

# Chapter 3



## *Yeast and How it Works*

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## ***Yeast and How it Works***

This chapter is in three parts. The first part is about principles--you will learn about yeast and how it works. The second part is about techniques, how to use yeast generally in the making of great breads. In the third part, you will learn to use yeast in particular recipes and applications.

### **Part 1: Yeast and How it Works**

Did you ever wonder why flour tastes like sawdust but a French or Italian bread made with that same flour and little else has a pleasant, sweet taste? It's the yeast.

Yeast is the magic ingredient of the baking world. While the rest of our ingredients are inanimate, yeast is alive and bakers have learned to cultivate yeast as a living thing in their bread and pastry doughs. In this chapter, we will explore the different types of yeast and learn to cultivate yeast in different ways to create different products.

Our grandparents used--and many commercial bakers still use--fresh yeast rather than the dry yeast that we buy in the store. Fresh yeast performs marvelously well but is fragile, must be kept refrigerated, and used right away--hardly the conditions of today's carefree baking.

The yeast that we buy is granular. Each little grain is a manufactured ball of starch or dextrose containing many yeast cells. When these grains are dissolved, the yeast is released into the dough.

The yeast on the grocers' shelves typically comes in two forms: either instant active dry yeast or active dry yeast. The difference is in how the yeast cells hydrate or absorb water. Instant active dry yeast does not have to be hydrated in water prior to mixing as active dry yeast does.

Active yeast is mixed in water, the particles are dissolved, and the yeast is allowed to grow until the mixture becomes foamy. Then it is added to the flour. The cells of instant dry yeast are porous to absorb water and can be put directly in the flour without waiting for the yeast to hydrate.

And yes, yeast is alive. It is neither plant nor animal but a fungus. We add it to the flour in its dormant state and create a growing culture with moisture and the proper temperature. Under the right conditions, the yeast multiplies rapidly and a loaf of bread, when it is ready to go into the oven, may contain millions of live yeast cells.

So how do we nurture these little creatures? Like most other living organisms, they require three conditions for growth: moisture, food, and a hospitable environment. In such an environment, yeast will grow rapidly. Yeast feeds on sugar or converts the starch in the flour to sugar for food. (Without the capability to convert starch to sugar for food, yeast would not thrive in sugar free breads such as French bread.) As the yeast

cells feed, they expel carbon dioxide and alcohol (ethanol). The carbon dioxide gas rises through the bread dough and is captured by the gluten structure in the dough to form gas pockets. The alcohol is evaporated in baking.

The alcohol and other excretions impart a “yeasty” flavor to the dough. Master bread bakers manipulate the ratio of these two byproducts, carbon dioxide and alcohol—usually with temperature and acidity—to control the rise time and the flavors in the breads. In this chapter, you will learn to do the same.

Bread wouldn't be bread without yeast and yeast can't work without sugars. Since yeast is alive, it needs food for fuel, in this case, simple sugars. But flour is mostly starch and table sugar (sucrose) is too complex for the yeast to digest before the sugar is broken down in the biological and chemical actions of the fermentation process. Amylase and invertase, enzymes present in the flour or created by the yeast, break down the starch molecules into sugars. While some of these simple sugar molecules become food for the yeast; others create the sweet flavor we find in a fine bread—even a French bread where there is no sugar added.

Generally, a long, slow fermentation makes for bread with better flavor, texture, and moisture retention. Many fine breads call for “retarding” or slowing down the growth of the yeast with refrigeration. If dough is refrigerated, the yeast grows more slowly. As long as the dough is above 40 degrees, fermentation still takes place but at a slower rate. As the temperature of the dough approaches 40 degrees, the yeast growth slows and stops. When the dough is warmed and the growth of the yeast takes off, there is plenty of sugar present for the yeast and an excess of sugar to sweeten the bread.

## Creating the Right Environment for Yeast

As a baker, you need to know how to create the right environment for the yeast to work in. Let's look at the factors that you need to understand and control to create wonderful breads:

- **Moisture:** You must create a moist environment to dissolve the yeast granules, to hydrate the yeast cells, and to create the right environment for growth. Most of the time, you will want your bread dough as moist as you can handle without being sticky. A bread dough that is too dry will take a long time to rise because the yeast will not multiply as rapidly and because the dry dough is stronger and more difficult to lift. Especially with a bread machine, it is important to measure the amount of water carefully with an accurate measuring cup.
- **Acidity:** Yeast prefers a slightly acidic environment. Our grandmothers discovered they could create that with a tablespoon or two of lemon juice. We recommend that you do the same with a dough conditioner. (A dough conditioner has other conditioning roles.) Try several conditioners until you find the one that works best for you.
- **Saltiness:** Salt impedes the growth of yeast and slows down the rise. Measure salt carefully. An extra half teaspoon of salt will significantly increase the time it takes the dough to rise. Conversely, you can speed up yeast growth with sugar.

- **Temperature:** Yeast is very sensitive to temperature and temperature is a major factor in how fast yeast multiplies. As we discussed earlier, yeast is dormant and will not grow at 40 degrees and grows only slowly at 55 degrees. Yeast dies instantly at 140 degrees. (We recommend not using water warmer than 120 degrees to avoid accidentally killing the yeast.) Between 78 degrees and 80 degrees is an ideal environment for yeast growth.

A thermometer has been called the baker's secret weapon. In all breads, it is very useful to be able to measure the temperature of (1) the water used for mixing, (2) the dough, and (3) the bread as it comes from the oven. If you do not already have one, we recommend that you purchase a good insta-read thermometer either from The Prepared Pantry or elsewhere.

