Drying Apricots on the Basis of New Technologies

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ABSTRACT

More than 60% of the population of the country is engaged in the cultivation of agricultural products. One of the most pressing issues is the export of finished and semi-finished products obtained through the processing of agricultural products, as well as the supply of high quality, affordable products for the consumption of our people, the development and application of new techniques and technologies for long-term storage. It is known that Uzbekistan is a leader in Central Asia in the production of agricultural products. An average of 5 million tons of fruits and vegetables are grown in the country annually, of which 107,000 tons are canned fruits and vegetables. From these fruits and vegetables are produced a variety of food products for consumption.

Keywords: Drying, drying technology, sublimation drying, solar dryer, apricot varieties, infrared rays, vibrating drying device.

Introduction. In recent years, artificial drying of apricots is developing rapidly in our country and especially in foreign countries. In this method the fruit is of good quality and dried in a short time. Abroad, many fruits are dried in this way. Often it is also used to bring the moisture of the product to the required condition in the final stage of air-drying of some fruits.

Even in the regions of the country with favorable conditions for air-drying, it is advisable to use this method for drying apricots, which are not traditionally wet, drying in the sun. This method is especially important in areas where drying is not possible in weather-sunny conditions.

The main acting agent of drying devices is heated air. Dryers differ from each other in the method of heating and the method of feeding it to the raw material.

Steam conveyor and tunnel dryers are common in the canning industry. The following types of steam conveyor dryers are available: SPK-4G-15, SPK-4G-30, SAK-4G-45, SPK-4G-60. Production capacity for evaporated moisture is 90,180,270,630 kg / h, respectively.

Tunnel-type dryers are divided into direct-flow, counter-flow, combined and intersecting types according to the mode of movement of the drying agent. Drying agent is a mixture of ignited gas and air or heated air. The temperature regime of the dryer operation has a stepwise characteristic (50-60 to 75-780S). Such aggregates can be used both for drying fresh berries and for sufficient drying of berries soaked in air-sun drying.

The use of a modernized SKO-90M medicinal herb dryer for apricots also gives good results. The dryer receives heat energy from four TG-2, 5A heat generators with a heat capacity of 250,000 kcal / h. The fans pump heated air into the drying chamber at a speed of 1.5 m / s. Inside the camera are 5 conveyor belts. With the help of load conveyors, the raw material comes to the upper belt (in a row thickness). Depending on the pomological navigation of apricots, a differentiated step temperature regime is established. In the initial stage, drying at a temperature around 900S is effective. Moving from top to bottom, passing through the lowest band (fifth), the raw material temperature drops to the region of 60-70 0S. The order varies depending on the raw material. Drying time of fresh berries in this type of dryer is 12-24 hours.

One of the promising directions in the development of modern methods of drying apricots is the use of solar dryers. In Central Asia, Armenia, Azerbaijan, South Dagestan, as well as in some districts of the Crimea, Krasnodar Krai, Rostov region, there are ample opportunities for their work (availability of favorable climatic conditions). The main principle of operation of solar dryers is the efficient use of solar heat. At the same time, special artificial dryers are equipped with glass windows, polyethylene films, plastic windows, which transmit good sunlight, and the inside is ventilated. The quality, color and vitamin content of dried fruits in helio dryers are kept close to natural.

Today, small-capacity electric fruit dryers are also becoming more common. These dryers are highly effective in drying apricots in small batches under farm conditions

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It is one of the most widely used methods at the moment, leading the industry. In infrared radiation, under the influence of product light, molecules and atoms move rapidly as a result of heat, that is, an increase in internal energy is observed. The thickness of exposure to infrared rays in food is 6 - 12 mm. At this thickness, a much larger energy of radiation is consumed, but the temperature of the layer of material placed in the range of 6 - 7 mm is much higher than the convective method.

The effect of short-wave infrared radiation on food has a large effect as it reaches the molecular structure of the product. Infrared drying is also widely used in industry, where many types of vegetable and fruit, meat and fish raw materials are processed and many types of semi-finished products are produced. Infrared drying devices are widely used for drying and long-term storage of fruits, food colorings, food powders, as well as livestock products.

It should be noted that this process is non-existent - it is also used for drying food.

In addition, the powder dried under infrared rays has antioxidant, detoxifying properties.

Products dried under infrared rays do not contain preservatives and other unwanted substances, these products are not exposed to harmful electromagnetic fields and rays. Infrared rays used in drying devices are harmless to human health and environmental pollution.

Infrared drying devices based on this technology are resistant to the development of microfiora and can be stored in a variety of conditions. Products that have passed this tool are considered durable in the long run.

