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SOME FEATURES OF BARLEY PROCESSING

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Key words: hull-less barley, groats, flakes, modes of processing, scheme of processing.

Today in the world there is a transition to a less complex and more energy efficient technologies which allows obtaining products with high yield and nutritional value. The basis for the creation of new food products with improved properties are new specially bred by breeders grain crops. Among which can identified hull-less varieties of barley.

Hull-less barley has a high groats processing potential and almost total absence of hard floral hulls, allows to its processing in cereal products by reduced technological process. Y.V. Kolmakov and N.I. Anyskov studying the processing of barley grains found that in its processing yield of groats can reach 79-84 %, while L.V. Rukshan and others found that the main stages of processing hull-less barley into groats are grain clearing stage, water heat treatment by method of cold conditioning and pearling.

The main advantages of hull-less barley are excellent chemical composition. Studying the different varieties of showed that hull-less barley grain has a mass fraction of protein 13-16 % that prevails by its number of hulled grains 11-13 %. An-

other important factor for cereals, which are used to create products with special purposes (dietary, medical, functional) is the presence of non-starch polysaccharide β -glucan. It is known that among other crops, barley grain contains the largest mass fraction of this substance – 3,5-5,7 %, at the same time research findings Y.L. Yin and others show more mass fraction of β glucans in hull-less barley grain 4,0-7,0 %. As revealed research conducted by A.A. Gryaznov and others hull-less barley contains more vitamin E (44.96 mg / kg) and B5 (50.31 mg / kg) and has a slightly lower content of vitamins B1 (2.45 mg / kg) and B2 (0.81 mg / kg) compared to hulled grain. Considering it hull-less barley grain are widely used for the production of daily food products in Japan, China, Pakistan, Nepal, Afghanistan, while in Europe this more grain used to produce functional products.

In Ukraine hull-less barley grain is a relatively new culture which is not widely used for production of groats products. Breeding of food varieties of hullless barley engaged in Odessa Plant Breeding and

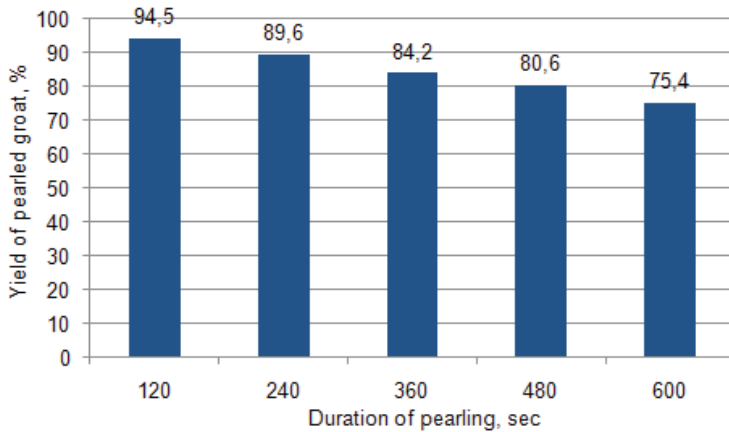


Figure 1. Influence intensity of pearling hull-less barley with a moisture content 12% on yield of groat

Genetics Institute, where under the guidance of D.Sc. Rybalka A.I. two modern food cultivars of hull-less barley «Achilles» and «Gladiator» were bred.

Cultivar of hull-less barley «Achilles» was cultivated in Odessa region, Ukraine in 2016...2018 years were selected for the researches..

Studied hull-less barley characterized by high protein content 14,6-15,8 % and β -glucans – 6,8-7,4 %, has same to conventional dehulled grain mass fraction of lipids 2,1-3,8 % and starch – 57,6-60,5 %, low ash content 2,3-2,7%. Naked oats grain traditionally characterized by high mass fraction of lipids – 6,0-6,3 %, high mass fraction of protein – 14,9-15,4% and β -glucans – 6,4-6,9% close to conventional dehulled grain mass fraction of starch – 59,3-61,6 % and ash – 2,1-2,3 %.

Pearling is the main technological operation during processing of hull-less barley and naked oats. This operation

allows obtaining high yield of a kernel and also ensures the production of products with regulated indicators. The research of influence intensity of pearling on yield of groat and changes in mass fractions of ash, protein and β -glucans were conducted. The results of research of influence intensity of pearling naked oats and hulless barley on yield of groat with a moisture content 12% are presented in Figure 1.

It was found that the technologically expedient moisture content of hull-less barley before pearling is 12-13 %. In the pearling the grain with this humidity depending on the duration of pearling yield of groat estimated to range between 67-96 %. Increasing moisture content of grain before pearling to 14,0% does not significantly change the limits of yield values, and pearling grain with low moisture content of 10,5% leads to excessive grinding and formation of a significant amount

of by-products and waste in the form of fine particles and husking bran.

In the pearling stage of hull-less barley realized by method of intensive abrasion due to the extracting a particle bran parts redistribution of mass fraction of chemical elements are observed.

Depending on the studied mode of pearling were observed overall reduction of mass fraction of ash (in grain barley from 2.4 to 1.1 %) witch explained by removing high in ash outer layers of grain and also mass fraction of protein (in barley grain from 16.1 to 12.8 %) and the mass fraction of β glucans (in barley grain from 7.2 to 4.4 %) witch explained by irregular distribution of grain in the working zone of pearler and in accordance with uneven degree of removal outer layers from grain, removing a certain part of the upper layers of the grain endosperm containing a certain amount of protein and β glucans respectively.

Based on the data structure of processing hull-less barley in groats products were developed which includes grain cleaning stage, grain water heat treatment, pearling, sorting of pearling products, pearled groat water heat treatment, flaking, drying, control of end products.

It is proved the high effectiveness of using naked oats varieties Salomon and Samuel and hull-less barley variety Achilles as raw material for production new groats products with high biological value.

The feature of the developed scheme is significant, in comparison with existing technologies of barley and oats process-

ing, reducing of the technological process – no energy-intensive stages of dehulling, sorting of dehulled products, groats separation stage, pearling using several systems which allows to carry out full cycle production at the plant with low productivity. At this use as raw materials of hull-less barley and naked oats at the recommended modes can increase yield of pearled and flaked groats at 1.5-1.7 times in compared to processing of conventional varieties.

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