Always add water at the temperature called for in the recipe or the directions for the bread machine. In using a bread machine especially, the exact water temperature is critical to a uniform outcome. In all of our development work, we always chill or warm the water to within one degree of the target. The flour and other ingredients should be at room temperature. Remember, unless we want to retard the growth of the yeast to create more alcohol in the dough, the objective is to create a dough at 78 to 80 degrees. At higher temperatures, the dough may rise too quickly creating a crumbly texture to the bread. At less, the bread will rise more slowly with a higher alcohol content. (A retarded dough with more alcohol has marvelous, complex flavors.)

Bread is baked when the internal temperature is between 190 degrees and 210 degrees. Hard crusty breads must reach 210 degrees to drive enough moisture from the bread to preserve the crust. We recommend that you use your insta-read thermometer to tell when the bread is properly baked.

Understanding yeast and how it works is an essential lesson for the bread baker. Controlling the environment in which the yeast grows is the first step to spectacular bread. You are now equipped to control the moisture, the temperature, and the acidity and saltiness of the bread culture you create.

## *Part 2: Using Yeast to Make Great Breads*

### **How Long Should My Bread Rise?**

It depends. The best way to tell if the dough has risen enough is not by time—though it helps to set the timer so you don't forget about your dough—but by look and feel. It will look soft and bloated. When you touch the dough, it will be soft and your finger will leave an indentation when lightly pressed against the dough. If it is not ripe, the dough will tend to slowly spring back.

If you want light, fluffy bread, the dough should rise until it is puffy. The more gas incorporated in the dough, the lighter it will be. Of course, if too much gas is captured in the dough, it may collapse. The trick is to let the dough rise until you get just to the edge of collapsing and then bake it. In most cases, that means that the dough will double—or more—in volume. With a free-standing loaf, since the pan can't support the loaf, you cannot let the bread rise as much.

How long should it take? A lean, moist dough in a warm kitchen will probably rise in 45 minutes or less. A firmer dough with less moisture will take longer to rise. Yeast is very sensitive to temperature; even a few degrees less in the kitchen can extend the rise time significantly. A change of 17 degrees will cut the rise time in half.

It doesn't hurt to let dough rise slowly. Bread that has risen slowly has a different flavor than fast risers, a more acidic flavor—hence the sourdough flavors in slow rising breads. Conversely, bread that has risen too quickly is not as flavorful and tends to have a crumbly texture.

While lean breads are deliberately retarded to enhance the flavors, rich doughs or doughs with ample sweeteners or flavors will gain little with an extend rise since the flavors and sugars tend to mask the natural flavors of the yeast.

### **Why do We Need to Knead?**

Bread dough needs to be elastic in order to capture the gases created by the yeast, stretch as bubbles form in the dough, expand, and rise. Without that elasticity, bread would not have the open texture we enjoy nor would bread be chewy. But what creates that elasticity?

The endosperm of the wheat contains two important proteins, glutenin and gliadin. When wheat flour is mixed with water, these two proteins link with the water molecules and crosslink with each other as they are physically manipulated by kneading. It takes a certain amount of physical manipulation to bring these molecules into contact and create strong links. As the kneading continues and these molecules create stronger bonds, gluten is formed. It is gluten that gives the dough elasticity.

If you watch the dough being mixed with the bread hook in your stationary mixer, you will see changes occur in the dough as the kneading takes place. First the dough will stick to the sides of the bowl. As the bonds become stronger and the dough more elastic, it pulls away from the sides into a drier ball. The sides should become clean. Within four or five minutes at medium speed, the dough will change even more and become elastic as the gluten is completely formed. After you have watched this process a few times, you will be able to recognize the changes in the dough as the gluten forms. If you pinch a portion of the dough and stretch it, it should pull to a thin layer before it breaks. Without that elasticity, bread isn't good bread.

## Does it Matter What Flour I Use?

As we just explained, gluten is a substance made up of the proteins found in wheat flour that gives bread its structure, strength, and texture. Since all wheat flour (but not oat, barley, rye, or rice flours) contain the proteins to form gluten, how is it then that we can use flour to make both a tender cake and firm chewy French bread? The gluten makes the difference. In a cake, we want little gluten development. In a chewy bread, we want a high percentage of well-developed gluten. We can control this texture in our baked goods by changing four conditions:

- **Selection of flours:** Cake flours are “weak” or “soft” and have a low protein content, probably around 8%. Bread flours and high-gluten flours are “strong” and usually have a protein content of 12 to 14%.
- **Amount of shortening:** Any fat is referred to as a shortening because it shortens the gluten strands. It does so by lubricating the fibers so they cannot stick together. The more shortening in the dough, the more tender and less chewy the product will be.
- **Amount of liquid:** Gluten must have liquid to absorb and expand. If dough does not have enough liquid, the gluten will not fully form and the product will not be tender. That's why we put a minimal amount of water in pie crusts.
- **Mixing methods:** Generally, the more a batter or dough is mixed, the more the gluten develops. Tender muffins use low-protein flour and are mixed only until the moisture is absorbed while breads are kneaded for a relatively long time.

## The Secrets of Great Breads

Often we field questions about making great bread. Great bread is a matter of using the right ingredients and the right techniques—there's no single secret that will make perfect bread. But really great bread is readily attainable. We've compiled our list of what goes into great bread.



1. The right flour.
2. An understanding of yeast.
3. A good dough conditioner.
4. A baker's thermometer

Now this isn't everything that goes into great bread but the baker that is armed with these four tools is likely to be baking great bread.

