PHASES OF HYDROTHERMAL PROCESSING OF CEREAL PRODUCTS IN TERMS OF QUALITY INDICATORS.

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Annotation: *the quality of the grain product in its processing and proper processing.From improving grain quality, soaking the flour uses cold and hot conditioning types for the steaming process.This increases the quality of the flour and saves time.*

Keywords: *grain, hot and cold condiratory, grain processing, soaking.*

INTRODUCTION

The first-class food product of the Uzbek people and other Central Asian peoples is undoubtedly bread. For this reason, wheat is grown for a large part of our arable land. In order to develop rural agriculture and agro-industry in our country,produce quality products,consistently develop export and import networks and deliver quality products to the population, a number of decisions and orders have been developed to provide rural agricultural enterprises of the Prizident of the Republic of Uzbekistan and the Cabinet of Ministers with modern technologies.In particular, the decision of the Cabinet of Ministers of the Republic of Uzbekistan " to improve the system of accounting for grain and grain processing products, on additional measures tostrengthen control over their preservation " [16], the decision of the president of the Republic of Uzbekistan on measures to develop production in the Republic and create an effective system for expanding industrial cooperation[60], the decision of the Cabinet of Ministers of the Republic of Uzbekistan on measures “development of the agro-industrial complex and the system of digitization in agriculture” [18], These include the decisions of the president of the Republic of Uzbekistan on " measures for the widespread introduction of digital economy and e-government.

The main task facing the employees of the flour production industry is to increase the production and quality of finished products. The solution to this problem is impossible without the use of an automated system for controlling the processes of soaking and cleaning before grinding grain.[1]

The aim of the research is to improve the effectiveness of various methods of grain conditioning.The statements of these scientists are based mainly on laboratory research, without taking into account the various interconnected factors that are fully manifested in the conditions of production .

METHODS

In this article [1,2,8,15,22] of many research scientists on the cold conditioning system of cereals, the article covered the issues of managing cold conditioning of cereals.Useful information is provided for this article.

In this instruction of research scientists [3,7,12,16,18], the data is covered in hsqi, a step-by-step sequence of cold conditioning of cereals.

To illuminate the methods of moisture measurement techniques prior to grain coagulation,data on the methods of moisture measurement, moisture detection and control by scientists [4,5,9,10,17] was used.

In order to illuminate the adaptive control system, scientists [6,11,13,14] have provided a lot of information about the methods of control and management of technological processes.

As for the choice of optimal air conditioning modes in mills powered by pneumatic transport, this issue has not been studied in either laboratory or production conditions.The search for more effective air conditioning methods does not stop.

The most effective of the considered methods is to ensure an increase in the strength of the shells, which causes maximum resistance to mechanical stress during grinding and weakening of endosperm particles in the zone bounded by the aleyron layer, resulting in a greater yield of high-quality flour.

It was found that the grain of all wheat should increase the strength of the shells, but not all wheat should reduce the strength of the endosperm and bring it to a loose consistency during the conditioning process, especially since this does not always arise from the requirements for the roughness of the flour. For example, the quality of pasta and semi-grinding is characterized by the minimum amount of fine flour and the maximum spread of bread flour. In both cases, this is a positive factor.

Currently, there are two ways to solve the problem [2,3]: replacing and completely updating existing equipment or partially replacing and automating some stages of the wetting process. The first method requires large economic and material costs, while the second is the most optimal for most enterprises and allows you to quickly and flexibly respond to the problems that arise.

The moisture content of the grain significantly affects its structural and mechanical properties and, first of all, its strength and, therefore, the efficiency of its grinding [4,5,6]. The effect of moisture on the structural and mechanical properties of grain and the effectiveness of its grinding has been studied by many parents: V. ya. Girshson, ya.N. Kuprin, S. D. Khusid, I. A. Naumov, G. A. Egorov, A. L. Shpolyanskaya et al. Studies have found that with increased moisture content of the grain, increased resistance to its destruction, decreased micro-hardness, and increased specific energy expenditure per newly formed Surface unit. This phenomenon is explained by the plasticity of the grain as a whole and the increased humidity of its anatomical parts. [7,8,9,10]

Analysis of the stage of cold conditioning as an object of control of the technological properties of grain;

- The complex organization of the technological process of processing grain into it is determined by two main factors [11,12,13,14,15]:

- features of the grain structure of various crops;

- the target function of a particular process, that is,it implies the production of flour or cereals and what varieties.In the modern production process at the mill, all technological operations are the only current built on a hierarchical principle.

