QUALITY MANAGEMENT SYSTEM IN GRAIN PRODUCTS

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Abstract*. A quality management system for grain products refers to the processes and procedures implemented by producers to ensure that their products meet established quality standards and customer expectations. Typically, this system includes several components.*

This article provides information on studying the quality of grain and grain products and determining other indicators. General information about grain quality is provided.

Keywords: *grain, quality, color, taste, smell, density, DASt, size, category, level of pollution. Food, grain products, products, quality, seeds, raw materials.*

INTRODUCTION

The management system in agriculture has been radically changed and the formation of the farming movement will help to supply the land resources of the state sector, to provide the population with the capacity and levels of food.

Experiences of the world show that in-depth assimilation of theoretical knowledge and practical experience by experts in the storage and processing of grain products has become the demand of the time. The state has created a regulatory framework and necessary conditions for farms to store and process their own raw materials.

There are opportunities to process the cultivated grain products and export not only semi-finished products, but also high-quality finished products to the world market. In order to make full use of the created bases, the use of advanced foreign technologies in the production of storage and processing of grain products is highly effective.

The rapid development of science and technology is becoming a demand for production automation, technology improvement, increased quality requirements, and the use of new methods of technology in harvesting and processing. Year by year, grain production has increased, the domestic market is fully supplied with grains and grain products, and grain exports have been achieved.

In the conditions of the market economy, the main strategy of the economy must be quality efficiency.

Supporting large and small producers by establishing on-site storage and processing of raw materials, the use of new innovative technologies will provide an opportunity to ensure economic efficiency and quality. In the conditions of the market economy, there is an increasing demand for qualified specialists who are well-versed in the production of raw materials, their processing and the characteristics of finished products, armed with economic, economic and legal knowledge.

Any pile of grain has certain physical properties that must be taken into account during storage. Such physical properties include: dispersibility, self-sorting, porosity, sorption to various gases and vapors, (absorption of gases and vapors), heat capacity, thermal conductivity, temperature conductivity, heat and moisture conductivity.

Proper and skillful use of these properties will reduce waste. It allows to improve the quality of the grain pile, as well as to prevent the stagnation of grain in all the enterprises and

organizations related to grain processing, as well as the production of flour, and the retention of grains in systems. The physical properties of grain are especially important in mechanization and automation processes, including the placement of grains in threshing machines, the use of modern drying methods, the use of vibrating conveyors in grain processing processes, and the storage of grains in large facilities. Grain mass is a two-phase dispersed system and is considered a dispersible material.

Good dispersibility makes it easy to mix, place, store and transport grain in norias, conveyors, pneumatic equipment, etc. At present, it is widely used in grain loading and unloading operations. Depending on this principle, grain elevators in flour and semolina factories are built in a vertical style.

The mass of grain raised to the upper floor of the elevator with the help of special norias flows to the lower machines as a result of its spillage. Loading and unloading processes in silo elevators are also based on the above principle. The degree of filling of warehouses with grain mass also depends on dispersion. The higher the spreadability, the faster and better the filling of the silage.

Also, dispersion warehouses are used in statistical calculations. The dispersion of grain is an important indicator, which is important in the design and operation of grain warehouses, flour, groats and feed plants, loading-unloading equipment, etc. Usually, the dispersion of the grain mass is characterized by the coefficient of friction determined by measuring the friction angle and natural slope. The friction angle is a relatively small angle at which the grain mass begins to slide on a surface. The natural slope or angle of deviation of the grain mass is understood as the angle of the conical shape formed by the grain freely spilling on a flat surface with respect to the surface.

Many factors affect grain dispersion. The most important of these are: grain granulometric composition and granulo morphological character, humidity, type and amount of impurities, material, shape and structure of the surface on which grain mass flows. Grain mass consisting of seeds with a smooth, spherical shape has a high spreadability, as well as a relatively small friction angle and natural flow slope. The above factors have a relatively imperceptible effect on the dispersibility of this type of grains. The more the shape of the grain deviates from the sphericity and the rougher its surface, the smaller the dispersion of the grain mass.