We have stated before that a thermometer is the baker's secret weapon. Recently we stated that if there is a secret ingredient, it's the flour. So we put the right flour on the top of our list. Most commercial bread bakers are going to use flours with 10% to 14% protein--bread flour. (Many pizza doughs and artisan breads are made with flours or flour blends in the 10% range. Chewy breads are made with flours in the 12% to 14% range.)

Commercial bakers have access to dozens of different flours. If you want really good bread, buy a good quality bread flour--even if you have to make a deal with a local baker.

If you buy your flour at the grocery store be aware that all flours are not equal. They will have different protein contents and other characteristics. Name brands are likely to do a better job of holding to a specification and will provide more consistent results.

You can get an idea of the protein content from the nutrition label. Divide the grams of protein by the grams in the serving size to get the approximate percentage of protein in the flour (subject to rounding error).

Yeast is a living organism. The gases expelled by the growing yeast are what leavens the bread. The skilled baker recognizes that with the dough, he or she is culturing a living organism and that the yeast must be growing in the right culture to create the gases to make light airy bread. The right culture is primarily a function of moisture, temperature, and pH or the acidity level.

Dough conditioner alters the pH of the dough (among other things) so that it enhances the growth of the yeast and it makes the dough more extensible. All else being equal, dough conditioner can make a good bread great.



You can buy dough conditioner (or dough enhancer as it is sometimes called) in some grocery stores or you can get our dough conditioner. Ours is a commercial dough conditioner that we have found to be very good.

We would not think of making bread without a thermometer. We use it to measure water temperature. (When we use our bread machines, we measure the water temperature to exactly 80 degrees—not one degree off. When we make bread in our stand-type mixer or by hand, we use water between 100 degrees and 110 degrees.) We nearly always measure the temperature of the bread when it comes from the oven. And you can use a thermometer to measure the temperature of the dough to make sure that you have the right temperature for your yeast to grow in. You can buy an insta-read thermometer at most department stores and we offer a larger-face baker's thermometer on our site.

## Is Brown Bread Better?

Brown (or whole wheat) bread is touted as the healthy choice. Does it deserve its acclaim? You be the judge. The following table compares the nutritional content of a one-ounce slice of white bread versus a one-ounce slice of wheat bread.

In our opinion, the meaningful difference lies in the different levels of dietary fiber. Dietary fiber slows digestion so that the starches convert to blood sugar more slowly. The higher glycemic level of white bread can be mitigated by adding slower-to-digest foods to your meal.

The table to the right shows a higher sodium content for whole wheat bread. This dependant on the recipe used and will vary considerably from bread to bread.

Incidentally, unbleached white flour is better for you than bleached. (All of our breads are made with unbleached flour.)

<b>Comparison of Whole Wheat and White Breads</b>		
<b>(Based on a one ounce slice of each)</b>		
	<b>100% whole wheat</b>	<b>100% white</b>
Calories	70	76
Fat	1.2	1.1
Sodium	181	146
Carbohydrates	12.9	13.9
Protein	2.7	2.4
Dietary Fiber	1.5	0.5
<b>% of US Recommended Daily Allowance</b>		
Protein	4.2	3.7
Vitamin A	trace	trace
Vitamin C	trace	trace
Thiamin	6.7	8.7
Riboflavin	3.5	5.3
Niacin	5.4	6.4
Calcium	2	3.6
Iron	5.5	4.5
Vitamin B-6	2.5	0.5
Pantothenic Acid	2.3	1
Folacin	4	2.5
Phosphorous	7.4	3.1
Magnesium	6.5	1.5
Zinc	3.2	1.2
Copper	5	2

Both white and wheat breads are healthy additions to most diets when eaten in moderation.

## High Altitude Breads

Can you make bread and buns in the mountains?

We got a call from a baker in California, “I can make great bread in L.A. but at my cabin in Montana, it doesn’t turn out so well.”

We would like to help. This summer, you might find yourself at a cabin or in an RV high in the mountains. That doesn’t mean you can’t enjoy great bread.



The trick is realizing that you are working with living creatures and giving them the culture that they need to thrive in—a warm, moist environment. In a healthy culture, yeast organisms feed on the sugars and starches in the dough, multiply rapidly, and expel carbon dioxide gases that make the dough rise regardless of altitude. If the dough is not moist enough, it will take much longer for the dough to rise. Yeast organisms are very sensitive to temperature. If the dough is too cool, the yeast organisms do not multiply as rapidly and produce less gas.

Yeast products are not as sensitive to altitude as chemically leavened products although with less air pressure and all else being equal, dough may rise faster. But all else is rarely equal. Higher altitudes are likely to be drier and the recipe that you used at sea level may require more liquid. In a humid location, unsealed flour absorbs moisture; in a dry climate, that same flour dries out. If you add the same amount of water to flour in both locations, the dough in the humid climate will be much moister.

Our California friend in her Montana cabin may find her kitchen much cooler than in L.A. In the cooler cabin, the bread will take longer to rise. At higher altitudes, your kitchen may be cooler than it is at home. A few degrees difference in temperature will make a substantial difference in the time it takes your dough to rise. Compensate by taking advantage of the warmest spot in the kitchen.

We have worked with yeasted breads while camping with scouts at almost 11,000 feet in the Rockies. It worked but we had to move a tent to the warmest spot we could find, banking the tent into the sun, to get enough temperature for the dough to fully rise.

