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GRAIN PRODUCTS TECHNOLOGY

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Annotation:
according to the composition of the grain is divided into the following parts:
1. Endospermia-the main nutritional part of cereals is 85% of the grain mass.
2. Pink-a part Rich in basic biological substances (vitamins, semi-saturated fatty acids, etc.), is about 1,5% of the grain mass.
3. Peel-is 14% of the grain mass. The chemical composition of the grain depends on seed production and climate.
On average, the humidity in grain products is 13-14%, protein 10-12%, fat 2-4%, carbohydrates 60-70%. According to its chemical composition, oats differ in fat content (up to 5%), low carbohydrate content (up to 50%). In products with legumes, the protein is contained up to 23%, fat 2%, carbohydrates 52%. Flax seed has a unique composition, it contains 34,9% protein, 17/3% fat and 26,6% carbohydrates.
Keywords: consignment, Aspergillus vitreus, gluten, endosperm, decolorization, IDK-1.

Introduction: Grain is the fruit and seed of leguminous plants. It is a dry fruit with one seed. Grain the bare grain varieties of oats with rye, corn and barley will be without oats, as well as oats, barley, rice, millet and others with a thin crust. According to the grain structure, it consists of three main parts: bark, endosperm and Mastic. Grain Dogi consists of 81-84,2% of the weight I endosperm, 6,8—8,6% I aleyron floor, 1,4—3,2% and mortars and 3,1—5,6% I Hull.

Main part: Current GOST R52554-2006 "grain. On the topic ”technical conditions", recommendations were made on its cultivation. Classification of cereals grain grades are determined by the worst value after sorting, cleaning and drying of seeds. GOST 93-53-90 provides a commodity classification of culture, characterized by the properties of milling and baking.There is also a conditional 6th grade for soft varieties. Separation by quality and chemical

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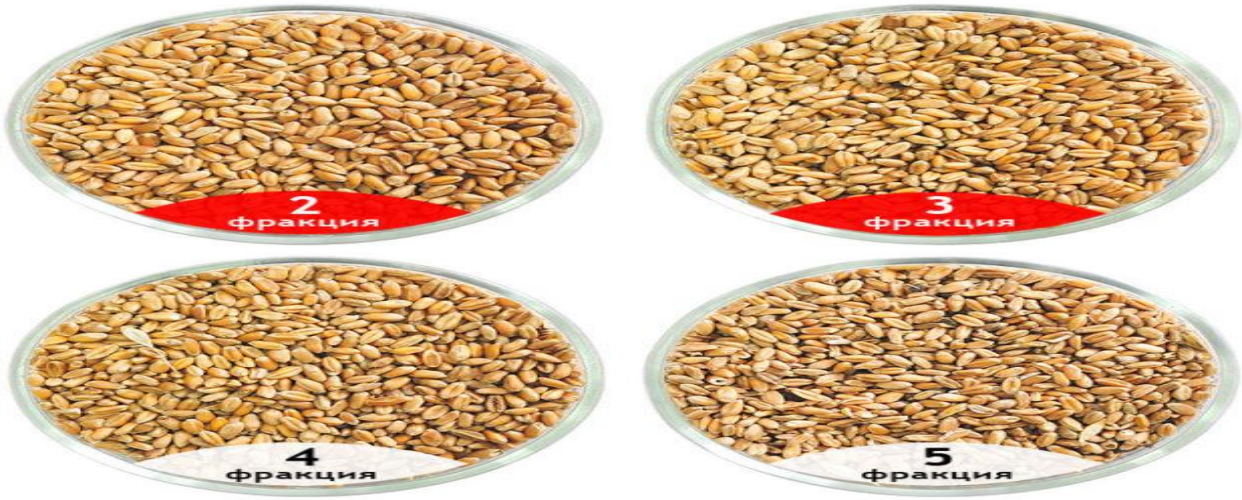
composition is necessary to improve the yield and grain yield to obtain a good harvest Tours The change in grain color before the harvest period or when stored incorrectly is called the "decolorization of powdered grains".

Grain quality of Whole Grain In accordance with the existing GOST 13586.3-83, grain sample is taken during batch loading or unloading to assess grain quality.. The minimum amount will be set only in the first 3 class of grain. For soft varieties of the first class, the amount of gluten should be not less than 32%, 2-th grade grain should be at least 28%, 3 - at least 23%. Indicators of solid varieties: 28%, 25% and 22%, respectively. Grain for 5-varieties of both hard and soft breed, the level of gluten should be at least 18%. The vitreous property of the grain affects the quality of the mill: its fertile flour and its ability to form coarse. According to the results of the analysis of the consistency of the endosperm, grain vitreus is classified as partial vitreous or meal. Description of Vitreus is described in detail in GOST 10987-76. It contains a list of necessary for the analysis of equipment, the exact weight of the sample is given-50 g, the maximum humidity indicator - 17% and two methods of the procedure.