For example, you can get rice, barley and oat grains. Other factors also affect the dispersion of these grains:

- humidity,
- mixtures,
- grain mass

Some other factors that can affect the dispersion of grains include the size and shape of the grains, the moisture content of the grains, the airflow in the surrounding environment, and any obstacles or barriers in the path of dispersal. Additionally, external factors such as wind, water currents, and animal activity can also play a role in dispersing grains.

If there are impurities in the grain mass, its dispersibility decreases. If the amount of light impurities in the grain mass increases, as well as if there is a large amount of weed seeds with an uneven surface, the spreadability can be completely lost. Such grains are not allowed to be placed in silo elevators until they undergo preliminary cleaning. An increase in humidity will reduce the dispersion of the grain mass sufficiently.

The main quality indicators of grains include their freshness (color, taste, smell), moisture, size, degree of contamination, whether or not they are damaged by pests, vitreousness of the grain section, the amount of flower bark, etc. Grain is mainly brought to storage and processing in a certain volume. Grain masses are required to be uniform in appearance and quality.

Determining grain quality is studied mainly in two groups. It is checked by organoleptic and laboratory methods. The laboratory method determines the moisture content of grains, the level of contamination with foreign substances, and the level of damage by warehouse pests. In order to get more detailed information about grain, parameters such as density of grain, mass of 1000 grains, vitreousness of grain kernel, protein content, amount and quality of gluten, and ash content in grain can also be determined. In the laboratory method, inspection works are mainly carried out with the help of special tools.

Another way to determine the quality of grain is called the organoleptic method, which includes the assessment of grain quality using sensory organs. In this method, it is possible to determine quality indicators that cannot be determined by other methods (for example, grain color, smell, taste). Determining grain purity indicators (color, smell, taste) are its main purity indicators. In addition to the main grain, the mass of grain presented in each batch may contain other impurities (weed seeds, sand, clay, stalks, husks, etc.). Therefore, it is necessary to pay attention to these when determining the quality of grain or determining the degree of purity. If defects or defects in the grain are detected, the defect category may be assigned and cases of return of the grain by the recipient may occur.

Today, a new state standard - UzSS 880:2004 - has been developed and approved for wheat grain grown, prepared and delivered in our Republic. This standard is used for wheat grains prepared in the state system and used for food and technical purposes. According to the requirements of this standard, the sample of wheat grain should be 750 g/l. The amount of water should not exceed 14 %, the amount of foreign impurities should not exceed 1 %, and the mixture of other grains should not exceed 3.0 %, and other basic and important parameters are indicated. As indicated in the standards of the Russian Federation and the Republic of Kazakhstan, even in our standards for grains, it is not allowed to damage grains by warehouse pests, and measures against this are regularly considered. As we mentioned above, the selection and separation of samples is carried out in accordance with UzSS to determine the color, taste and smell of grain.

Grain quality indicators: The uniformity of grain sizes is one of the main indicators used to assess their quality. The more uniform the grains are in size, the higher the quality of cereal and flour products made from them, and the less waste from processing. To determine this indicator, grain is sifted in sieves of certain sizes. The uniformity of grain sizes is indeed a crucial factor in determining the quality of cereal and flour products. Sifting the grain through sieves helps to separate out grains of different sizes and ensure a consistent product. This process is essential for producing high-quality flour that will result in better baking outcomes. It also helps to reduce waste and improve overall efficiency in processing grains.

Grain color: In agriculture, the color of grains is their main quality indicator. Because depending on the color, it is possible to get a lot of information (for example: the type, variety, homogeneity of the grain) and other indicators are determined. The color of each grain is unique and reflects additional shine, lines and other indicators. The grain color should match the standards. Grain color is determined by comparison with standards or samples.