There are some other tricks that you can deploy to help that yeast along at higher altitudes. A little extra sugar will feed the yeast and speed growth. An extra teaspoon per loaf will do and probably won’t make a noticeable difference in your recipe. Salt retards yeast growth. If you cut the amount of salt in a recipe by 1/2 teaspoon per loaf, you will speed the yeast along.

## *Part 3--Recipes: Applying What You Learned*

### **Using Yeast Successfully: Hamburger or Sandwich Buns**

Yeast is treated the same way when making hamburger buns as for bread loaves. Even if you have never made bread before, this is a good exercise to tackle.

You can make hamburger buns or sandwich rolls from any mix or recipe. This is a little richer than most with milk instead of water. It makes a soft, delectable roll that your family will find irresistible. Be warned though: Once you've served burgers on fresh-baked buns, your family will never let you use store buns again.



### **American Hamburger Buns**

#### Ingredients

5 1/2 cups plus of high gluten bread flour, divided  
1 seven-gram packet instant yeast or two teaspoons  
2 tablespoons sugar  
1 tablespoon salt  
1 teaspoon dough conditioner  
2 cups milk  
1 egg, warmed to room temperature  
4 tablespoons butter, melted and slightly cooled

Note: Warm the egg to room to temperature by placing the unbroken egg in a cup of warm water for ten minutes.



#### Directions

1. Place about one cup of flour in the bowl of your stand-type mixer equipped with a dough hook. Heat the milk in the microwave to 105 degrees. Add the yeast and

milk to the flour. Mix with the dough hook for 30 seconds or until the yeast is dissolved and the ingredients begin to combine.

2. Add the rest of the 5 1/2 cups of flour, the sugar, salt, dough conditioner, melted butter, and egg and continue mixing at a medium speed for at least four minutes. (It is important that the dough be mixed for at least four minutes to develop the gluten.) The dough should clear the sides of the bowl but stick to the bottom. The dough should be soft but just dry enough that it can be handled without being too sticky. If you feel that the dough is too moist, add one or two tablespoons of additional flour. (With our flour and kitchen conditions, we need to add four additional tablespoons of flour to get the right consistency.) Once the dough is mixed, move the dough to a large greased bowl, turn once to coat both sides, and cover with plastic wrap. Let stand until the dough is doubled and very puffy. Depending on how warm your kitchen is, that may take an hour to an hour and one-half.

3. Grease two large (or one large and one small) baking sheets and sprinkle the sheets with cornmeal. Once the dough has risen, deflate it and divide the dough into eighteen equal pieces with a sharp knife (or scale the pieces at 3 ounces each on your kitchen scales). Form smooth round balls by pulling the dough around the center and pinching the seams together on the bottom of the roll. Place them on the greased sheet allowing room for them to expand.



(We place them in three rows of four buns on a 12-inch by 19-inch baking sheet.)

4. Gently press the balls into flat discs with your hand. The dough will tend to spring back. Allow the dough to relax a few moments and then press again. You may need to repeat the process again until you have discs that are 3 1/2 to 4 inches in diameter and 1/2 to 3/4-inches thick.

5. If you would like, lightly dust the tops with flour (we use a strainer to distribute the flour). Cover the rolls lightly with plastic and allow to rise until doubled and puffy--about an hour. Let them rise completely for soft, light buns.



6. If you prefer, you can top your rolls with sesame seeds or poppy seeds. To do so, instead of dusting the tops with flour, mix one egg with one tablespoon water in a cup. Whisk well. After the rolls have risen and just

before baking, gently brush the egg wash on the rolls with a pastry brush. Sprinkle the seeds onto the tops of the rolls; the egg wash will hold them in place.

7. In an oven preheated to 375 degrees, bake the rolls for 15 to 20 minutes or until the tops are a rich golden brown and the interior of the bun is 190 degrees. If you are baking both sheets at once, switch the top sheet with the bottom sheet half way through the baking so that the buns will bake evenly. Immediately remove the rolls to a wire rack to cool.

## Retarding the Growth of Yeast: Italian Herbed Focaccia

This is a fun project.

To develop the best in yeast flavors in this bread, the dough is refrigerated overnight. Mix the dough, stick it in the refrigerator, and bake it the next day. The cooler dough, both as the dough cools in the refrigerator and as it gradually warms the next day, develops marvelous flavors. (The yeast is practically dormant once the dough reaches the forty degrees of your refrigerator and can therefore remain refrigerated for several days.)

### Italian Herbed Focaccia

This recipe makes a wonderful focaccia with an open crumb, well-developed flavors, and a crusty exterior. It is great as an appetizer, with pasta, or split for sandwiches. You can also use this bread for bread sticks or a pizza crust.

For the best results, store the dough overnight or up to three days in the refrigerator. If you don't want to tackle the steamy oven as described in the recipe, you can bake this bread without the steam. Without the steam, the bread will not be crusty.