Vitreous is determined with the help of a diaphragm or by hand. For the reference color of each class, the color of a healthy grain type or subspecies is used. For the first four classes, it is possible to decolorize the first level under certain conditions. Grain there is no option to adjust the color of the seeds. The mass is calculated according to GOST 10842-89. The humidity of the grain is determined by GOST 29027. These devices are able to determine the moisture content of the seed from 5 to 40%, the error is less than 1,5%.

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Grain quality indicator Safety indicators include toxic elements, mycotoxins and pesticides, harmful impurities and radionuclides, which should not exceed the acceptable level in accordance with SanPiN.

Additional indicators for groups quality include the chemical composition of the grain, the composition of micro organism, the activity of ferments, etc. The state standard is the initial part of determining the quality of grain - this is the batch. Consignment is a grain of homogeneous quality (according to organoleptic evaluation), intended for simultaneous reception, delivery, shipment or storage in a single silo, batcher, storage. The quality of each batch of grain is determined by the results laboratory analysis is an average sample, which consists of a recess from the batch. The sum of all the honeycombs from the grain batch is the original sample. The average sample of the original sample allocated for laboratory research is called. If the grain batch is small, then the initial sample (weight 2 kg) is averaged at a time.

Color. The most important quality indicator, which characterizes not only the natural properties of the grain, but also its freshness. Cereals that have not undergone any changes in the influence of unfavorable conditions of cultivation, harvesting and storage are considered fresh. Fresh cereals should have a smooth surface, natural light and a specific color to the grain of a certain crop.

Smell. A very important attribute of quality. A healthy cereal should not have a peculiar smell. The grain receives the smell of cereals mainly from weeds, other mixtures containing efir oil, and from impurities that come into contact with it. In assessing the quality of grain, a possible error to eliminate rancidity and exclusion, VNIIZ developed an object method of determining grain shortages based on the quantitative calculation of the content of ammonia.

To Taste. This is determined in those cases where it is difficult to determine that the grain with the smell is fresh. To do this, it is necessary to chew a small amount (about 2 g) of clean chopped grain (without impurities), separating 100 g from the average sample. Before and after each determination, the mouth is washed with water.

Transparency characterizes the structure of the grain, the relative position of the tissues, in particular, starch granules and protein substances, and the consistency of the binding between them. This indicator is determined by calculating the number of grains (%) of transillumination and vitreous, semi-

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vitreous, fruit consistency in the diaphragm. In vitrified cereals, starch grains and protein substances are very tightly packed, and they are tightly connected with each other, there are no microcracks between them.

The protein substance contained in cereals (determined only in the composition) is a set of protein substances of cereals, capable of forming a combined elastic mass when swollen in water. Grain flour, which contains a large amount of gluten, can be used independently in bread baking or as a weak grain grinder.

Cereals-expressed as a percentage of the mass and mass of flowering plyons in granular cereals and fruit shells in buckwheat. The grain varies greatly depending on the region of the abdomen, the region of cultivation and the year (for buckwheat - 18-28%, for oats - 18 46, barley - 7,5-15, rice - 16-24%). The larger the grain, the smaller it will be, and the more the yield of the finished product.

The flatness is determined by passing through a sieve through a sieve at the same time, and one or two joints are marked as a percentage of the largest residue in the sieve. For processing, the alignment of the grain should be uniform.

The density depends on the chemical composition of the grain and its parts. Well-poured grain has a higher density than unripe grain, since starch and minerals have the highest density. The freshness of cereals is included in the composition (taste, color, smell). A grain that has changed color is called a grain mixture. It belongs to a weak group of strong Willow, in which 3-4% of damaged grains are contained. Under the influence of these ointments, gluten from grains damaged by a steam mist is quickly diluted.

Baked bread has a small volume and porosity, dense, the surface of which is covered with fine cracks, tasteless.

Mycotoxicosis-the defeat of various fungal diseases during cultivation, harvesting, storage of grain. Ergot and smut mentioned above are examples of such diseases. Mycotoxins also form other mold fungi, which can appear on the surface of grains and processed ishlangan products in harmful storage conditions. Aflatoxins, which affect the liver and have a certain carcinogenic effect, are produced by Aspergillus fungi (Asp.flavus and Asp. Parasiticus). Ochratoxins produce penicillin mushrooms. The indicators for the quality of

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cereals for a certain purpose are as follows: grain the nature of cereals, vitreous, gluten.

How to determine the quality of cereals?

