

Practical technology from Lallemand Inc., parent of American Yeast Sales, producers and distributors of Eagle® yeast, fresh and instant.



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Flour Tortilla Production

TORTILLAS WERE traditionally made from corn, but today wheat flour tortillas are increasing in popularity in the United States. There are three methods for forming the circular-shaped piece of dough: hot-press, hand-stretch, and die-cut. The hot-press operation is growing at the fastest rate because it is the most suitable for automated production of tortillas with the desired characteristics and consistent quality.

HOT-PRESS PROCESS

Mixing the ingredients into a smooth dough of the right consistency requires water absorption to be around 750 Farinograph Units. Lower water absorptions will give stiffer doughs, which are more difficult to press and yield tortillas of inferior quality. Higher water-absorption levels result in tortillas with a more desirable silky and soft texture with many layers, but may also cause machinability problems because the dough pieces will become too slack and sticky. Undermixed doughs give tortillas with smaller blisters, whereas overmixing causes machinability problems due to sticky doughs. Normal dough temperatures for hot-press wheat flour tortillas are 90° to 100°F. Lower dough temperatures increase water absorption and yield softer tortillas but also slow down dough relaxation and increase resting time.

Dough dividing, rounding, and resting take place immediately after mixing. Scaling weights normally vary from 1 to 2 ounces, depending on the desired size (diameter) of the tortilla. The dough pieces are usually transferred to an overhead proofer for a short resting period where they become less elastic and more extensible. A proper relaxation of the gluten protein in the dough pieces facilitates pressing, while improper relaxation results in irregular-shaped tortillas with translucent areas and less puffing.

Pressing takes place by transferring the relaxed dough pieces onto a heated conveyor that moves them under a hydraulic press that operates at 350° to 450°F with 400 to 1,100 pounds per square inch of pressure. During pressing, a thin skin is formed on the surface of the raw tortilla that seals it to limit the release of steam and carbon dioxide. This causes the tortilla to puff and expand into a balloon shape during the subsequent baking.

Baking takes place in a three-level tortilla oven. The tortillas are baked for approximately 40 seconds at temperatures of 375° to 500°F. The tortillas start at the top level of the oven, then are flipped over to the middle oven level, and then are flipped again onto the lower conveyor before they leave the oven.

Cooling is required to keep the tortillas

from sticking together in the package. This is achieved by transporting the tortillas over multilevel conveyers. Proper cooling limits the loss of moisture from the baked tortillas.

Packaging the tortillas in plastic bags limits further moisture loss. Since tortillas are mold-free directly after baking, avoiding contamination during cooling and packaging is important for controlling their mold-free shelf life.

INGREDIENTS

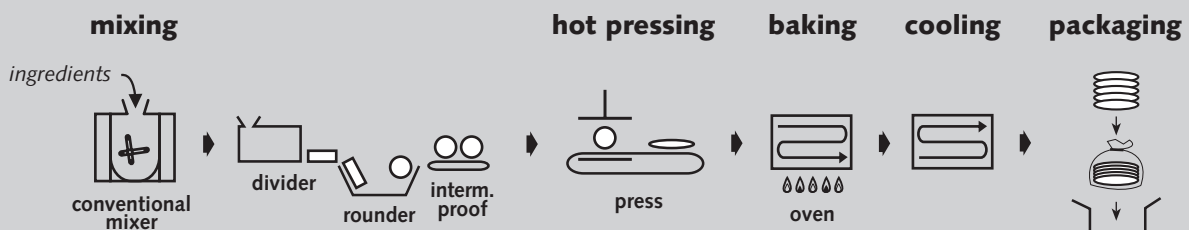
Flour for hot-press tortillas should have a protein content of 9.5 to 11.5 percent. Weak flours with low gluten content give tortillas of inferior quality with unsatisfactory tearing quality that easily crack and split after overnight storage. Strong flours, on the other hand, require extended mixing times and resting times before pressing.

Fat improves machinability by reducing dough stickiness. High-shortening doughs are less elastic and more extensible and therefore easier to press. High levels of shortening are also essential to prevent the tortillas from losing their ability to be folded without cracking.