#### Ingredients

3 cups plus of high gluten bread flour, divided  
1 teaspoon instant yeast  
1 1/4 cups water  
1 tablespoon sugar  
1/2 teaspoons salt  
1/2 teaspoon dough conditioner  
2 tablespoons olive oil

1/3 cup good quality olive oil  
1 tablespoon basil  
1/2 teaspoon oregano flakes  
1/8 teaspoon garlic powder

coarse salt  
2-3 tablespoons parmesan cheese

## Directions

1. Place about one cup of flour in the bowl of your stand-type mixer equipped with a dough hook. Add the yeast and water. The water should be at 80 degrees or just cool to the touch. Mix with the dough hook for 30 seconds or until the yeast is dissolved and the ingredients begin to combine.
2. Add the rest of the three cups of flour, the sugar, salt, dough conditioner, and two tablespoons olive oil and continue mixing at a medium speed for at least four minutes. (It is important that the dough be mixed for at least four minutes to develop the gluten.) The dough should clear the sides of the bowl but stick to the bottom. Dough for ciabatta and focaccia should be slightly wetter than most breads. Water absorption may vary with your flour and conditions in your kitchen. If you feel that the dough is too moist, add one or two tablespoons of additional flour. (With our flour and kitchen conditions, we need to add two additional tablespoons of flour to get the right consistency.) Once the dough is mixed, move the dough to a large greased bowl, turn once to coat both sides, and cover with plastic wrap. Refrigerate overnight or up to three days.
3. On the day that you are going to bake your bread, measure 1/3 cup olive oil. Stir in the basil, oregano, and garlic powder. Set aside to steep.
4. Remove the dough from the refrigerator and let it come to room temperature for about three hours. The dough should rise to nearly double in this time. Once it has risen, coat your hands with flour and lightly dust a work area on the countertop. Holding the dough in your hands, allow the weight of the dough to stretch out the dough until it is about one inch thick. Lay it on the dusted countertop and fold the ends over itself like you would a letter. Lightly dust the top with flour and cover with plastic wrap. Let double again in size, about one hour.
5. Prepare a 15-inch pizza pan or a baking sheet by greasing the surface and dusting it with cornmeal. Once the dough has doubled, move it to the prepared pan. Using your fingertips, dimple and spread the dough as shown, spooning the oil and herb mixture over the dough as you spread it. The oil should run down into the dimples and some may get under the dough. If the dough is too stiff to spread, allow it to rest a few minutes before resuming. The dough does not have to cover the entire pan. Once the dough is spread to cover most of the pan, sprinkle with coarse salt, cover again loosely with plastic wrap, and let rise until doubled--about one hour.
6. Preheat the oven to 425 degrees. Place a large, flat metal pan on the bottom rack of the oven to be used to hold water and with which to create steam and





condition the crust. (Since high heat may distort the pan, the pan should not be expensive—an old baking sheet is perfect.) Do not use a glass or ceramic pan.

7. Immediately before placing the bread in the oven, mist the sides of the oven with water using a spray mister and then pour two cups of very hot water into the steam pan. Be very careful—steam can burn badly. To avoid rising steam, pour the water in without holding your hand directly over the pan. Wear a glove and turn your face away from the escaping steam both when you pour the water into the hot pan and later when you open the oven.
  8. Immediately place the bread in the hot oven and quickly close the door to retain the steam. Turn the heat down to 400 degrees and bake for fifteen minutes opening the oven after about five and ten minutes to mist the walls again. Continue baking at 350 degrees for another 10 minutes or until the crust is golden brown and the bread tests done. The interior of the bread should reach 210 degrees. Immediately remove the bread from the pan to cool on a wire rack. Sprinkle with parmesan cheese while the bread is still hot. Unused focaccia should be stored in a paper bag at room temperature.
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## Adding Cheese to Your Bread: Cheesy Dinner Rolls and Loaves

Everyone loves cheesy bread and rolls. We know of three ways to make cheesy bread:

1. Add cheese to the ingredients so that the cheese is mixed in as the dough is formed.
2. Add grated cheese to the finished dough. Barely knead the cheese into the dough to create a marbled effect.
3. Roll cheese or a cheese mixture into the dough jelly-roll fashion. (Imagine cinnamon raisin bread with cheese instead of raisins and cinnamon.) In the bonus section at the end of this chapter, you will see how to do this.



All three of these techniques are simple. The first, integrating the cheese into the dough, must be done carefully. Since the cheese is integral with the dough, the cheese fat acts as a shortening and reduces the gluten strands and, with the weight of the cheese, makes for a slower rise. Still, if you don't overload the dough, you can mix cheese into the dough.

The following pointers will help make that loaf of bread or batch of rolls a booming success.

- Try 1/2 cup grated cheese for every one cup of flour in the recipe. Remember, if you get too much cheese in the dough, you'll overwhelm the yeast and the dough will not rise properly.
- For the best flavor, use a sharp cheese. Sharp cheddar works well but any sharp cheese will work.
- Since you're trying to maximize the cheese flavor, there's no reason to add other fats to the mix to bog down the yeast. If the recipe calls for butter or oil, leave it out—there's more room for cheese.
- If you want to give the rolls a little extra zip, add 1/4 teaspoon white pepper or 1/2 teaspoon ground dry mustard to the ingredients. No one will ever know that it's there and you'll accent the flavor.
- The cheese will slow down the rise. Be patient. If it takes twice as long to rise, that's okay. Let it get nice and puffy.

- The cheese may increase the baking time by five minutes. The lactose in the cheese will accentuate the browning of the rolls. Let the rolls get to a rich golden brown color or use your thermometer. The internal temperature should be at least 190 degrees.

## Dilly Cheese Bread

This is a great cheddar bread with the cheese incorporated into the dough. This recipe includes sharp cheddar and parmesan. There is a limit to how much cheese you can add to bread dough before you weigh it down. When there is too much cheese, it takes much longer to rise. It can still make a fine bread but it takes patience. (There is a point where the cheese will just overcome the ability of the yeast.) This bread will still rise quickly.

The recipe calls for dill weed. Feel free to substitute basil or the herb of your choice. The two tablespoons dill weed in this recipe results in a mildly dilly bread. If you want more dill flavor, try three or even four tablespoons of dill.

