

BAKING UPDATE

Pie Crusts

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



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Pie Crust Production

PIE DOUGH is the simplest form of dough, combining flour, fat, salt, and water. The filling is the predominant portion of the pie and consequently will affect the pie's character. Yet the crust greatly influences the pie's overall quality and eating properties.

PRODUCTION PROCESSES

Pie dough is normally produced with a two-stage process. First the flour and fat are blended. Then the liquid, usually ice water, is added and mixed very gently without developing the gluten protein into a cool (less than 70°F), cohesive dough. The texture of the pie dough is achieved through the fat/flour blending stage, which dictates the final absorption.

After mixing, the dough is retarded for several hours or overnight. Retarding the pie dough ensures complete water absorp-

tion by the flour, allows the flour enzymes to modify the dough, reduces shrinkage, and improves the crust tenderness. Unbleached flours with lower proteins or blends of bread and cake flour are best suited to pie products.

For small operations, scaled dough balls are pressed into the pie plate with a fitted plate that forms to the shape of the pie pan. A major problem when producing pie crusts this way is that the texture of the crusts tends to be mealy rather than flaky.

For larger operations (twenty to thirty pies per minute) the pie dough is sheeted to a predefined width and thickness, then cut into rectangles. The rectangles are transferred to a cross-rolling machine, which further sheets the dough into the correct dimensions for the top and bottom crust. The bottom crust is then deposited into the pan and filled; the top crust is

dropped on, crimped, and trimmed.

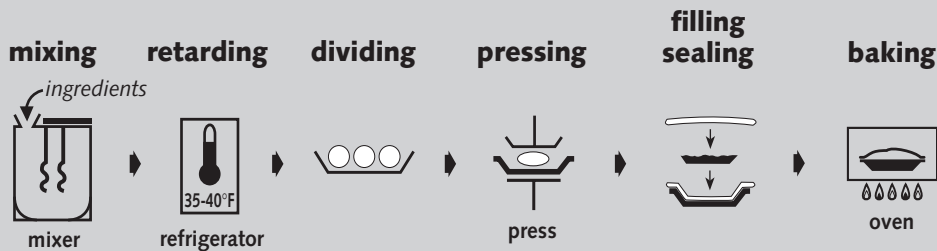
For large-volume operations (up to two hundred pies per minute) the dough is extruded into two continuous dough strips. Once sheeted, the dough is cut into uniform rectangles and further sheeted, usually with a cross-rolling device. The bottoms are then placed in pans, filled, fitted with the top, crimped, and trimmed. Sometimes water is sprayed prior to filling to allow a better seal between the top and bottom crusts. Dusting flour is kept to a minimum; if used, a soft and weak type of flour is preferred.

Baking conditions to be used depend on the type of pie, whether fully baked or partially baked, filled or not filled. For filled pies, a high oven temperature is preferred to a low oven temperature. In a hot oven (450°–500°F) the crust will bake quickly and set before the filling reaches boiling temperature and water starts to evaporate from the filling.

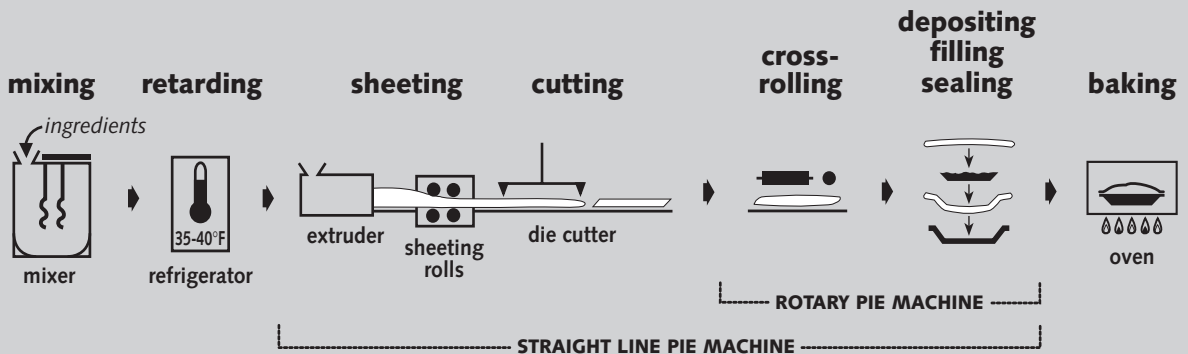
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PIE CRUST PRODUCTION PROCESSES

