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PEARLING OF HULL-LESS BARLEY AND NAKED OATS

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Key words: hull-less barley, naked oats, pearling stage, modes 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 and oats.

The promising and the most common cultivars of naked oats and hull-less barley grown in our country were selected for the researches. Two samples of naked oats cultivars «Salomon» and Samuel were cultivated in Ukraine in 2016...2018 years. Cultivar of hull-less barley «Achilles» was cultivated in Odessa region, Ukraine in 2016...2018 years.

Before pearling stage samples of naked oats and hull-less barley moistening to 12-14 % and then tempering 8-12 hrs. Pearling of oats and barley were carried out in the laboratory dehulling and pearling which used method of intensive abrasion. Samples of naked oats grain pearled for 30 to 180 s with the change interval 30 seconds, hull-less barley – for 120 to 600 s with the change interval 120 seconds.

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 shape of barley and oats contributes to irregular distribution of grain in the working zone of pearler which contributes to the formation fine particles, which are breaking away from grains. Pearling stage realized by method of intensive abrasion impact on redistribution anatomical parts of the grains in which placed the appropriate components of the chemical composition of grains. Therefore, at the pearling stage besides removing of outer layers of grains that contain mostly hard to digest cellulose also occurs partial removal protein, starch, β-glucans, etc. Husking bran of barley and oats obtained after pearling usually characterized by high nutritional value, formed by the high amount of protein, β-glucans, starch, lipids, and vitamins which means that these valuable substances eliminated from groats and its biological value decreases.

It was found that the technologically expedient moisture content of hull-less barley and naked oats 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 and naked oats 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 oats grain from 2.4 to 1.4%, grain barley grain from 2.3 to 1.5 %) witch explained by removing high in ash outer layers of grain and also mass fraction of protein (in oats grain from 15 to 10%, grain barley grain from 16 to 11%) and the mass fraction of β glucans (in oats grain from 7 to 3 %, grain barley grain from 6.8 to 4.5 %) 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.

Regardless of the studied mode of pearling were observed in the pearled barley and oats groat were observed increasing the mass fraction of starch (in oats grain from 60 to 67 %, grain barley grain from to) witch explained by increasing of the mass fraction of endosperm when outer layers from grain were removed.

Analysis of the data shows that pearling of hull-less barley and naked oats with moisture content of 12-13% with milder modes allows obtaining pearled groat with increased yield (75-94 % for hull-less barley та 84-94 % for naked oats) and increased by 1.5-2.0% mass fraction of protein and β-glucans at the same time ash content in pearled groats increased slightly and include 2.3-2.4 % for barley and 2.2-2.3 % for oats.

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