GRINDING METHODS

PRODUCTS WITH DIFFERENT GRINDING METHODS

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Wheat, the unique heritage offered to us by the soil and the staple food of mankind, has occupied an important place in our nutrition chain for thousands of years. Wheat and cereal products, which rank first among food sources, have played an important role in shaping human history. The wheat plant, which is the most important species that affects the ecological tolerance in the World, after human beings, is planted on approximately six million square kilometers in the world. In addition to being the main source of starch and energy, wheat consumption has increased to 66.8 kg/person globally due to its protein, vitamins, dietary fiber, phytochemicals and antioxidant activity necessary for human health.

Wheat and wheat products are the raw material of many foodstuffs such as flour, semolina, bran, crumbs, gluten, germ and starch. It is estimated that there are 15 species and around 30 thousand wheat varieties. Economically, wheat varieties are divided into three; durum (triticum durum), bread (triticum aestivum) and biscuit (triticum compactum). Bread, pasta, biscuits, cakes and crackers with high commercial value are obtained from wheat and milling products with different characteristics.

Wheat grain consists of a multi-layered structure; embryo, endosperm, aleurone layer, pericarp (inner shell) and seed coat are some of these layers. In general, wheat grain consists of bran (14.5%), endosperm (83%) and embryo (2.5%). The purpose of milling wheat is to separate the flour or semolina (endosperm) from the husk and embryo layers. Wheat grain is separated into bran, flour and germ by milling, and the chemical composition of these separated parts varies.

The history of milling

It has been determined that the beginning of the milling process was thousands of years ago in Göbeklitepe, known as the zero point of history. It is found that the homeland of wheat is the Mesopotamia region and especially Şanlıurfa, and in many sources, the goddess of grain is depicted on cylinder seals. In Mesopotamia, there are many evidence of a rich variety of breads, and in Çatalhöyük, findings proving the existence of bread wheat dating back to 9 thousand years ago were obtained. The center of grinding has been identified as Şanlıurfa Göbeklitepe, known as the zero point of history. It has been observed that the first grinding technology was used in Şanlıurfa Göbeklitepe in Mesopotamia 12,000 years ago, when human beings gathered wild wheat and barley varieties during the hunting and gathering period and ground them with grinding stones. Apart from hunting, scientists have also determined that they consumed fermented foods by leaving the wild grains they grinded to fermentation.

Mills are one of the oldest traditional production structures. Approximately 2300 years ago, rotary stone mills powered by human and animal power were discovered. Grinding became an industry between 1850 and 1900 and its use on this scale began in France and Hungary in the 19th century. Pneumatic conveying became widely used in industry in the 20th century and computers were used to control the process.

Processes in wheat processing

The two main products obtained by milling wheat grain are wheat flour and bran. For the miller processing the wheat, quality means that the wheat has a high yield of white flour and milling quality but low energy consumption. Wheat flour yield is an important characteristic not only for the milling industry but also for wheat quality.

The main processes of wheat processing in the milling industry can be categorized under three headings. First stage: Preparation

of wheat by receiving and storing, cleaning and separating from foreign materials, ragging, washing and tempering if necessary. In the second stage, the grinding process is carried out with the help of crushing and refining rolls and sieving equipment, and semolina-sandmeal purification devices. The last stage is flour storage and blending. All these process steps performed during the processing of wheat affect the qualitative and quantitative properties of the milling products to be obtained.

Milling techniques can be analysed under the headings of dry, semi-wet and wet milling. The purpose of dry milling is to produce high quality refined or whole grain flour. Dry milling, or milling in general terms, involves the processing of cereal products, especially wheat, which are annealed in the 14-18 percent moisture range, into flour or semolina, more often using roller milling systems.

Semi-wet milling products are used to produce corn grits used in breakfast cereals and snack formulations. The moisture content of corn varies between 20-30 percent in the milling process using pin/needle, hammer or roller milling systems. In the dry and semi-wet milling technique, the size of grain products is reduced in a controlled manner. Simultaneously, the anatomical parts are purified to obtain flour or semolina as the main product and bran and germ as by-products.

Wet milling is the industrial separation of the main components of cereals or pseudo-cereals by physical, chemical, biochemical and mechanical processes. The wet milling technique takes place in an abundant aqueous environment. Wet milling technology of pseudo-cereal proteins can be performed under different conditions to produce protein additives with high functional properties.

While the main chemical components of the cereal grain cannot be obtained separately in dry milling technique, some grain parts of the cereal grain such as germ and bran and some chemical components such as protein and starch can be obtained separately in wet milling technique. While wet milling requires the use of

large quantities of clean water, dry milling uses lower quantities of water than wet milling.

In the milling industry, the main objective is to provide the customer with a product of specific quality and to efficiently separate the main parts of the wheat grain (bran, embryo and endosperm). For producers who process wheat into the final product, quality is the chemical, rheological, physical and physicochemical properties that best suit the product.

Maintaining the stability of important criteria for milling such as ash, yield and capacity is important for the sustainability of mill performance. Factors affecting the grinding performance in the mill are the distance settings of the rolls used in the grinding process, sandblasting of the lyso rolls at certain intervals and sieve performance.

Bastak's role in simplifying milling process

By using experimental milling methods (AACC 1983, 26-20, 26-21, 26-30), commercial milling performance of wheat can be determined with the help of laboratory research mills. With Bastak brand laboratory mills, it is ensured that the values of the raw materials to be milled in the factory are determined in advance and necessary changes and arrangements are made in the process.

Bastak Company: Bastak Brand 4000, 4500, 4500S, 1800, 1600, 1650, 1900 and 1900S model roller, crushing, hammer, disc, laboratory mills, is the only manufacturer in the world with such a rich variety of laboratory mills.

With the aforementioned different types of mills, physical, chemical, microbiological, physicochemical, photochemical, rheological and organoleptic tests, especially moisture, can be performed in the grain, flour and feed sectors. Apart from the sectors mentioned above, our mills are also used in many other sectors required by the industry. In addition to the many different laboratory mills Bastak manufactures, Bastak manufactures a total of 52 types of laboratory equipment, exports to more than 150 countries without interruption and has more than 20,000 devices in operation worldwide. Raw materials and semi-finished products, whose economic value is known to be very high in the global market, are classified with Bastak Laboratory Mills and other quality control devices. Thus, Bastak automatic sampling systems, mills, quality control devices and analyzes are used to direct the trade worth billions of dollars in the world.

In addition, Bastak brand laboratory mills have received the ICC standard and have been offered to the use of all universities, academicians, research centers and international quality control laboratories in the world. Thus, the results obtained from these mills have become indisputably accepted in the world. With the values obtained from these mills, starting from the analysis of the raw material at the entrance of the factory, the quality control of the semi-finished product and the finished product, if any, is carried out and a negative situation is prevented in the production of millions of dollars.

Also, the raw materials purchased by pre-production companies by giving millions of dollars are classified with the help of our laboratory mills with sensitive international standardization and their economic value is determined and according to these values, the products are stored correctly without mixing. Again, if the pre-production companies detect any quality problem in the products in their warehouses, they can use Bastak brand laboratory mills to determine the mixing ratios of the quality products and the poor-quality products.