The white pepper adds just a little bite that accents the cheese. Freshly ground black pepper also works. Dry mustard or paprika is sometimes added for the same purpose.

You may need to adjust the moisture used in this bread. It's easy to add a little more flour; a little more difficult to dribble in a bit of water. Because it is easier to add flour than water, start your dough a bit on the wet side and add flour as needed.

### Ingredients

2 cups fine ground whole wheat flour  
2 tablespoons granulated sugar  
1 seven-gram packet of instant yeast  
2 cups warm whole milk, 110 degrees (see note)  
3 to 3 1/2 cups white bread flour  
2 tablespoons dill weed  
1 1/2 cups grated sharp cheddar cheese  
1 cup grated parmesan cheese  
1 tablespoons melted butter  
1/4 teaspoon white pepper  
1/2 tablespoon salt

***Baker's Notes:*** *This is best made with high-heat dry milk. (The high heat dry milk will produce a dough with a better gluten structure.) Use 1 3/4 cup plus 2 tablespoons warm water along with 1/3 cup dry milk. Increase the melted butter to two tablespoons.*

*This can also be made with skim milk. If using skim milk, increase the butter to two tablespoons. If using low fat milk, increase the butter to 1 1/2 tablespoons.*

### Directions

1. Place the whole wheat bread flour, sugar, and yeast in the bowl of your stand-type mixer. Add the warm milk and beat with a dough hook until it is partially mixed. The purpose of this mixing is to hydrate the yeast.
  2. Add most of the bread flour to the bowl. Add the dill, the cheese, melted butter, white pepper, and salt. Knead with the dough hook at medium speed for four minutes, adding flour to reach the right consistency. A softer dough rises more quickly than does a firm dough so do not add too much flour.
  3. Set the dough in a greased bowl, turn once, and cover. Set the bowl in a warm place and allow it to double in size.
  4. Grease two large loaf pans. Form two loaves, cover them, and let them rise until doubled and puffy.
  5. Bake at 375 degrees for 25 minutes or until done. The internal temperature should be 190 to 200 degrees. The lactose in the cheese will caramelize and make a very bronze crust, a darker crust than most breads.
  6. Remove the bread from the pans and let the bread cool on a wire rack.
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## Adding Grains to Your Bread: Hi-Country Seven Grain Bread Recipe

Adding a cereal mix or cracked wheat makes great bread. You can add cereal to most recipes. Because different grain mixes and different grain sizes absorb water differently, be prepared to adjust the water to flour ratio in your recipe.

This recipe uses our seven grain cereal mix. You can certainly use other cereals. (With our flours and cereal, in our kitchen, this is exactly the right water to flour ratio.)



### Ingredients

3/4 cup seven grain cereal or other cereal or cracked wheat  
1 1/2 cups hot water

6 tablespoons butter  
3 cups good quality bread flour  
3 cups whole wheat flour  
2 tablespoons wheat gluten  
1 teaspoon dough conditioner  
(or use 6 cups plus 2 tablespoons Hi-Country Flour Blend in place of the flours, gluten, and dough conditioner)

1/4 cup granulated sugar  
2 teaspoons salt  
1/4 cup baker's high heat dry milk

1 7 gram packet of instant yeast

1 cup warm water at 105 to 110 degrees

### Directions

1. Mix the cereal with the 1 1/2 cups hot water. Set aside for two hours to absorb the water and soften.
2. Melt the butter in the microwave and set it aside to cool. With shortening or butter, grease a large bowl for the dough and 2 large loaf pans (9 x 5-inch). If you are going to make hearth loaves, grease a baking sheet and sprinkle it with cornmeal.
3. Measure the flours into a large bowl by whisking the flour so that it's not packed and then spooning it into the measuring cup followed by leveling the top with a straightedge. Add the gluten and conditioner and stir to combine. Stir in the sugar, salt, and dry milk.

4. Put about 1/3 of the flour mixture in the bowl of your stand type mixer equipped with a dough hook. Add the yeast. Add the 1 cup water at the indicated temperature. With the dough hook, run the machine for thirty seconds to mix the water with the flour to create a slurry. Add cereal and water mixture and the rest of the flour mixture. (The cereal and water mixture should be 105 to 110 degrees. If it has cooled beyond that, reheat it in the microwave.) Add the melted butter.
  5. Mix at medium speed for about four minutes or until the gluten has formed and the dough is elastic. The dough should be soft but not too sticky. To reach the right consistency, you may need to dribble a little extra water (maybe one tablespoon) or flour as the dough is kneading. Place the dough in the prepared bowl and cover it to keep the dough from drying while it rises. Let it rise until it doubles.
  6. Gently deflate the dough and form two loaves either as free-standing loaves on a baking sheet or sandwich loaves for your bread pans. Cover the loaves and let them rise again until the dough is soft and puffy, about doubled in size.
  7. If you are going to make hearth bread with its, chewy, crisp crust, see the direction for baking listed for "EZ Sourdough Bread" in the last section of this chapter. If not, preheat the oven to 350 degrees. Bake the bread for about 35 minutes. The time will vary depending on your loaves, the pans, and your oven. The bread should make a hollow sound when thumped on the bottom. The internal temperature of the loaves should be 190 degrees.
  8. Remove the loaves from the pans and let them cool on a wire rack. Cool completely, or nearly so, before slicing.
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## Adding Vegetables to Your Bread: Summer Zucchini and Carrot Bread

When the first vegetables of the summer are on, we like to add vegetables to our breads. You'll find that you can use many of the vegetables from the garden in your baking—adding color, flavor, and nutrition to your baking.