The quality of the grain is determined by gluten, more precisely - by its quality and quantity, smell, color and color appearance. This includes such nuances as existing impurities, sprinkled grains and vitreous. The vitreous property of cereals largely determines which class of cereals belongs to. For the first class, the vial should reach at least 70%.

A low percentage of transparency indicates a low quality of grain. In appearance, it is possible to try to determine the level of vitreosity depending on the seeds: if they look crumbly and soft, and the cut line is painted white, this indicates a low indicator. The amount of gluten also determines the culture class. This indicator can be determined by washing the dough. When washing down starch and other substances dissolved in water, pure gluten remains. After drying and processing this protein, you can determine the mass of gluten by weighing the substance. Having calculated the ratio of flour to the total weight, we can draw a conclusion about its class.

The quality of gluten can be determined depending on its appearance. If the substance is light, painted in yellow or gray, then gluten is in order. If the color is dark, then this means that the substance is spoiled. It was improperly stored or developed under the wrong conditions.

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More accurate data is provided by a special IDK-1, which can calculate the stamp index. For the first 4 class, the allowable percentage of weed mixtures is not more than 2. For the fifth class - no more than 5%. In addition to ticks (but not higher than the second level), they do not allow grain to be infected with insects. The check is prescribed for hexachlorophenoxygexane, DDT and their mebolites. Each party should be given a certificate, which must indicate not only toxins, but also mycotoxins, pesticides.

Table of parameters

Device readings in the of conventional	Group quality units	Gluten characteristics
From 0 to 15	Ⅲ	Unsatisfactory strong
From 20 to 40	Ⅱ	Satisfactory strong
From 45 to 75	Ⅰ	Good news
From 80 to 100	Ⅱ	Satisfactory weak
From 105 to 120	Ⅲ	Unsatisfactory weak

The permissible amount of pesticides in accordance with GOST 13586.1: DDT metabolites - up to 0,05 mg / kg, HCCH isomers - up to 0,2 mg / kg. Grain Classi is also determined by the amount of protein present. If the flour enters the Group "A", then this indicator should be from 11% to 17%. The minimum indicator for the first class is 14%. The lower the Protein content,the worse the culture.

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As a result, the quality of bread and pasta cooked from this cereal deteriorates. Its maximum value is 23%, and the minimum characteristic of the 5th grade is only 10% It should be noted that solid varieties are rich in protein.

Permissible quality indicators are easy to find in a special table. Accordingly, the grape content of the willow should be at least 70%, and the humidity should not exceed 14%. The amount of impurities in the grains should be about 5%, and the litter about 1%. Mineral mixtures are allowed less often - only 0,3%. If we talk about broken grains, it should be noted that their number should be very small (only 0,3%). The allowable number of infected seeds is more - 5%. Harmful impurities contained only 0,2%. Bug'd the protein content should be at least 14%. The special device" IDK " should indicate the stamp index from forty-five to one hundred. When determining the quality of cereals, all indicators should be taken into account.

If at least one of the above indicators does not meet the norm, the grain will be transferred to the lower class

Through infection

Seeds of many cereals and legumes, damaged by pests and cereals, are considered to be defective. Restrictive conditions allowed them to be infected only with ticks. Losses in the mass and quality of cereals and products of its processing are huge. They not only consume the grain, but also pollute it, and in some cases make it unsuitable for its intended use. A great danger both at the place of distribution and at the damage caused - barn and rice grass, fine-grained khrushchak, pretens, grain grinder, red flour Eater, Whetstone (bread) moth, shredded fire and bread whites. Grain infestation by pests is characterized by five degrees, depending on the value of the indicator of the total density of infection (the number of copies per i kg).

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• Level I - up to 1 Copy. per kg
II degree-St. I up to 3 index per kg
III degree-St. From 3 to 15 copies. per kg
IV degree-St. In 15-90 copies. per kg
V degree-St. 90 per kg of copies

Contamination of legumes with cereals is expressed in percent in relation to the weight of the test sample (100 g for peas, flour, peas, lupines, wikis); 200 g-lentils, beans, forage).

Vitreous	At least 70 percent
Humidity	No more than 14 percent
Grain impurity	No more than 5 percent
Weed admixture	No more than a percentage
Mineral impurity	No more than 0.3 percent
Damaged and spoiled grains	No more than 0.3 percent
Harmful impurity	No more than 0.2 percent
Smut grain (affected by the discase)	No more than 5 percent
Mass fraction of protein	At least 14 percent
Gluten quality	I - II
Unit readings of the “IDK” device	45-100

By humidity

Humidity of grain is of secondary importance as an indicator of quality: economic and technological. The basis of calculations for the purchase (sale) of grain, as well as for the accounting of grain in public resources, is based on the basic norms of moisture content. For the deviation of moisture from the basic conditions, a discount or privilege is applied to the physical mass in the ratio 1: 1, additionally a fee is charged for drying

With wild grass

Clogging-the amount of impurities in the grain is in percentage relative to its mass fraction

The classification of mixtures in the composition of cereals is based on the printsip: the degree of influence of these types of mixtures on the profitability and quality of the product produced, on the nutritional value of the feed grain.

