HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

# METHODS FOR DETERMINING THE TECHNOLOGICAL, PHYSICAL AND MECHANICAL PROPERTIES OF THE DRYING OBJECT (RICE)

**Rakhmonqulov Tursunboy Botirali ugli**
Andijon state technical institute,
Senior teacher +998932530504
rahmonqulovtursunboy@gmail.com

Doi: https://doi.org/10.5281/zenodo.21776989

**Abstract:** In general, rice is a cereal crop. Rice mass is a heap of rice harvested using a cereal combine harvester.From the point of view of storage, the following technological properties of rice mass are of greatest importance: -physical and geometric dimensions of rice and various mixtures;-flowability (mobility) of the rice mass;-self-sorting, density, porosity;-physical and chemical and sorption properties;-thermal conductivity and heat dissipation;-thermal (heat) mass conductivity;-moisture distribution in the rice mass;-physiological - respiration; -continuation of development in rice after harvest;-germination;-vital activity of microorganisms and pests;-spontaneous heating.

**Keywords words and phrases:** physical - geometric dimensions of rice and various mixtures;-flowability (mobility) of the rice mass;-self-sorting, density, porosity; -physico-chemical and sorption properties;-thermal conductivity and heat dissipation;-thermal (heat) mass conductivity;-moisture distribution in the rice mass;-physiological - respiration;-continuation of development in rice after harvest;-germination;-vital activity of microorganisms and pests;-self-heating.

The condition of the rice mass is the main physicochemical properties of rice, which are related to the degree of ripeness and freshness, moisture content, degree and nature of contamination, damage, temperature, pest infestation. to self-heating, drying. The condition of the grain is different and can change depending on the moisture content, degree of contamination, temperature, color, smell, taste. In all cases, the moisture content of the rice is the most important factor. The temperature, pest infestation and especially the quality of the rice depend on the moisture content. The moisture content of the rice is usually divided into four groups: dry, medium dry, wet and very wet. According to the content of various impurities and foreign grains in the rice mass, it is divided into: clean, medium clean and unclean types. As a result of the technical measures taken in the areas of drying and cleaning, the condition of the rice mass can change significantly. This is the main task in storing rice.

Rice quality is a set of characteristics and properties that are capable of satisfying conditional or expected needs.

The linear dimensions of rice are the length, thickness, and width of the grain. Rice, the largest grain of which is less than 3 mm, is called small-grained. The linear dimensions of rice are the main indicator when choosing the dimensions of grain cleaning machines and trier sieves.

Rice and seed size. Data on the size of a single grain or seed are rarely used in practice, but this indicator characterizes the porosity and volume value of the grain mass, which is important in determining the cleaning and processing modes of the grain.

Uniformity is a concept that characterizes the degree of uniformity of individual grains in the rice mass in terms of size, color, moisture, chemical composition, and other indicators. In practice, uniformity usually means the uniformity of equal rice grains. Uniformity is determined by the ratio of rice grains passing through the sieve and the residue.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

The weight of 1000 grains of rice indicates the amount of matter contained in that number of grains, characterizes the size of the rice, and can have different values depending on the mass of harvested rice.

The vitreousness of rice is a varietal characteristic, but it can also depend on the climatic conditions during rice cultivation and harvesting. The structure of rice can be vitreous, floury, or with varying degrees of vitreousness. Vitreousness is measured as the percentage of vitreous grains in rice. It is an important technological indicator of rice, as it affects the quality of rice .