Any time that you add vegetables to your bread, be prepared to adjust the amount of flour that you use.

Vegetables will add moisture to your bread and how they are grated or pureed along with the type of vegetables, will determine the

moisture added. But it's easy to add a little more flour; a little more difficult to dribble in a bit of water. Because it is easier to add flour than water, start your dough a bit on the wet side and add flour as needed.

### Summer Zucchini and Carrot Bread

Here is a wonderful bread recipe for all that zucchini squash that seems to overwhelm us each summer. Some fresh carrots are added for color and nutrition. Unlike the quick bread recipes for zucchini squash, this is a yeasted recipe.

This is not a sweet bread recipe and so it makes wonderful sandwiches and toast. We like it with peach and apricot jam.

Because zucchini has such a high moisture content, salt is used to draw some of the moisture from the squash.

#### Ingredients

- 3 cups coarsely grated zucchini squash
- 1 tablespoon salt
- 2 cups coarsely grated carrots
- 3 1/2 cups white bread flour
- 3 tablespoons granulated sugar
- 1 seven-gram packet of instant yeast
- 1 1/4 cup warm water, 110 degrees
- 2 cups fine ground whole wheat flour
- 1/2 tablespoon salt
- 2 tablespoons melted butter
- 1 teaspoon cinnamon

## Directions

1. Grate the zucchini. Place the zucchini in a colander over the sink and stir in the salt. The salt will draw water from the zucchini. Grate the carrots and set them aside.
  2. Place the white bread flour, sugar, and yeast in the bowl of your stand-type mixer. Add the warm water and beat with a dough hook until it is partially mixed. The purpose of this mix is to hydrate the yeast.
  3. Squeeze the water from the zucchini. Add the vegetables to the mixer bowl along with the whole wheat flour, the rest of the salt, the butter, and the cinnamon. Knead with the dough hook at medium speed for four minutes. You will likely need to adjust the moisture level either by adding flour or water. Start out a little on the dry side as the kneading tends to wring water from the zucchini. Set the dough in a greased bowl, turn once, and cover. Set the bowl in a warm place and allow it to double in size.
  4. Grease two large loaf pans. Form two loaves, cover them, and let them rise until doubled and puffy.
  5. Bake at 375 degrees for 25 minutes or until done. The internal temperature should be at 190 to 200 degrees. If this bread is under baked, with all the vegetables, it will tend to be soggy. Remove and let the bread cool on a wire rack.
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## Using Cornmeal in Your Bread: Southern Cornbread (Yeast)

We find cornmeal in bread recipes from time to time and love the crunchy goodness that it adds. Hearty peasant, artisan, and whole grain breads have cornmeal added. Anadama bread has cornmeal in it and is one of our favorite breads for morning toast. Though not popular, there are cornbreads made with yeast. (They deserve to be popular.)

### Southern Cornbread (Yeast)

A yeasted cornbread is different. Because the kneading develops the gluten, it is more bread-like and less crumbly than traditional cornbread. Oh, and this bread makes great Thanksgiving dressing.



#### Ingredients

- 1 (7 gram) package active dry yeast
- 1 cups warm water (100 to 110 degrees)
- 4 1/3 cups all-purpose or bread flour (more or less)
- 1 teaspoon salt
- 1 2/3 cup cornmeal
- 4 tablespoons melted butter
- 1/4 cup honey
- 2 large eggs
- 1 can whole kernel corn, drained
- 2 tablespoons cornmeal
- 1 egg for egg wash (optional)

#### Directions

1. In the bowl of a stand-type mixer, dissolve the yeast in the warm water.
2. Add half of the flour and mix with a dough hook. Add the salt, cornmeal, butter, honey, two eggs, and drained corn and continue mixing.
3. While continuing to mix, add the flour needed to bring the dough to a bread-dough type consistency. The amount of flour needed will vary largely on how well drained the corn was.
4. Knead as you would for other yeast breads and then remove the dough to a greased bowl. Turn once to oil both sides. Cover with plastic wrap and let rise until doubled.
5. Once doubled, divide the dough into two equal parts for two loaves. Form the loaves. If you are going to make free standing artisan loaves, grease a baking sheet and sprinkle the sheet with part of the remaining cornmeal. Place the loaves on the sheet. If you are making sandwich loaves, grease the baking pans

- well—the bread tends to stick to the pans--and sprinkle cornmeal in the pans. Let the bread rise until doubled again.
6. Preheat the oven to 375 degrees. If you choose, just before baking, whisk the remaining egg with one tablespoon water and brush the egg wash on the loaf. Sprinkle the loaf with cornmeal. Bake the bread for about 30 minutes or until the bread is golden brown and tests done. Remove the bread from the pans and cool on racks. Freeze any extra bread or save the bread for croutons.

## Creating a Sourdough Starter with Yeast: Easy Sourdough Bread

This recipe illustrates several bread practices. First, it demonstrates how we can jump start a sourdough starter with yeast. Second, it demonstrates how to use a preferment to create those subtle alcohol-induced flavors found in sourdough bread. Third, it shows how you can make a crusty bread in your oven at home.

There's a reason why this is the last recipe in this chapter. This is the graduating exercise. While there is nothing in this recipe that is difficult or complex, there are multiple steps and procedures. If you take it a step at a time, you won't find it hard. If you have never made yeasted bread before, we suggest that you start with one of the other recipes. If you are fairly confident with dough and have made bread several times, go for it. We think you will make marvelous bread. In fact, this bread can be so good that it will transform you into a legend in your hometown.