Emulsifiers with good dough stabilizing effects, such as sodium stearoyl lactylate (SSL), are used to improve dough machinability and tortilla texture. Emulsifiers with good starch complexing properties, such as

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TORTILLA HOT-PRESS PRODUCTION PROCESS



TORTILLA FORMULAS

INGREDIENT	REGULAR	LOW-FAT	NO-FAT
Flour	100	100	100
Water	53.33	58.66	55
Shortening	10.0	0.67	–
Sodium stearoyl lactylate (SSL)	–	0.50	–
Sodium metabisulfite	30 ppm	–	–
Nonleavening yeast (Fermaid® T)	–	2.0	1.0
Salt	1.67	1.67	2.1
Sugar	0.83	0.83	–
Gum	0.19	0.19	–
Baking powder	2.67	2.67	2.0
Sorbic acid	0.67	0.67	0.325
Fumaric acid	–	–	0.325
L-cysteine	–	–	20 ppm
Glycerin	–	–	3.7
Modified starch	–	–	7.45

Flour Tortilla Production (Continued)

distilled mono- and diglycerides, are added to prevent the tortillas from sticking together in the package.

Preservatives are generally added to extend mold-free shelf life. It is important to control the final pH of the tortilla, since preservatives like propionates and sorbates lose their effectiveness above pH 6.0 to 6.5. Since sorbates are more effective than propionates from pH 5.5 to 6.5, it is advised


to use sorbates instead of propionates in this pH range. When using baking powder it is best to use sodium propionate instead of calcium propionate, because calcium can interfere with the baking powder salts.

Baking powders based on sodium bicarbonate and appropriate amounts of leavening acids like monocalciumphosphate (MCP), sodiumaluminumphosphate (SALP), or sodiumaluminumsulphate (SAS) are gen-

erally used at levels between 1 and 3 percent. Baking powders affect the puffing of tortillas during baking and also influence the pH of the tortilla. A high pH improves dough consistency and tortilla quality, but a low pH is required for extending the mold-free shelf life of tortillas. Although some tortilla formulations use yeast instead of baking powder for leavening, the primary reason for adding yeast is to improve the taste and flavor of the tortilla.

Reducing agents are used to improve dough machinability and to reduce resting times by increasing dough extensibility and reducing dough elasticity. This is achieved by adding compounds that break or block disulfide bonds in the gluten protein. These include L-cysteine, glutathione (present in nonleavening yeast), fumaric acid, sorbic acid, and sodium (bi)sulfite.

Other ingredients are used for tortillas such as salt (usually 1 to 2 percent on flour weight) and fat replacers, which help to keep the low-fat and no-fat tortillas soft and prevent them from becoming brittle and developing cracks when folding. These fat replacers, usually based on wheat gluten, fibers (soy, oat, pea, etc.), starches, gums, or nonleavening yeast, help to increase water absorption and prevent excessive moisture loss during baking.

The above table gives some guidelines on how to change a regular tortilla recipe into a low-fat or no-added-fat formula. 

Fermaid® T

FERMAID® T is a natural dough conditioner from Lallemand/American Yeast that functions as a unique dough relaxer and fat replacer in regular and low-fat flour tortillas.


Fermaid® T is a nonleavening dry yeast product processed to maximize available glutathione—a naturally occurring yeast peptide. The dough-relaxing effect is attributed mainly to the release of low molecular weight SH compounds from the nonleavening but still intact yeast cells. Fermaid® T also binds water (approximately two parts of extra water can be added for one part of Fermaid® T), which helps to keep the tortilla soft and pliable during storage. Unlike chemical reducing agents such as L-cysteine and sulfites, Fermaid® T doesn't reduce shelf life stability (rollability over time) of wheat flour tortillas.

Fermaid® T provides the following improvements in quality of hot-press wheat flour tortillas:

- Improved taste and flavor.
- Improved machinability and reduction in resting time.
- Improved shelf life stability (rollability over time) and overall quality of low-fat and no-fat wheat flour tortillas.

In addition to Fermaid® T, Lallemand/American Yeast offers a full line of ingredients used for tortilla production:

- Shortenings
- SSL and monoglycerides
- Sorbic acid
- Calcium and sodium propionate
- Baking powders
- L-cysteine tablets
- Sugars and syrups
- Guar gum

All of these ingredients are backed by technical support from experienced bakery technicians. 

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BAKING UPDATE

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LALLEMAND Inc.
1620 Préfontaine
Montréal, QC H1W 2N8 CANADA
tel: (800) 840-4047 (514) 522-2133
fax: (514) 255-6861

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