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DEVELOPMENT OF A FUNCTIONAL DIAGRAM "ACOUSTIC-CONVECTIVE DRYING PROCESS ICT"

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ABSTARCT:

After gaining independence, Uzbekistan faced the following tasks - this is a significant increase in agricultural production and full satisfaction of the population's needs for food. Enterprises for the processing of agricultural raw materials play an important role in solving these problems.

INTRODUCTION:

The most important strategic task is a deep technical re-equipment of processing industries, equipping them with modern equipment and technology, creating a complete technological cycle for the production of high-quality competitive consumer goods. A significant increase in the production of dried fruits, dried vegetables and raisins is envisaged. Special attention should be paid to the development of the production of baby food and food additives for confectionery products.

For this, a drying process must be used. From the theory of drying, we know that drying is a complex technological heat-mass transfer process, which in many industries should ensure not only the preservation of a number of active properties of the material, but also the improvement of these properties. Therefore, the solution of urgent problems in the field of drying should be based on the scientific foundations of the bitch technology: from studying the properties of the material (product) as an object of drying - to the choice of methods and substantiation of the process modes and only on this basis - to the creation of rational designs of drying plants.

Drying is one of the most energy-intensive processes, therefore, in the field of drying technology, saving energy resources is an urgent problem. Therefore, when designing new dryers, special attention should be paid to saving energy and fuel. Fuel economy lies in the utilization of the heat of the treated drying agent emitted from the drying chambers and the heated air emitted from the cooling chambers. Fuel savings are ensured by partial recirculation of the spent drying agent and cooling air, in these cases fuel savings are 5-10%.

Fruits and vegetables are an irreplaceable source of the most important physiologically active substances - minerals, vitamins and carbohydrates, necessary for the life of every person. At the same time, in the hot summer period of ripening and harvesting, many types of fruits and vegetables can be stored for a short time, their long-term storage is possible only after drying.

The automated functional scheme of the acoustic-convective drying device is given.

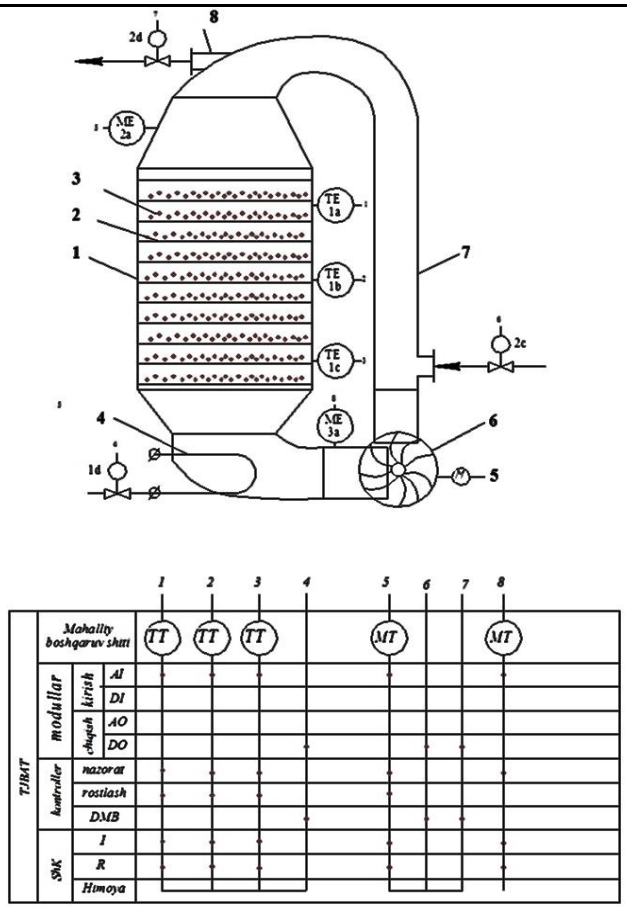

Figure 1. Automated functional scheme of acoustic-convective drying apparatus

Products with different humidity in the drying chamber 1 are placed in the drying chamber in the desired order and thickness depending on the type of product. DS18B20 resistance thermometers (pos. 1a, pos. 1b, pos. 1c) are installed at three points of the camera and emit a unified signal based on a voltage of 0... 5 V. ports. However, for the camera and according to the selected product types, the temperature limit limits are set and included in the programmable logic controller database.

In order to prevent the temperature from deviating from the regulated value, it is installed as an actuator (pos. 1d) that converts 220 V electrical energy into thermal energy (pos. 1d), in which the signal from the digital port of the controller is actuated by a relay. The dryer will then be set to the desired mode. The moisture content of the product is also very important. Depending on the initial type of product or the experimental method, the technological mode is selected to bring it to the desired humidity.