Products dried in an infrared dryer can be stored for up to a year without a special container, so even vitamins can be lost by 5 - 15%. The dried product in an airtight container can be stored for up to two years. When the products are dried, the shape is reduced to 3-4 times. It can be reduced in weight by 4 to 8 times.

However, attention should be paid not only to the dried product, but also to special devices that undergo infrared and technological processes that work in this way. Uses 100% energy per product using infrared drying technology.

The water molecules in the product absorb the infrared rays and their erratic motion begins to accelerate, i.e., the energy is more focused on the water than on other types of drying. There are two advantages to such drying:

1. does not damage cells, vitamins are preserved, sugar does not thicken;

2. Heat is retained in the product even at low temperatures.

At the same time, infrared rays at 40 - 600S destroy all the microfiora in the product shell, and then the product is clean.

In infrared light, a vibrating drying device transmits energy to a layer that vibrates in an electromagnetic field in the infrared range. The process of energy transfer to the product in the electromagnetic field - improves product quality, creates favorable conditions for process automation - creates conditions, the heat exchange process is accelerated due to the density of large amounts of heat, part of the energy input.

The essence of the process is that the product liquefies, loosens and takes the desired shape under the influence of vibrations. All parts of the product are treated under infrared rays, which come from quartz halogen lamps. Due to the high density of heat flux and its absorption properties, the product heats up and dries quickly.

To speed up the process of heat and weight exchange, drying takes place in the

order of oscillation, and in the heat-producing zones, air heating is provided.

In this order of drying, the heating time of the product with infrared rays alternates with the ripening time. During the preparation of the product, the temperature gradient in the product loses its character, and then moisture quickly settles in the evaporation zone.

The transfer of hot air to the drying zone creates a convective heat and mass transfer process and helps and accelerates the release of vapors.

Due to this process, the drying efficiency, quality, as well as the quality of the product will be high.

In tape dryers, the process of heat treatment of the product takes place in the fixed layer of the product, as a result of which heat and moisture are not evenly distributed, which reduces the quality of the finished product. Transport in tape dryers is involved in the transportation of its metal type or rubber band. This type prevents the processing of the fine powder product, and the rubber band cannot transmit heat. Infrared vibrating dryers do not have such shortcomings, because the transport part is steel rails, in which both wheat and powdered products can be placed at the desired speed, and the processing rate can reach 2500C. In such dryers, the horizontal vibrating conveyors (1) are in the form of a right-angled groove with its working bodies (2), which is made of stainless steel. Tarnov's upper infrared cassettes (3), steam generator (4) and product freezer (5) sections are located. The initial part of the tarnov is heated by the cassette at the bottom.

Each cassette of infrared rays is equipped with a fan, which passes the lamp through the cooler, as well as dries the hot air into the drying zone. Cassettes and sections are housed in circular bars.

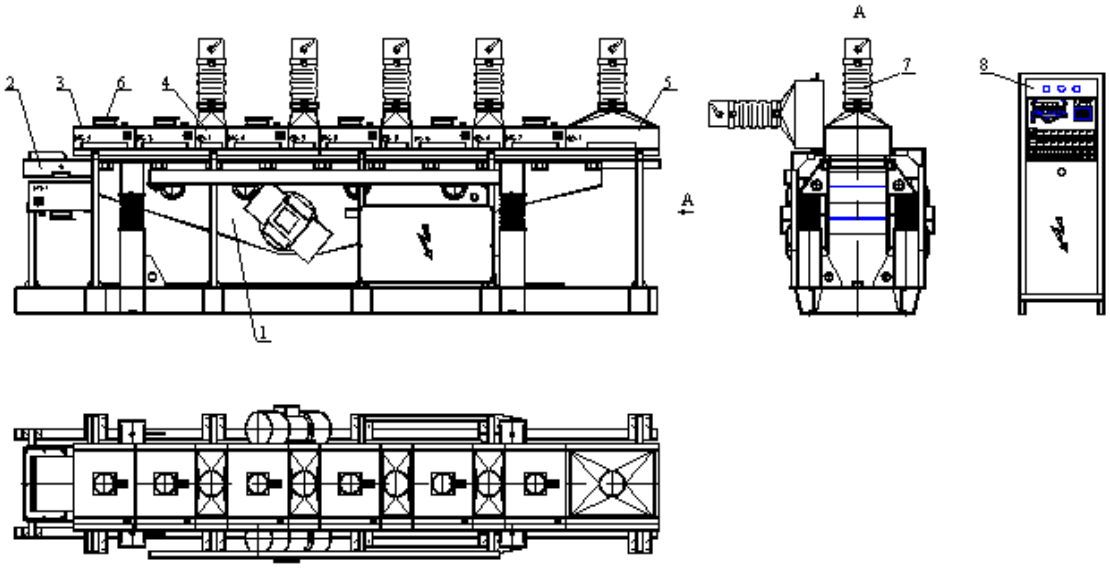

Figure-1. Infrared light vibrating dryer.