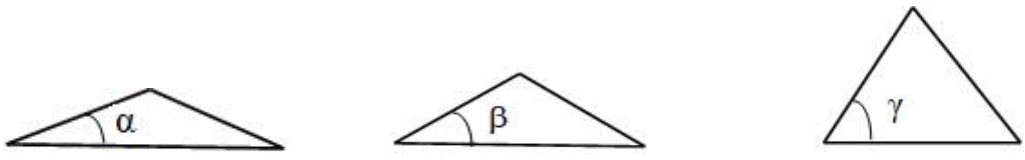
The bulk density of a rice heap is the weight per 1 m3 of volume, taking into account the inter-grain space. The bulk density of a rice heap is the most important indicator characterizing the grain quality of rice. It is known that the bulk density of different varieties of rice is 450…550 kg/m3, as presented in . The value of the bulk density of a rice heap is affected by the following: the shape of the grain, its size, moisture content, density, uniformity, and the composition of impurities. The amount of rice obtained from processing rice increases with the larger the bulk density of the rice heap.

Damage and cracking of rice. During the harvesting, transportation, drying, and processing of rice, some grains are mechanically damaged (scratches, cracks, crushing, fragmentation, embryo breakage). This phenomenon can lead to the death of the grain, and also reduces the viability and shelf life of the grain. - in a word, it leads to a deterioration in its quality. Mechanical damage is especially dangerous for seed grains.

Impurities in a rice heap. Harvested rice almost always contains various impurities. Various impurities appear in the field, during harvesting, during grain transportation, in drying areas, and in elevators. Grain impurities make grain storage and processing difficult, and degrade the quality of the finished product. Various impurities can include: weeds, foreign grains, sand, and stones. Some foreign grains in the rice husk mixture can be used as animal feed, but some can have a negative impact on human health. Sand and stones in the rice husk mixture have negative consequences during the processing process, that is, during the mechanical extraction of rice from rice. In other words, sand and stones reduce the amount of rice that can be processed.

The following main physical properties of rice husk are important in the processes of cultivation, drying, and processing: dispersibility, self-sorting, heat and moisture conductivity.

The dispersibility (spontaneous flow) of rice husk is the property of the grain husk to move under the influence of gravity and fill voids and volumes of various shapes . The magnitude of the scattering of the rice mass is expressed by the natural slope of the pile. The natural slope of the pile is the angle α β γ between the base and the side of the rice pile when the rice is freely spilled onto a horizontal plane (Figure 1.5).



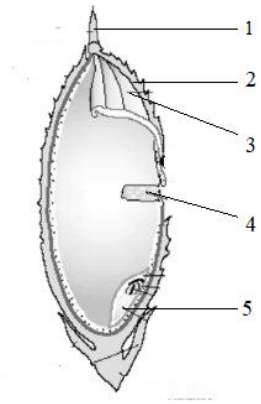

a) b) c)

a-for beans; b-for wheat; c-for rice

**Figure 1.5. Natural slope angles for different grains**

According to the analysis of the natural slope angles for different grains shown in Figure 1.5, it can be seen that the natural slope angle of the rice heap is larger than the natural slope angles of the bean and wheat heaps, that is, $\alpha < \beta < \gamma$. The fact that the natural slope angle of the rice heap is larger depends on the structure of the rice (Figure 1.6).

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr




1-stalk; 2-husk; 3-shell; 4-endosperm; 5-embryo.

**Figure 1.6. Structure of rice**

1. Bekkulov B.R., Rakhmonkulov T.B. Determining the specific heat capacity of a rice field. Materialy mejdunarodnoy nauchno-prakticheskoy conference "novye vozmojnosti ustoychivogo razvitiya gornykh regionov: innovatsii i sotrudnichestvo", postvyashchyonnoy 60-letiyu Oshskogo teknologicheskogo universiteta imeni M.M. Adysheva. Kyrgyzstan, Osh 2023. P.142-147.

2. Bekkulov B.R. Development of construction of rice drying device and justification of its parameters. Dissertation of Doctor of Philosophy in Technical Sciences. Namangan - 2020.

3. Bekkulov B.R., Rakhmankulov T.B. Methodology for developing the structure of the rice drying device and justifying its parameters. Monograph. "Number one" publishing house. Andijan, 2021.

4. Agapkin A.M. Fizicheskie svoystva zernovoy massy i ix znachenie pri rabote s zernom. Vestnik REU G.V. Plekhanova, 2018, No. 2(98), str. 227.