There is a possibility to exchange information with Arduino MEGA (pos. 2b) controllers, which are equipped with a two-electrode moisture meter type YL-69 (pos. 2a) and a secondary device selected on the cut-out prism umbrella connecting the air chamber with the end chamber of the drying room. If the humidity in this pipe deviates from the set value, electromagnetic (2c pos., 2d pos.) Actuators are installed on the inlet and outlet valves, which provide exchange of wet air and dry air in the air circulation pipe, and serve to keep the regulation value stable. To avoid wasting hot air in the chamber, it is recirculated through the air duct 7, which provides air circulation. The removal of hot humid air from the chamber is done by means of 8 sieves to introduce fresh air into the chamber.

A number of measuring sensors are installed to monitor and control the parameters in which the parameters of humid air play a very important role in the drying process.

In this master's dissertation "Control of the drying process by acoustic-convective processing through ICT" the technological process was thoroughly analyzed and special emphasis was placed on the drying apparatus. The principle of operation and structure of all devices in the technological system we have considered have been thoroughly studied. The main technological parameters affecting the technological system were identified, and a fully automated functional scheme of the process was developed, taking into account the fact that the limits of the regulatory values of each quantity were determined.

Primary and secondary devices that fully meet today's requirements were selected. Of these, modern types of sensors used as primary tools, as well as Arduino UNO, a programmable logic controller that automatically controls the process, and modern types of actuators that

serve to increase or decrease the consumption of a given product were selected. In this functional scheme, the sequence of execution of all selected devices for the organization of automatic control of the parameters affecting the process is clearly described in detail.

In this process, the main parameter was the temperature of the product, its automatic adjustment system and dynamic characteristics were studied. In order to organize the remote control of the process, its three-tier architecture was built, and the connection sequence of the identified tools was described in detail. In order to save manpower and improve product quality, a control algorithm was developed based on the selected programmable logic controller, and its software was formed.

REFERENCES:

1) M. S. Narziev, O. R. Abdurakhmanov, F. Y. Khabibov, Karimova, D. sh. Investigation of flow hydrodynamic structures in the final distillation of a cotton miccella. "Problems and prospects of development of innovative cooperation in research and training." Bukhara. 2017.- Pp. 52-53
2) M.S.Narziev, F.Yu.Habibov. Definition of optimal technological parameters of the process of final distillation of binary mixtures // Proceedings of the scientific-practical conference of professors, researchers, masters and students on "Problems of development of innovative activities and active entrepreneurship integration in higher education." Volume II. April 17-19, 2019. -Buxoro. -96-98 b.
3) Narziev MS, Abdurakhmanov OR, Khabibov F.Yu. Systematic analysis of the technological process of the final distillation of cotton oil mica. Scientific and Technical Jurisprudence"Science and Technology Development". № 3. 2017.C.3-7.
4) M.S.Narziev, F.Yu.Habibov, D.S.Karimova Development of systems of management of the process of final distillation of cottonseed oil on the basis of adequate mathematical model // International scientific-practical conference "Integration of modern" modern scientific research . December 28-29, 2016. Kemerovo. - S.41-44.
5) F.Yu.Khabibov, M.S.Narziyev/ A study of the process of the final distillation of cottonseed oil on the computer model». Scientific and technical journal "news of science of Kazakhstan" 2019, no. 2. Almaty 2019-P. 157-167.
6) F.Yu.Khabibov. Development of a hierarchical structure of systemic thinking of the process of final distillation of cottonseed miscella. "Development of science and technology". Bukhara. 2019. No. 5.- P.189-193.
7) Artikov A.A. Computer methods of analysis and synthesis of chemical-technological systems // Textbook for masters of theological specialties. Tashkent: Voris nashriyot. 2012.-P.160.
8) F.Yu.Khabibov, M.S.Narziyev, M.A.Abdullayeva “Optimization Of The Final Distillation Process By Multi-Stage Atomization Of Vegetable Oil Miscella” The American Journal of Applied Sciences, (ISSN – 2689-0992) Published: September 30, 2020, Pages: 255-262. IMPACT FACTOR 2020: 5. 276, The USA Journals, USA
9) T.V.Voblikova, Protsessy i apparaty pishchevyx proizvodstv: Uchebnoe posobie / T.V. Voblikova, S.N. Shlykov et al. - SPb .: Lan, 2016. - S.102-108.
10) D.Yu.Slabodchikov. Intensification process ispareniya letuchix fractions from mistselly in final distillators with paravymi nozzles. St. Petersburg. Dissertation for the degree of candidate of technical sciences. 2002 g.-S. 10-11.