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Research Article

IMPROVEMENT OF STORAGE OF WHEAT GRAINS

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ABSTRACT

One of the most important tasks ensuring the sustainable development of the country and its food security is to increase grain production and reduce losses at all stages. This article discusses the issues of improving the storage of wheat grains.

KEYWORDS

Wheat, storage, plant, method, technology.

INTRODUCTION

The task of increasing grain production should be solved not only by increasing the gross harvest, but also by improving the quality of post-harvest processing and storage, since grain quality is the second harvest. Reliable and long-term storage of millions of tons of grain is costly and labor-intensive. It is inextricably linked with the correct consideration of the properties of grain as an object of drying, processing and storage.

MATERIALS AND METHODS

The main properties of grain that require special consideration during drying and storage: humidity; temperature; shell state; stickiness; uniformity; shape, size and duty cycle; nature; bulk density; flowability (angle of repose, external and internal friction); chargeability; thermal conductivity, heat capacity, thermal diffusivity [1].

RESULTS AND DISCUSSION

Due to the biological nature of grain crops, in order to avoid damage and loss, the grown crop must be harvested in a short time and, depending on the condition of the grain and seeds, post-harvest processing is required at a high rate.

The grain mass is a living system that is not in a state of "rest", therefore, when processing it, it is necessary to observe special processing regimes, and during storage, conduct continuous monitoring. Particular attention should be paid to preventing injury to the grain. Violations of the shells, the embryo, the appearance of cracks, scratches, and splitting of the grain greatly affect its quality. Biochemical changes occur in it, it can self-heat, which worsens its consumer properties. As a result of the action of microorganisms and pests of grain reserves, grain can even become toxic and will be unsuitable for food or feed purposes, not to mention its use for seeds. If stored improperly, the weight of the grain also decreases.

Other reasons for the deterioration of grain quality are the moisture content in the grain above equilibrium (active) and the presence of impurities. The moisture and contamination status of grain entering the post-harvest processing lines and granaries (which largely determines the degree of preservation of natural properties) directly depends on the level of equipment with harvesting equipment [3]. With a sufficient quantity and technical level of harvesting equipment, you can choose a time favorable for harvesting and obtain grain that is more uniform in quality, with less moisture and contamination.

It should be borne in mind that the moisture content of the grain after harvesting is greater than before harvesting, due to the fact that most of the moisture in the straw and weeds (which obviously have higher moisture content) transfers to the grain itself [4]. A major role is played by climatic factors, which are rarely optimal during the harvest and post-harvest periods, especially in the regions of the so-called. Fast mechanized harvesting does not leave time for active and passive ventilation of grain in the open air (despite the obvious effectiveness of using natural drying for drying), since the artificial drying process must begin from the moment freshly harvested grain arrives.

Despite the fact that when the grain is fully ripe, its moisture content in dry weather decreases to 14%, it is recommended to harvest grains with combines in the middle of waxy ripeness, since significantly greater losses will occur in the phase of full ripeness; In addition to shedding, grain in this phase is also the most sensitive to moisture (it absorbs and releases moisture very easily, acquiring the greatest hygroscopicity).

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Drying grain accelerates the process of post-harvest ripening, ensures storage stability, and improves the technological and sowing qualities of grain. Currently, there are high-performance automated grain drying plants. However, with small production volumes and low humidity of freshly harvested grain, their use is unprofitable in the conditions of collective farms, breeding and seed stations, as it is associated with large capital investments and high energy costs. The disadvantage of high-temperature grain dryers is also the contamination of grain and the environment with toxic products of fuel combustion; uneven heating of the grain mass and the formation of cracks caused by high drying speed, which reduces the technological and sowing qualities of the grain.

Grain drying technology is developing along the path of transition from processing a dense, low-moving layer to processing individual grains in a fluidized bed and in a pneumatic tube, as well as combining processing operations [3]. Due to the fact that under these conditions heat exchange occurs much more intensely than mass exchange, when drying grain with significant humidity (initial humidity of the order of 20% or more), it is advisable to use combined heating and cooling cycles. In this case, a certain part of the moisture is removed during the cooling of grain heated to the optimal temperature, using self-evaporation and the phenomenon of thermal and moisture conductivity, which transforms the latter from the category of harmful phenomena into useful ones [4].

The use of natural drying of grain on a current or floor-mounted grain dryers with electric heaters requires a lot of labor and electricity. At the same time, it seems promising to use active natural drying with solar power plants and energy accumulators as part of storage facilities or grain dryers. In fact, calculations show that the cost of fuel alone for drying grain is approximately half of its selling price [5].

The heat sources in the case of using this approach in the storage are a conventional solid or liquid fuel stove and a solar collector combined with an external southern wall. The air heated by the collector enters the room through hatches (closed at night and in cold cloudy weather) under the ceiling and, mixed with warm air from the stove by a fan, is directed down a vertical air duct into the underground space filled with gravel and pebbles that accumulate heat. From here it enters the room through the floor and special gaps along the walls. Reducing heat loss can be achieved both as a result of planning measures and with the help of special devices. The main task of the layout is to select the optimal shape of the storage facility with a minimum perimeter of non-heat-receiving walls, with an increase in the southern front. Taking into account also the distribution of grain pressure over horizontal and vertical sections, we can recommend a round (cylindrical silo) or semicircular - trapezoidal (for a storage building) section. The accumulator (made of pebbles and gravel), due to the accumulation of thermal energy during the day, and increased draft (in the exhaust pipe) prevent the formation of condensation in the storage and the increase in grain moisture during the rainy season, which allows grain to be stored throughout the entire period without loss of quality.

Another promising area is storing grain in an environment of inert gases (nitrogen), at a high content of carbon dioxide and at a very low concentration of oxygen. In this case, the following advantages additionally appear: no need for fumigation, slowing down and stopping the development of molds, reducing insect activity, eliminating fluctuations in the temperature of the grain mass and self-heating, preservation of grain at critical humidity for a much longer time (than in the presence of atmospheric air), better and significantly longer maintenance of grain viability and properties without the use of additional measures [2].

Conclusion

Experience shows that for the reliable preservation of grain in Uzbekistan, granaries are needed, the total capacity of which exceeds the average annual gross harvest by 1.5-1.8 times. This allows you to compensate for annual yield fluctuations, take into account the volumetric mass of grain of various crops, separately process and store different quality batches of grain, and have a carryover grain balance of up to 20% of consumption.

References

1. Tsuglenok, N.V. Methodology for determining the thermophysical properties of grain material [Text] / N.V. Tsuglenok, S.K. Manasyan, N.V. Demsky, N.N. Cones // Bulletin of KrasGAU, No. 4. – Krasnoyarsk, 2017. – pp. 131–133.
2. Boumans G. Effective processing and storage of grain / Transl. from English – M.: Agropromizdat, 2011. – 607 p.
3. Manasyan, S.K. Combined bunker installation for drying and cleaning grain material [Text] / S.K. Manasyan, O.V. Pilyaeva // Vestn. KrasGAU. – 2018. – No. 6. – P. 135-138.
4. Manasyan, S.K. Chamber grain dryer [Text] / S.K. Manasyan // Vestn. KrasGAU. –2019. – No. 2. – P. 166-170.
5. Baydakov E.M. Application of renewable energy sources for drying grain // Bulletin of the Saratov State Agrarian University named after. N.I. Vavilova. – No. 7. – 2019. – p.32-36.