PRESSED CRUST



ROLLED CRUST



COMPOSITION OF PIE CRUST TYPES

| INGREDIENT | MEALY | MEDIUM FLAKY | FLAKY | LONG FLAKY | FRIED | SHORT DOUGH |
|---------------|---------|--------------|---------|------------|---------|-------------|
| Pastry flour | 100 | 100 | 100 | 100 | 100 | 100 |
| Shortening | 50 – 80 | 60 – 70 | 60 – 70 | 60 – 80 | 30 – 40 | 40 – 60 |
| Sugar | 0 – 2 | 0 – 2 | 0 – 2 | 0 – 2 | 2 – 6 | 2 – 5 |
| Salt | 2 – 3 | 2 – 3 | 2 – 3 | 2 – 3 | 2 – 3 | 1 – 2 |
| Milk powder | 1 – 3 | 1 – 3 | 1 – 3 | 1 – 3 | 1 – 2 | 2 – 4 |
| Baking powder | – | – | – | – | 0 – 1 | 0 – 1 |
| Soy flour | – | – | – | – | 3 – 6 | – |
| Water | 25 ± | 25 ± | 30 ± | 30 ± | 20 ± | 30 ± |

Pie Crust Production (Continued)

INGREDIENTS

Flour. Unbleached pastry flour made from a soft wheat is best for pie dough production. Bread flours with higher protein levels absorb water too quickly, resulting in gluten development and a tough dough. Conversely, cake flours with very low protein absorb water too slowly and yield pasty, sticky doughs.

Fat. Hydrogenated vegetable shortening has replaced lard as the fat of choice today because of its good plasticity, neutral taste, and consumer-friendly label declaration. Plastic shortenings tend to distribute better in the dough, giving the crust a more mealy texture, whereas hard types of fat tend to give a more flaky texture.

Other ingredients. Water (usually cold) and salt (always dissolved in the water) are the other essential pie crust ingredients. Sugar, milk, baking powder, and soy

flour are optional ingredients used only in certain types of crusts.

CRUST TYPES

Mealy crusts are made by blending the fat and flour into almost a paste, which results in a finer distribution of the fat through the flour. When ice water is added and blended for a short period, less water is taken up by the flour particles because they are well-covered by fat. This type of dough yields a pie crust with a fine grain that is more suitable for crust tops rather than bottoms.


Medium flaky crusts are made by blending either half of the fat with all of the flour, or half of the flour with all of the fat. The remaining fat or flour is added with the liquid and mixed again. The resulting crust has a fine, somewhat short texture that cuts more easily than a mealy crust.

Flaky crusts are obtained when the flour

and shortening are blended very coarsely, with the fat lumps smaller than a quarter of an inch. The liquid is added and mixed briefly until it's absorbed and the bowl is free of crumbs. This type of crust is used most by large commercial bakeries for normal pies.

Long flaky crusts are produced using a harder shortening, which is blended very coarsely with the flour, the fat particles approximately one inch in size. The liquid is added to the dough just so it holds together and can be handled. The divided dough is then sheeted rather thickly (two inches), given a threefold as for puff pastry, then rolled again; the process is repeated twice. This yields a very tender and flaky crust with excellent bite and good color.

Fried crusts need a dough with the proper degree of toughness. To achieve the desired dough texture, the fat and flour are blended slightly (if at all) before the addition of the liquid. The dough is mixed at higher speed to produce a more-cohesive dough.

Short crusts are preferred for pies with custard or other high-moisture fillings. The flour, salt, sugar, and shortening are blended into a smooth paste. Warm water is then added and the dough mixed well. The leanness of the dough, the warm water, and the extra mixing cause the dough to dry faster during make-up, creating a water barrier for the custard. 

Pie Crust Problem Solvers


AS THE pie industry changes, many of the traditional ingredients and methods have failed to keep up with the requirements of the new technology. To help bakers produce pies of constant high quality, Lallemand has introduced Fermaid® P to its line of dough conditioners.

Fermaid® P is a blend of deactivated bakers' yeast strain (*Saccharomyces cerevisiae*) and enzymes. Originally designed to reduce shrinkage in pizza dough, lab and field trials confirm the benefits of Fermaid® P to the pie baker. Introduced as a more-natural replacement for L-cysteine and bisulfite in pie dough, commercial trials quickly showed that in addition to reducing crust shrinkage during baking the proper use of Fermaid® P yielded the following benefits:

- Quicker processing of the dough, eliminating the need for dough retarding.

- More-resilient crust with reduced tendency to snap or break.
- Improved machinability with reduced damage related to shearing.
- Improved flakiness and bite with low-fat pies.

The normal usage rate of Fermaid® P varies with formula type and process. As a rule of thumb, for normal pie dough with some rest period, the usage rate for Fermaid® P is 0.2 to 0.4 percent based on flour. For high-speed operations with little or no rest period, the rate is 0.5 to 1.0 percent based on flour. For reduced-fat pies and fried pies, the inclusion rate is 0.5 to 1.0 percent and for frozen pies, 0.3 to 0.8 percent.

Lallemand can provide technical support to help the pie baker optimize the benefits of Fermaid® P in pie production. 

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BAKING UPDATE

Lallemand Baking Update is produced by Lallemand Inc. to provide bakers with a source of practical technology for solving problems. If you would like to be on our mailing list to receive future copies, or if you have questions or comments, please contact us at:

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