EXPOSURE OF INFRARED RAYS ON DRYING COCOONS OF THE SILKWORM

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Abstract: *for different materials, the degree of absorption and the penetration depth of infrared rays are different, since the materials are selectively related to the wavelength of the incident radiation. The wavelength, in turn, depends on the temperature of the IR generator. The spectral optical properties of the product and the spectral characteristics of the heaters are interrelated and of paramount importance. With a valid choice of the type of radiator and the irradiation regime, infrared radiation penetrates into the product, which intensifies heat and mass transfer processes. With the use of this technique and technology, the process of acceleration of carrots and drying, as well as the quality of the resulting silk, is provided.*
Keywords: *cocoons of silkworm, drying, infrared rays.*

ВОЗДЕЙСТВИЕ ИНФРАКРАСНЫХ ЛУЧЕЙ ПРИ СУШКЕ КОКОНОВ ТУТОВОГО ШЕЛКОПРЯДА

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Аннотация: *для разных материалов степень поглощения и глубина проникновения ИК-лучей различны, так как материалы избирательно относятся к длине волны падающего излучения. Длина волны, в свою очередь, зависит от температуры генератора ИК-излучения. спектральные оптические свойства продукта и спектральные характеристики нагревателей взаимосвязаны и имеют первостепенное значение. При обоснованном выборе типа излучателя и режима облучения обеспечивается проникновение инфракрасного излучения в глубь продукта, что интенсифицирует процессы тепло– и массообмена. При использовании данной техники и технологии обеспечивается процесс ускорения морки и сушки, также качество полученного шелка.*
Ключевые слова: *коконы тутового шелкопряда, сушка, инфракрасные лучи.*

Drying is a complex technological (physico-chemical) process that should ensure not only the preservation of quality indicators of the material, but in some cases, the improvement of these indicators. Therefore, the choice of methods and rational process regimes should be based on the scientific principles of drying technology from the study of the properties of the product as a drying object - to the selection of the method and the justification of the process regimes and on this basis to the creation of rational designs for drying plants [1].

Drying technologies are also undergoing changes. Increasing use is being made of short-term drying processes with the use of sparing regimes for maximum preservation of physiologically valuable substances for

the body - vitamins, carbohydrates dissolved in water, minerals and rapid removal of moisture to increase shelf life. In our eventful 21st century, fast food products will also be needed, and therefore the dried food products restored in a matter of minutes will find their place in the diet of the man of the new century [1].

Drying processes are characterized by a high cost of energy. Energy consumption for drying in developed countries is 15-18% of total energy consumption. One of the most common types of IR drying, for them is mainly used heating [2-4].

Infrared radiation – is a kind of electromagnetic radiation occupying a range of 0.77 to 340 mcm in the spectrum of electromagnetic waves. In this case, the range from 0.77 to 15 mcm is considered short-wave, from 15 to 100 mcm – medium-wave, and from 100 to 340 – long-wave. The short-wave part of the spectrum adjoins the visible light, and the long-wavelength part merges with the region of ultrashort radio waves. Therefore, infrared radiation has both the properties of visible light (propagates rectilinearly, is reflected, refracted, like visible light), and the properties of radio waves (it can pass through some materials that are opaque to visible radiation)

At the heart of IR-processing technology lies the ability of water molecules to absorb a certain spectrum of infrared radiation. In this case, the organics of the product with a certain degree of reliability can be considered transparent for infrared rays. Thus, the energy that is converted from electricity without losses is completely transferred to the water of the product, heating it and causing it to evaporate.

As heat generators of IR radiation for industrial drying plants of raw materials in our country and abroad heaters of different types and designs are used. They differ in the wavelength of the maximum radiation, depending on the temperature and methods of heating (electric, gas) and the elements of resistance (metal, ceramic). The transformation of radiant energy into thermal energy is caused by the thermoradiation spectral properties of the product, i.e. its transmissive, reflective and absorbing capacity. The energy of IR radiation is converted into heat only if it is absorbed by the irradiated substance. For different materials, the degree of absorption and the penetration depth of infrared rays are different, since the materials are selectively related to the wavelength of the incident radiation. The wavelength, in turn, depends on the temperature of the IR generator.

Thus, the spectral optical properties of the product and the spectral characteristics of the heaters are interrelated and of paramount importance. With a valid choice of the type of radiator and the irradiation regime, infrared radiation penetrates into the product, which intensifies heat and mass transfer processes [5-6].

The proposed development of techniques and technology for the carrot and drying of silkworm cocoons - works at a low temperature, infrared, vibration installation, using elastic waves and convective heat supply. With the use of this technique and technology, the process of acceleration of carrots and drying is provided, as well as the quality of the resulting silk.

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