Grain processing preparation involves a number of technological operations that can be considered independent complex open systems. In this scheme, four blocks of technological

operations are separated as subsystems: separation, grain surface processing, hydrothermal processing and the formation of crushed batches.

Analysis of the system of processes for changing the quality of grain during processing of cereals hydrothermal processing of grain for the purpose of wetting-cleaning, the main task is to change its technological properties, aimed at their optimization and subsequent stabilization at this level. Therefore, this process is one of the main ways to control the technological properties of cereals. As influencing factors of hydrothermal processing, changes in grain moisture, its temperature are used, while the influence of these factors occurs for some time, as a result of which changes in the structure and all properties of the grain occur. The volume of these changes depends on the specific design of hydrothermal treatment and is determined by the method and process mode adopted in each case, the characteristics of the mechanism of interaction between grain and water have a significant effect during humidity.[1]

RESULTS

The results carried out show that the methods of optimizing the activities of the grain retraining Department of flour production enterprises were analyzed and the optimal option was determined.To solve the problem of managing the technological properties of grain in the preparation section of the mill, the following main sets of operations are used: batch formation for processing and hydrothermal processing of grain. Of particular importance in the subsystem of the formation of crushed batches is the choice of strong and weak wheat components in a ratio that ensures a clear positive manifestation of outflow from the additive. Based on the selection of components, a technological stream is formed for the hydrothermal Processing Subsystem, for which the technological task is to carry out operations according to the parameters of a separate mode for each component of the mixture, in accordance with their technological haracteristics [11,14].

The purpose of this work is the scientific justification and development of the principles of automated control of the cold air conditioning stage and the technical implementation of the control system, which works in conditions of prior uncertainty of the initial technological characteristics of the hygrotermic parameters of grain and environmental air and allows to increase the efficiency of the preparatory department of the mill.

The functions of this system, accordingly, should consist in the operational assessment of the current technological parameters of the grain state, the analysis and recognition of the characteristic features of the state of the control object, the prediction of changes in the hygrotermic state of the control object at the stages of hydration and the formation of sufficient control effects.

DISCUSSION

The controller receives a signal from the primary water temperature measurement transducer and compares it with the specified value. If the temperature is not enough, then the relay connected to the heating element gives a signal that closes it and turns on the heating element. Once the specified value is reached, the relay signal is emitted and the heating element is turned off. The error in regulating water temperature is about ±1°C.

Water consumption is measured using a VZLET-ER420 electromagnetic flow meter. The signal from the current output of the flow meter is given to the controller that controls the flow of water [19]. The actuator is a clorius Controls Type l1ip co solenoid valve, an

mt40a Type mounted drive [20] with the driver powered from a 24 v urban network. The 2-10 V or 4-20 ma control signal allows you to smoothly adjust the valve movement. The regulatory capacity of the valves is 50: 1. This means that the declared (or defined) tuning properties do not change until the fluid flow power drops to 2% of the full power.

CONCLUSION.

Based on the analysis of the mechanism of moisture distribution in cereals and the analysis of the interaction of the grain surface with wet air, the structure of the mathematical description of the decision-making process is based, which makes it possible to determine the interaction of the control and calculation parameters with the output parameters that characterize the distribution of moisture in the grainIt made it possible to predict the end time of the moisture redistribution process based on quick control of properties.by the size of the grain in the grain box.

The proposed concept of managing the cold Condi-sioning process made it possible to create a control system that works in conditions of uncertainty of the initial properties of processed raw materials and ensures the minimum duration of the process of transferring the product from a set of possible initial states to a specific final state.

A grain processing moisture meter transducer has been developed, the advantages of which include pe-rhyodic correction of current calibration characteristics, continuous operation under vibration conditions, discrete-continuous mode of grain moisture measurement, ease of maintenance and ease of inspection.

The developed measurement transducers made it possible to quickly and reliably control the dynamics of moisture redistribution by grain size.

With the help of digital measuring instruments and secondary transducers, a universal decentralized system of cold air conditioning control is proposed before grinding grain, which provides tracking, storage and remote transmission of data, reduces the error of direct measurement and increases the accuracy of indirect control of process parameters.

An algorithm for optimizing the operation of the cold air conditioning unit has been developed and implemented programmatically, with the help of which optimal modes of processing ground batches of grains are determined by seasonality, initial technological characteristics and the size of ground batches, as well as geometric dimensions and the number of silos.

The use of a grain moisture rapid control system developed at the Starominskaya elevator OJSC confirms the practical significance of the proposed technical solutions.

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