Density: (kg/m3) is one of the main indicators of grain, and this indicator depends on the structure, completeness, level of ripeness and other indicators of grain. Due to the small amount of endosperm in whole grains, their density is relatively small. The density of fully ripe grains is slightly higher than the density of unripe grains.

Smell: Grain has a unique smell. If the grain has a peculiar smell, it indicates that the grain is damaged and deteriorated. As for the reasons for the appearance of foreign odors in grain, it can be caused by absorption of various substances from the external environment, i.e., steam and gases, or other seeds mixed with grain, organic compounds, and various pests

Determining the degree of vitreousness of the grain:

If the surface of the cross section of the grains is completely vitreous or less than 1/4 of the surface of the vitreous section, such grains are called vitreous grains. In floury grains, the cross-section is completely floury or less than 1⁄4 of the cross-section is vitreous. This indicator is determined in wheat, barley, corn and rice grains. According to the standard requirements, wheat grains are divided into small types based on the glassiness index.

This description appears to be related to the classification of grains based on their vitreous or floury nature, specifically in wheat, barley, corn, and rice grains. The vitreous grains have a surface that is completely vitreous or less than 1/4 of the surface is vitreous. On the other hand, floury grains have a cross-section that is completely floury or less than 1/4 of the cross-section is vitreous. This distinction is important for quality assessment and classification of grains according to standard requirements. In the case of wheat grains, they are further classified into different types based on the glassiness index.

Taste: Whole grains have a unique flavor that is often sweet or slightly sweet. 100 g of grain is used to determine the taste index. Grain taste is defined in clean and ground grain. 100 g of grain is brought, cleaned and ground in a mill, then chewed from 2 g. It is necessary to rinse the mouth thoroughly before and after each determination. Determining the taste of grain is carried out and studied in cases where it is not possible to determine the degree of purity of grain according to other organoleptic indicators.

This appears to be a description of a specific method for evaluating the taste of whole grains as part of assessing their quality. The taste index is determined by chewing a specific amount of cleaned and ground grain and evaluating its flavor, which is typically described as sweet or slightly sweet. This method may be used when other organoleptic indicators are not sufficient to assess the purity or quality of the grain. It emphasizes the importance of thoroughly rinsing the mouth before and after each determination to ensure accurate results.

We got acquainted with methods of storage of grain mass and checking of quality levels. When the grain mass is kept below the critical moisture content, metabolism, respiration and all other physiological processes in the grain are sharply reduced. When the grain mass is stored in this way, all its properties are fully preserved for a long time. If the grain mass is well cleaned and protected from external factors, it can be stored in warehouses for 4-5 years and in threshing floors for 2-1 years without any additional processing. When the pile of grain is kept dry, it is necessary to constantly monitor it. Because with the creation of favorable conditions, the activity of microorganisms and pests can increase, and the grain can heat up by itself. The relative humidity of the air is also important. Grains and legumes can be stored for a long time in warehouses with a moisture content of 12-14 %. The amount of oil in the grain of oilseeds is best determined when the moisture content is 611 %

Conclusion. It is known that each grain or seed, in addition to its agricultural characteristics, has yield, growing season, resistance to diseases and pests, and various consumption indicators. For example, different varieties of wheat have their own flour yield and baking quality indicators. Many varieties and hybrids of corn have clearly expressed technological properties and value. Flax seeds contain high-quality oil, while the amount of oil in sunflower seeds varies greatly depending on the variety.

Approximately 65-75 % of food products consumed by humans are made from I grains. Many primary products such as flour, groats and fodder are produced from grain. The demand of our people for these products is extremely high. Satisfying the population's demand for grain and grain products is one of the most important tasks in the period of stabilization of the current market relations. It is not possible to fully satisfy the demand for grain and grain products only by growing a lot of grain. It is necessary to know how to store the grown grain, cereals and fine fodder without allowing wastage.

By implementing a robust quality management system in grain product manufacturing, companies can enhance customer satisfaction, reduce waste and rework costs, comply with regulatory requirements, and build a strong reputation for reliability and consistency in the market.

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