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From this it follows that the grain mass is divided into three parts:

• main grain grain mixture

• spacing of weeds. Consider these three parts as an example of grain.

• The main grain is whole and damaged grains of. Willow, which, according to the nature of the injury, are not associated with impurities of weed or grain.

• A mixture of wild grass is an organic and mineral rubbish, the seeds of which are all wild plants, seeds of cultural plants that are not classified as cereal mixtures, spoiled grains, harmful impurities.

• It is limited to one percent, which is difficult to distinguish between

Mineral impurity – the permissible amount of stones should not exceed 1%, ergot and smut 0,05%. seeds of poisonous weeds contain no more than 0,3%, Gray feather trichodezma is not allowed. Otherwise, the flour will be unsuitable for food purposes. Scientific research and experience of flour production enterprises have proved that the higher the nature of the grain, the higher it will be ready (with other similar indicators of quality), that is, the more endosperms and less flours are in it, which ultimately determines the flour yield.

Bran The content of barley, which is intended for cooking, cereals, flour and alcohol products, as well as the uniformity and content of fine grains in cereals and legumes, is strictly standardized.

Structure of the core. Closely related to the performance indicators, the size and uniformity is the ratio between the number of flower film and the rest of the grain. The total yield of cereal crops in the processing of cereals and its individual varieties depends, first of all, on the percentage of pure grains and plaques. For this reason, grain grain standards indicate the minimum number

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of cores for conditional cereals: at least 63% for oats, for buckwheat - 71%, for millet and rice - 74%.

According to the harmony of endosperm. Depending on the compatibility of the endosperm, the technological and nutritional value of the grains of some crops varies. For example, rice grains of Mirror consistency are more durable, in the process of processing, a large grain of grain. grain is formed, which when cooking cereals are preserved in full form. The powder smoky grain of the endosperm becomes more brittle and brittle.

Gain evaluation of baked grain

Potential cooking properties (varietal properties) of cereals, the conditions of its cultivation, processing and storage have a significant impact on the quality of future baked bread. Protein substances of high molecular weight of grains have the ability to form a cohesive, elastic and elastic mass, which is called gluten, when mixing dough from flour (food) and water.

The main components of gluten proteins are gliadin and glutamine.

Many factors affecting the composition, properties and quality of gluten are now known. Grain the content of raw gluten in whole grains varies from 10 to 60%. High gluten is grain, which contains more than 28% of raw gluten. Depending on the degree of elasticity and stretch, gluten is divided into three groups:

1. Group I - good elasticity, long or moderate stretching gluten, from which you will get a good form of stability and sufficient looseness of the dough, which will allow you to prepare bakery products with a large volume and porosity;

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2. II group-with a good or satisfactory elasticity of gluten, with a short, medium or long stretch, with a large amount of such gluten, the dough usually has the ability to hold less gas, bread is obtained with a lower volume and porosity, but in most cases it is better;
3. Group III-gluten has a very strong or weak elasticity, very elongated, elongated, torn by weight, floating, as well as crumbly, bread is low porous, slightly voluminous, loose, not meeting the standard requirements.

SUMMARY AND SUGGESTIONS

Grain is considered to be the main branch of our agriculture. It is desirable to properly organize the storage of grain in order to deliver it to the table of grain processing, as well as to monitor all physiological and biochemical processes occurring during the storage period. We have summarized the following using the following observation works as well as the published literature.

1. In the correct Organization of grain storage, it is necessary to pay attention to what purposes the grain will be used in the future.
2. When choosing methods of storage of grain, it is desirable to specify the chemical composition of the grain, as well as the storage periods.
3. It is desirable that the shelf life of seeds grains does not exceed one year. If the year increases, the productivity level decreases sharply, even if the technological indicators do not decrease.
4. When storing cereals in elevators or in specially built cereals, its moisture content, the amount of impurities should not exceed the norm specified in the state standard.
5. If the storage of grain is planned for a long period of time, it is necessary to improve the storage facilities with modern technical processes.
6. When storing grain, it is desirable not to pollute nature, water, both in labor safety and in its cleaning.
7. If the storage of grain is properly organized, the economic efficiency will be high on account of the fact that the quality of the products prepared from it is better, without the quality of the grain being preserved.

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