

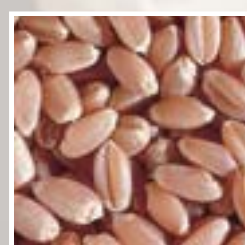
From Wheat to Bread

FLOUR MILLING

BREAD BAKING

Flour is produced by separating the endosperm from the other components of the wheat kernel and reducing it to a fine powder. Protein quantity and baking characteristics are important considerations in selecting wheat for bread flours. Canada Western Red Spring (CWRS) wheat is recognized as a premium wheat for bread production.

Wheat flour is unique among cereal flours. When mixed with water, the protein in flour forms gluten, creating an elastic dough capable of holding gas. Properly mixed, gluten produces desired loaf volume and crumb structure in baked bread.



Wheat Intake

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



Wheat Kernel Cross-section

The kernel of wheat is a storehouse of nutrients that requires careful processing to separate it into its component parts.



Methods & Ingredients

A good quality, consistent flour is key to the quality of the finished product. While bread is made by many different baking processes, the common objective is to develop the gluten. All methods are a combination of five basic processing steps:

FOUR BASIC BREAD TYPES

PAN BREADS



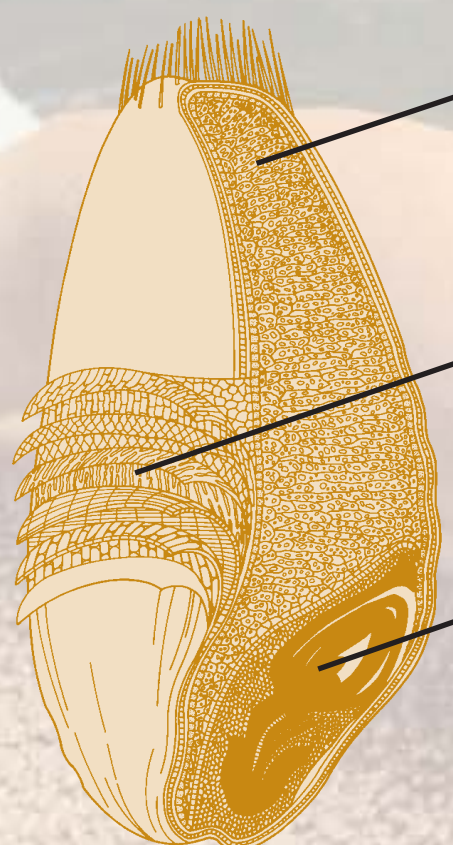
Pan breads usually require medium protein levels since the pan supports the loaf size and structure. They are typically produced in highly mechanized operations and are consumed in most markets around the world.



Cleaning & Tempering

Cleaners remove weed seeds, dirt and other extraneous material through machines which separate by size (separator), specific gravity (destoner) and shape (disc separator). Frictional cleaning equipment scours the surface of the kernel, removing surface contamination and the outermost layers of the bran. During tempering, water is added to toughen the outer bran coats for easier separation from the endosperm and to mellow the endosperm for grinding.

Wheat Kernel



Endosperm

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

Bran

Bran is removed from the kernel and used in animal and poultry feed or combined with the endosperm to produce whole wheat flour.

Germ

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

1. Mixing

Flour, water, yeast and other ingredients are mixed to form a dough. Mixing develops the gluten in the flour for optimum gas retention at later stages of proofing and baking. Mixing incorporates air into the dough. In some processes, additives included at the mixing stage reduce or eliminate fermentation time.

2. Fermentation

Yeast organisms feed on sugars and produce carbon dioxide which expands the volume of dough. As fermentation proceeds, the gluten is conditioned and mellowed and becomes elastic.

3. Make-up

Dividing is the process that separates the bulk dough into pieces of the correct weight. Rounding removes the stickiness and restores a smooth surface to the dough pieces. The dough is allowed to rest after rounding in a process called intermediate proofing, which makes it easier to machine. The dough is sheeted into a flat piece, moulded into the desired shape and transferred for final proofing.

4. Final Proof

Generally, the dough is placed in a fermentation cabinet under constant temperature and humidity. Under these conditions gluten regains its elasticity. As fermentation continues, the dough increases in volume.

5. Baking

Baking transforms dough into bread. In the oven, the dough expands, takes on a stable shape, develops the desired flavor, and forms a crust. After baking, the bread is cooled and may be sliced and/or packaged.

HEARTH BREADS



Hearth breads can be small rolls or large loaves and usually need medium to high protein flour to provide the necessary volume. They are consumed in markets around the world.

FLAT BREADS



Flat breads are common in the Middle East and Indian subcontinent. They are usually made from wheat with lower levels of gluten strength.

STEAMED BREADS



Steamed breads are a major baked product in China and other Asian countries. The flour needs to be highly refined to provide the desirable bright, white color.

The Milling Process

Milling is essentially a process of grinding and separating. Grinding is done on break rolls, sizing rolls and reduction rolls to reduce the endosperm into flour. Separation of the different sized flour particles is done using machines called sifters and purifiers.

Flours

Different flour separations may be combined to produce many different types of flour, including household flour, bakers' flour and noodle flour. Flour can be produced either by blending wheats at the milling stage, or by milling wheats separately and blending the resulting flours to meet customer specifications.

Flour Treatment

In some mills, flour is bleached immediately after it is milled. Flour may also be enriched to put back vitamins and minerals removed in the refining process. The flour is now ready to be packaged and sent to the bakery, store or warehouse.

By-products

Most of the endosperm is recovered as flour. Germ, bran and unrecoverable endosperm are sold as by-products, usually for animal feed.

Milling and baking photographs courtesy of the Canadian International Grains Institute; the Grain Research Laboratory, Canadian Grain Commission; Multi-Marques Inc.; Dover Flour Mills; Tony Nardella; and CWB collection. Diagram of wheat kernel courtesy of the Grain Research Laboratory, Canadian Grain Commission.

Canadian wheat is the product of a combination of plant breeding to meet market needs, careful varietal testing and registration, world-class management by farmers and adherence to the strict quality standards of millers, bakers and other processors.



Photo credits from top to bottom: Chris Yauk; George Siamandas (2); and the Grain Research Laboratory, Canadian Grain Commission. Cover photo by Robert Tinker.



Canadian Wheat

THE MILLING & BAKING PROCESS



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