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IMPORTANT ASPECTS OF THE METHOD FOR HYDROTHERMAL TREATMENT OF GRAIN PRODUCTS BEFORE COOKING.

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Akramova Gulhayo
PhD student in Andijan Machine Building Institute,Uzbekistan

Annotation

abstract: in this article, to improve the quality of grain during its processing and proper processing, the quality of the grain product is used, and for the process of moistening and steaming flour, the use of cold and hot air conditioning, which improves the quality of flour and saves time.

Keywords

grain, hot and cold conditioning, grain processing, humidity,temperature,pressure,hydrothermal treatment,vacuum pipe,moving screw, grain is poured into a pneumatic locomotive,Air conditioning system,compressor for producing compressed air,visual control of compressed air pressure,receiver for collecting and storing compressed air,pressure switch for automatic compressor control,hygrometer,air filter to clean incoming air,

Introduction.As we know, the grain industry plays an important role in the world economy, so the importance of developing the grain industry requires that the industry develop with the times.Undoubtedly, the first-class food product of the Uzbek people and other peoples of Central Asia is bread. For this reason, much of our arable land is grown in wheat. In order to develop agriculture and agro-industry, produce quality products, consistently develop the export-import industry and supply quality products to the population, it is necessary to provide agricultural enterprises of the President of the Republic of Uzbekistan and the Cabinet of Ministers. ministers with modern technologies, a number of resolutions and orders have been developed. In particular, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On additional measures to improve the system of accounting for grain and its processed products, strengthening control over their storage" [1], the work of the President of the Republic of Uzbekistan The Republic of Uzbekistan in the Republic Resolution on measures to create an effective system for the development of production and expansion of industrial cooperation [2], measures of the Cabinet of Ministers of the Republic of Uzbekistan

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"Development of a digitalization system in the agro-industrial complex" and agriculture of the Republic of Uzbekistan" [3], decisions of the President of the Republic of Uzbekistan "On measures for the widespread introduction of the digital economy and e-government" [4].

Optimization of technological technologies, grain characteristics, and its processing by hydrothermal method. Grain conditioning is used in flour, grain and feed production technologies. Technological improvements are achieved by regulating processing parameters and grain properties (for example, temperature, pressure, humidity, duration of output technological operations). In a scientific journal of the twentieth century, the term "grain conditioning" was replaced by the term "hydrothermal processing of grain" [5].

Not only in our country, scientists conduct a lot of research in the field of economics of world grain products. As an example, we can cite the indicators of research conducted on grain and grain products [6].

Until now, the use of cold grain conditioning has been limited due to several problems. For example, enterprises are not provided with modern technologies, high power consumption, lack of an automatic control system and control of cold air conditioning. Currently, there are two ways to solve the problem [11, 12]: replacement and complete renewal of existing equipment or partial replacement and automation of some stages of the humidification process. The first method requires large economic and material costs, and the second is the most acceptable for most enterprises, allowing you to quickly and flexibly respond to emerging problems.

Materials and methods. As a result of the analysis of existing technologies and methods for controlling cold-conditioning processes, it can be concluded that in order to improve process control, it is necessary to improve the concept and structure of managing humidification and cleaning operations, as well as to develop the necessary control for this [7].

Many flour milling enterprises traditionally use three methods of hydrothermal grain processing. These are: cold, hot and high-speed air conditioning [8].

Separately, it is worth noting that if grain cobs are crushed under conditions of low ash content and high whiteness, then the highest biological quality of flour increases, i.e. it is enriched with phenolic acids, anthocyanins, and meets the antioxidant properties of flour. , trace elements, carotenoids, B vitamins and tocopherols [9,10].

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Many scientists have worked on inventions and discoveries; as an example, there are many patents, articles and studies on hydrothermal processing of grain products. Other methods of grain conditioning have been proposed - vacuum (patent 2465048), surface (patent 2456081), as well as processing grain with saturated steam (patent 2246989), infrared radiation (patent 2336702), microwave radiation (patent 2019998), ultrasound (patent 2336702). patent 2405629), however, the following inventions could not be used in mills due to the high energy intensity, complexity of the process and the high cost of the equipment used to equip grain processing enterprises.

Thus, the purpose of the invention is to increase the efficiency of hydrothermal treatment before grinding grain, which allows increasing mill productivity with minimal operating costs, product quality and biological value.

Research results and discussion. The proposed invention has significant differences;

- the use of the method of active air circulation (ventilation) to automate the processes of moistening and conditioning grain allows you to create the efficiency of energy-saving management, use it in scientific and laboratory research and teaching aids;

-use of information-measuring systems to calculate humidity parameters based on the thermogravimetry method to save energy resources and control energy costs to analyze humidity regimes;

- introduction of a vortex tube into the air preparation system and the use of eddy currents from the air outlet to regulate the temperature of the air directed to the grain mass.

The proposed device is illustrated by drawings.

- grain is poured into a pneumatic locomotive,
-Air conditioning system,
- compressor for producing compressed air,
- visual control of compressed air pressure,
- receiver for collecting and storing compressed air,
-pressure switch for automatic compressor control,
- hygrometer,
- air filter to clean incoming air,
- air valves to regulate the amount of air components,
- computer information system and management system,
-vortex tube for releasing a stream of compressed air,
- input of grain flow into the device,

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- path of grain flow exiting the device,
- computer information and management system.

The device works as follows;

The operation of the device begins with turning on the air preparation system and setting it to a given mode. Then the air compressor is turned on, which fills the receiver with compressed air. It is carried out by an air filter and a pressure switch to clean the incoming air from dust and maintain the set pressure. In the automatic control system, the parameters of the air environment directed to moisten the grain (air pressure and humidity) are set.

Compressed air from the receiver enters the vortex tube and reaches a pressure value corresponding to atmospheric pressure.

Air flow is supplied to the device, and the amount of air components is controlled using air valves to monitor the condition. The device is accessed through the grain. During wheat processing, moisture is quenched and the values are sent to a computerized data and control system. Based on the result obtained, a command is sent to the air valves to control the state of the amount of air components to ensure the required air pressure. After achieving the desired result, the moistened grain from the stream is sent to the mills.

The technical result of the invention is to increase the efficiency of hydrothermal preparation for grain grinding, reduce grain cooking time and increase flour productivity, improve the quality of flour baking, soda is strong, durable, safe, universal, environmentally friendly, energy-saving and reliable, at the same time achieved with the help of devices , cheap and easy to manufacture, install, use and maintain, and is expressed in increasing its biological value.

Conclution.The proposed concept for controlling the cold conditioning process makes it possible to create a control system that operates under conditions of uncertainty in the initial properties of the processed raw materials and ensures the minimum duration of the process of transferring the product from a variety of possible initial states to a certain final state[7].

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