1 - vibrating conveyor, 2 - tarnov, 3 - IR lighting cassettes, 4 - steam extraction section, 5 - product cooling section, 6 - fan, 7 - flexible air duct, 8 - control panel.

The steam and refrigeration sections are combined with a flexible air duct (7). The product coming to the dryer is placed in the tray under the influence of vibration, then passes through the cassettes and steam extraction sections. Infrared rays pass through the layer and are converted into heat energy, which heats the product and evaporates moisture from it. The steam coming through the fan passes through the ducts inside it, cools, heats and dries the lamp contacts, while convective heat and mass exchange provide the steam extraction process. The humid air is exhausted through a steam-extracting section using an elongated fan.

The processed product is frozen using air before being removed from the dryer. The transport speed of the product and the processing time are controlled by the change in the rotational speed of the vibration. The heat

level of the tarn under the cassette is controlled by contact thermocouples, the heat level of the product coming out of the dryer is controlled by pyrometers. The supply set includes a control cabinet (8), steam extraction system and refrigeration systems (fan, flexible air ducts, barrier covers).

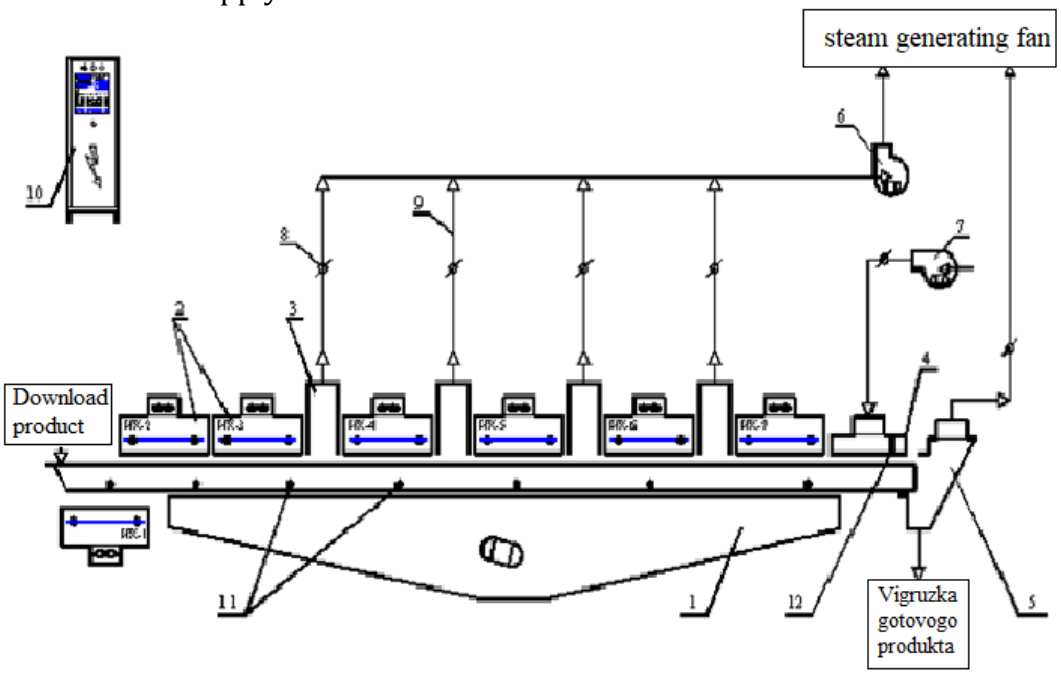

Figure-2. SVIK - 350 brand dryer technological scheme:

1 - vibrating conveyor, 2 - IR radiation cassettes, 3 - steam generating sections,

4 - product freezing section, 5 - bunker, 6 - steam generating fan, 7 - product freezing fan, 8 - barrier, 9 - air duct, 10 -control panel, 11 - thermocouple,

12 - pyrometer for temperature control.

The control and control system of the dryer provides switching on (off) of the device, manual and automatic control, control, technological order of the given work, switching off of devices in case of an emergency, use of alarm in case of failure.

Conclusion:

At present, various energy flows are used in the processing of agricultural products in the Republic.

Pulse drying of agricultural products with IR-convective acoustic vibrations increases the technical and economic performance of the process.

In the IR-convective drying of the product, effective results are obtained by pulsed processing using acoustic vibrations when the rate of decrease of moisture content of the dried product decreases. At the same time, along with accelerating the processing of the product, it is possible to reduce energy consumption, increase productivity, reduce drying time, resulting in improved product quality. It will be possible to use it in systems with low work efficiency in production.

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