capacity, increasing or decreasing the heat capacity, depending on the chemical composition of the product, the amount of carbohydrates, mainly cellulose.

The organoleptic characteristics (appearance, color, and consistency) of garlic bulbs obtained by freeze-drying with and without pretreatment with ascorbic acid are presented.

Before processing and drying the raw materials, they are sorted and controlled by structure, grade, and degree of maturity.

The cleaned products are cut into standard pieces with a knife and blanched in hot water with a temperature of 85-90°C for 3-5 minutes in a powdered form of ascorbic acid under local conditions. In the food industry, they are evaporated in a freezer, then dipped in a 0.4% citric acid solution for 3-5 minutes and rolled out and placed on trays. The trays are placed in a drying cabinet and dried at a temperature of 95-105°C for 2-3 hours.

In local conditions, garlic bulbs are cut off the tail and neck with a knife, and in industrial production plants, they are peeled on special cutting machines and cut into 8 different sizes in cm and mm according to the standard. The primary mass of the cleaned raw material is washed, inspected, cut into squares 4-6 mm thick and treated in a 0.3-0.5% ascorbic acid solution for 3-5 minutes. Then they are rolled out, laid out on trays, placed in a drying cabinet and dried for 3-4 hours at a temperature of 95-110°C.

It was found that when garlic onion raw materials, both whole and pressed, were treated with ascorbic acid, their color and structure were well preserved, and the treated product samples were highly resistant to heat agents. In addition, the secondary raw materials were processed in two different ways;

In method 1, the raw materials were mechanically processed, that is, first the raw materials were cut into various shapes, treated with ascorbic acid, then frozen and placed in a vacuum-sublimation drying chamber for drying.

Conclusion. A technological scheme of the technology of sublimation drying of garlic onion varieties “Starobelsky 62 and Jalalabadsky” selected for research has been developed. The experimental studies were carried out in the laboratory facility of “FRUITS DRIED INNO TECH” OOO.

Frozen samples are dried simultaneously using a two-chamber sublimation drying method and a convective drying method, using raw materials in two different forms (pieced and pressed mezga mass).

The pressure in both chambers is the same, and the pressure in the chambers is 10-15 Pa. The tray with the frozen samples is located in the center of the drying chamber, and in one chamber they are heated by a traditional heating agent, that is, the chamber temperature is controlled by heaters, while in the second chamber, instead of ions, an

aqueous concentration is located in the pipes, and the heating agent is a water-heating agent.

Samples of peeled, sliced and pressed garlic cloves, frozen at -30-35^{0}C, selected for the study, are placed in a tray in a drying chamber. The chamber door is hermetically closed and the air extraction system is activated using a vacuum. After that, the sublimation drying process is carried out in the chamber. After a certain time, the pressure in the chamber begins to decrease and a pressure of about 10-15 Pa is established in the chamber. This indicates that the vacuum state of the chamber has reached the desired point and the vacuum system is turned off. Then the drying agent is activated in the chambers. The drying period directly depends on the moisture content of the product and the heat agent in the chambers, and the modes for these processes were determined on the basis of experiments.

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