

From Durum to Pasta

MILLING

PASTA MAKING

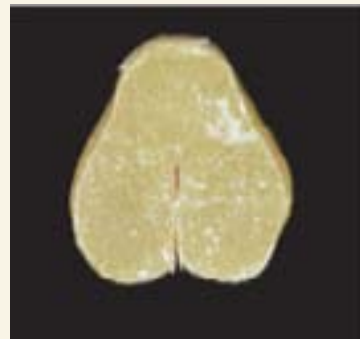
There are fundamental differences between milling common wheat and durum wheat. While common wheat is milled to produce flour, the objective of milling durum wheat is to produce semolina and minimize the production of durum flour. Semolina is the coarse, granular particles of endosperm used for pasta processing.

A high quality pasta product begins with high quality raw material. Durum wheat is ideally suited for pasta because of its unique color, flavor and cooking qualities. Durum is also used to produce couscous and durum hearth breads.



Durum Wheat

Canada is a supplier of high quality amber durum wheat. Canada Western Amber Durum (CWAD) produces a high yield of semolina, with excellent pasta properties.



Amber Durum Kernel Cross-section

The kernel of durum wheat is a store-house of nutrients that requires careful processing to separate them into their component parts.

Amber durum wheat is different from most common wheats. Its kernels are larger and longer and the endosperm is especially hard and yellow in color.

Wheat Intake

Incoming wheat is weighed, sampled and analyzed, passed through a preliminary cleaner and magnet, then stored according to grade.



Cleaning

Meticulous cleaning is required for durum wheat. Cleaners remove weed seeds, dirt and other extraneous material through machines which separate by size (separator), specific gravity (destoner and gravity table), and shape (indented cylinder). Frictional cleaning equipment (scourers) scours the surface of the kernel, removing the outermost layers of the bran.

Tempering

During tempering, water is added to toughen the outer bran coats for easier separation from the endosperm. Tempering also mellows the endosperm for grinding. Traditionally, durum wheat is tempered for a relatively short time. However, new technology in pasta manufacturing now enables finer semolina to be used, allowing for longer tempering periods.



The Milling Process

Milling is essentially a process of grinding and separating. Grinding is done on break rolls, sizing rolls and reduction rolls. Separation is done using machines called sifters and purifiers.

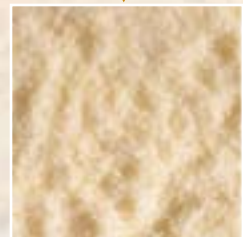
A durum mill has an extended break system in which grinding is relatively gradual. The endosperm is released in coarse granular form rather than as flour. The grading, purifying and sizing systems are more extensive in a durum mill, but the reduction system is very small compared to that of a flour mill.



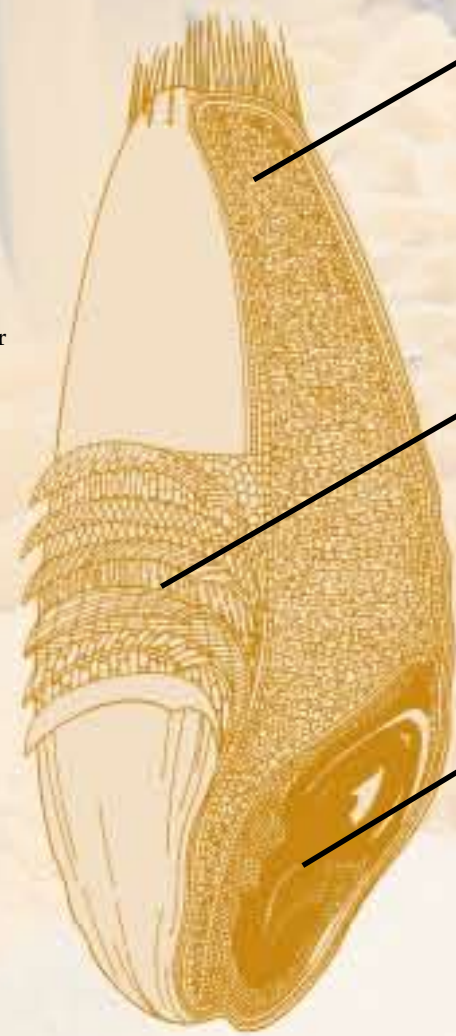
Semolina

Semolina, the main product of durum milling, is coarser than the flour produced in common wheat milling. Desirable characteristics for semolina include good color, minimum dark or bran specs and uniform granulation.

Small amounts of fine semolina and flour are produced. These are often combined with semolina to produce blended material which can be used for a wide range of long and short pasta goods.



Amber Durum Wheat Kernel



Endosperm

Semolina is made from the endosperm which makes up about 83 per cent of the wheat kernel and is composed of starch and protein.

Bran

Although bran and wheat germ are by-products of the milling process, both contain valuable nutrients. Bran is used in animal and poultry feed.

Germ

The germ or embryo is the sprouting portion of the seed. It is separated in the endosperm and sold as a nutritional component for human and animal use.

Pasta processing photographs courtesy of the Canadian International Grains Institute; the Grain Research Laboratory, Canadian Grain Commission; Borden Foods Canada; and Tony Nardella. Diagram of amber durum wheat kernel courtesy of the Grain Research Laboratory, Canadian Grain Commission.



Mixing

Semolina is mixed with water to form a lumpy dough. The dough is not fully developed until it passes from the mixing chamber into the extruder.



Extrusion

Dough is forced through various shaped dies, under very high pressures, to produce a wide range of different shapes of pasta products. The extrusion chamber is designed to draw off heat generated by the pressure and friction created during the extrusion process.



To prevent the pasta from sticking together in the drying process, long pasta is subject to a blast of air immediately after extrusion. Short pasta is transferred to a shaking pre-dryer to ensure it is separated.



Drying

Drying is a crucial part of the process for production of high quality pasta products. Humidity, air flow and temperature are carefully controlled as the pasta passes through several dryers. Modern high temperature drying systems improve pasta color and cooking quality. In the final stage of drying, cooling chambers return the dried pasta to normal atmosphere conditions. In general, the product is dried to a moisture level of about 12 per cent. The total drying time can take from six to 24 hours depending on the drying technology used.



Packaging

Following drying, the pasta is cooled, stored, cut and then packaged.

There are two main types of pasta - dry and fresh. Most durum semolina is used for the production of dry pasta.

DRY PASTA



Long Products

The highest quality durum semolina is needed for long pasta products. It must be free from specks and exhibit a bright yellow color. Long products, such as spaghetti, are consumed in markets worldwide.



Short Products

Short pasta products tend to be easier to make and do not need a lengthy drying time. They can be made from pure semolina or a granular blend of durum semolina and flour. Short products, such as macaroni, are consumed in markets worldwide.

FRESH PASTA



Fresh pasta has become more popular in recent years. Unlike dry pasta, which is extruded, fresh pasta is most often processed by sheeting and cutting similar to the process used for noodles. Drying is not necessary. The addition of eggs in fresh pasta shortens its shelf life. Refrigeration is required due to its high moisture content. Consumption of this product is more prevalent in developed countries.

COUSCOUS



Couscous is prepared from steamed durum semolina and is usually served with spices, vegetables and meat. A staple in most parts of North Africa, couscous requires a high quality durum semolina.