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TECHNOLOGY OF SEPARATION OF SHELLS OF GRAINS AND GRINDING OF GROATS IN CEREAL FACTORIES

N. B. Usmonov

Associate Professor of the Department "Technology of Storage and Preliminary Processing of Agricultural Products" of Fergana Polytechnic Institute

S. A. Sobirov

Master of the M27-24 QXMS and DIT Group of the Department "Technology of Agricultural Products Storage and Preliminary Processing" of the Fergana Polytechnic Institute

Abstract

It is known that in our country, two major categories of grain products are produced in the largest quantities: flour and semolina. The next places are starch, molasses, alcohol and other products. Flour is a product produced in the process of crushing grain. If it is obtained only from the inner part of the grain - the endosperm - this type of flour is called whole meal flour when ground together with the husks and bran. Grains of wheat, rye, triticale, small amounts of oats, buckwheat, barley, corn and other crops are used for flour production.

Keywords: Flour, semolina, grain, grinding process, endosperm, grain husk, grinding process.

Introduction

Cereal is the entire core of the grain or its large pieces after removing the flower, fruit and seed shells, as well as the pulp.

Groats are made from buckwheat, rice, tarik, oats, barley, corn, wheat, peas and corn.

Flour and semolina are the basis for the preparation of countless food products. As a result of their consumption, a person satisfies the need for 30-50% of protein and 20-40% of various necessary biological substances. The most valuable in terms of nutrition is plain ground flour, which is rich in nutrients. In addition, the flour contains fibrous substances due to crushed shells, which affect the release of various slags in the digestive tract and improve the physiological functions of the intestines.

In modern mills, it is possible to develop different types of flour with increased and decreased content of protein, starch, minerals and vitamins.

In the Republic of Uzbekistan, there are high-efficiency mills (mills with a capacity of 250 to 500 tons per day) and grain factories equipped with modern equipment. Up to 75% of high-quality flour is obtained in these mills. Currently, small mills with a productivity of 50 t/milk are being built in our republic.

It is clear that the field of grain processing is one of the most important and strategic areas, and it in turn puts forward the demand for qualified professionals for the successful operation of the system.

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In cereal factories, the outer shells of grains are separated (in millet, oat, barley, and rice, flower shell, buckwheat fruit shell, wheat and corn fruit and partially seed shell, pea seed shell). Peeling is one of the main operations in cereal production technology. The perfection of this operation determines the desired output and quality of the finished product.

The method of dehusking depends on the anatomical structure of the grain: the strength of the attachment of the husks to the kernel, the strength of the kernel, the type of product to be produced (whole or crushed kernels). Depending on the factors indicated in the separation of the shell of the grains, the effect of the working bodies is determined. The chosen method should ensure the formation of a small amount of crushed core during shelling and low energy consumption.

Methods of separating the husks of grains. Many different machines are used to separate the husks from the grain. The principles of operation of many machines can be divided into three main methods of impact of the working bodies on the grain.

Method 1 - pinch and slide;

2 methods - single and multiple hits;

3 ways - friction on abrasive and other hard surfaces.

As a result of compression and displacement, the grain is affected between two working surfaces when separating the shell of the grain. Figure 5. In this case, the distance between the two surfaces is smaller than the size of the grain, and one surface is definitely in motion relative to the other surface. In this method, the grain falls into the separation zone, is squeezed between the surfaces, the shells are cracked, and as a result of the relative movement of the surfaces, the cracked shells (films) are separated from each other and the kernel is freed from the shells. This method is effective for grains whose films have not grown together with the kernel. 1-way exposure is used in three types of machines: a roller deck machine, a shell separator, and a shell separator with rubber coated shafts.

2 methods - single and multiple impacting, shell separation is as follows: the grain, which is overtaken by the whips or plates of the machine, is directed once or many times to the inner surface of the machine.

It is appropriate to apply the one-time shelling method to grains (oats) in which the film has not grown together with the kernel and the kernel is not brittle.

Multiple dehusking can be applied to grains with or without husks. Using this method, if the shell of the grain is separated, the amount of crushed kernel is much larger. This method is used in two cases: grain with a non-brittle (flexible) kernel (oat grain); during processing, groats are obtained from crushed kernels (wheat, barley, corn).

3 method - it is advisable to use the method of friction on abrasive and other hard surfaces to separate the husk of the grains that have grown together with the kernel.

In this method, in the working zone of the shelling machine, the grain is rubbed for a long time under the action of a moving abrasive surface and in a measure the husk of the grain is penetrated. On this principle, the A1-ZShN-3 shell separator-shredder works. Processing the surface of the grain in one plane is used not only for separating the husk, but also for sharpening the core. In the A1-ZShN-3 machine, processing products of barley, wheat, peas and corn grains are dehulled, sharpened and polished (Fig. 1).

Grinding process of groats. In the process of grinding cereals, the fruit, seed shell, aleurone layer and pulp are removed in grinding machines.

As a result of smoothing, the following is provided:

1. To remove shells that cannot be digested by the human body and contain a large amount of fiber;

2. To improve the brand appearance and color of the cereal;

3. Improves the eating properties of the cereal (cooking time is reduced, its volume increases several times during cooking);

4. As a result of removing the outer layers of the pulp and core, which contain a large amount of oil, the shelf life of the cereal increases;

5. When grinding ground cereals (barley, wheat, corn), not only the husks are removed, but also the pieces are given a circular shape.



Figure 1. Overview of the A1-ZShN-3 grain husk separator-thresher machine

In the process of polishing, the outer shells of the core are constantly removed due to the effect of the abrasive surface, the working bodies, the holes of the shaft and the friction of the cores. The grinding process is affected by the design of the machines, the condition of the working bodies, the load on the machine, etc.

A large amount of flour is produced during the grinding process. A large amount of flour is produced by grinding the husk of red rice and ground wheat, barley, and corn groats. In addition, as a result of grinding, a large amount of crushed core is formed.

If the formation of flour is an unavoidable operation, then the increase of the crushed kernel is a non-target appearance. Therefore, it is necessary to use such machines for grinding, which should ensure the required level of grinding with minimal crushing of the core.

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