### Easy Sourdough Bread

Sourdough simply uses wild yeast in place of commercial yeast to leaven the bread. It relies on the wild yeasts that are in the air all around us and cultures those yeasts in a warm, wet environment created with water, flour, and sometimes other components.



When creating a sourdough starter, we always felt like we were on an expedition trying to trap invisible yeastie beasties with our flour and water concoctions. Because we couldn't see the beasties, we were never sure what we had captured.

While usually successful, we never felt like we were in control. Maybe that is the way sourdough bread should feel, a symbiosis with nature.

But there is an easier way: use commercial yeast in the starter. I know, that's heresy to the sourdough bread zealot but we only care about the bread. Using commercial yeast is easier, it's the alcohol from the long cool fermentation that creates the sourdough-like flavor, and the wild yeasts will eventually take over the starter anyway. Because it's easy, it's no big deal if you abandon your starter after a few weeks; you can readily start another when you're back in the mood or have the time.

Using this recipe for sourdough bread, a small amount of yeast is used in the starter. As the starter is used and refreshed with new feedings of flour and water, wild yeasts are introduced and cultivated.

Here is the recipe:

### For the starter:

1 cup warm water (about 110 degrees)  
1/4 teaspoon yeast  
1 cup high gluten unbleached flour.

Mix the starter in a glass or steel bowl, cover with plastic wrap, and set it aside at room temperature until it is doubled and bubbly, maybe 4 to 6 hours.

### For the sponge:

A sponge is a pre-ferment, a wet mixture of flour and yeast that acts as an incubation chamber to grow yeast at the desired rate. It is added to the dough.

1 cup of the starter  
3/4 cup warm water  
2 cups flour

Mix the one cup starter with the flour and water, cover, and set aside to ferment until it has tripled in volume. At room temperature, it will take four to eight hours. You can put it in a cool place--about fifty degrees--and let it perk all night. (In the winter, your garage may be just right.) You can also put it in the refrigerator overnight. At temperatures of forty degrees, the yeast will be inactive but the friendly bacteria will still be working and enhance the sour flavor of the bread. If you retard the growth with lower temperatures ("retard" is the correct term for slowing the growth of the yeast), simply bring the sponge to room temperature and let it expand to three times its original volume before proceeding.

### For the dough:

All of the sponge  
1 1/2 cups flour (more or less)  
2 teaspoons salt

Mix the salt with the flour. Knead the combination into the sponge by hand until you have a smooth, elastic, slightly sticky dough, adding more flour as needed. Put the dough in an oiled bowl and let it rise again until doubled, about an hour.

*Bakers note:* Notice that the salt is not added until the last stage. Salt in the sponge would inhibit yeast growth.

### Form the loaves:

Though you can make this bread in pans,



it works best as a large freestanding round or oval loaf or two smaller loaves. Place a clean cotton cloth in a bowl or basket in which to hold the loaf. Lightly dust the interior of the bowl with flour. Place each formed loaf upside down in a bowl on top of the dusted flour. Cover the loaves with plastic and let them rise again until doubled. This rising will probably take less than an hour.

*Bakers note:* You want a light dusting of flour on the cloth to be transferred to the bread, not a heavy caking. Softly sifting flour from a strainer is the easiest way to achieve an even coating.

If you choose to bake the bread in pans, omit this step. Instead, let the dough rise in a greased bowl covered with plastic until doubled. Form the loaves for pans, place the loaves in greased pans, and let rise until well-expanded and puffy. Bake at 350 degrees until done, about 30 minutes.

#### To bake crusty bread:

To form the thick, chewy crust that is typical of artisan breads, follow these instructions: Place a large, shallow, metal pan in the oven on the lowest shelf. You will pour hot water in this pan to create steam in the oven. (High heat is hard on pans so don't use one of your better pans and don't use a glass or ceramic pan which might shatter.) An old sheet pan is ideal. Fill a spray bottle with water. You will use this to spray water into the oven to create even more steam.

Preheat the oven to 425 degrees. When the oven is hot and the bread is fully risen and is soft and puffy--being very careful not to burn yourself with the rising steam and with a mitted hand—turn your head away and pour two or three cups of very hot water in the pan in the oven. Quickly close the oven door to capture the steam. With spray bottle in hand, open the door and quickly spray the oven walls to create more steam and close the door. The oven is now ready for the loaves.

Work quickly to get the bread in the oven before the steam subsides. Gently invert the loaf or loaves onto a slightly greased non-insulated baking sheet on which a little cornmeal has been dusted. With your sharpest knife, quickly make two or three slashes 1/4-inch deep across the top of each loaf. This will vent the steam in the bread and allow the bread to expand properly. Immediately, put the bread in the steamy oven. After a few moments, open the door and spray the walls again to recharge the steam. Do this twice more during the first fifteen minutes of baking. This steamy environment will create the chewy crust prized in artisan breads.

Let the bread bake at 425 degrees for fifteen minutes in the hot steamy oven then reduce the temperature to 375 degrees and bake for a total of 35 to 40 minutes. Check on the bread ten minutes before the baking should be complete. If the top is browning too quickly, tent the loaf with aluminum foil for the remainder of the baking to keep it from burning. The bread is done when the crust turns a dark golden brown and the internal temperature reaches 210 degrees. It is important that the bread is well-baked to drive moisture from the loaf. If the bread is under baked, the excess moisture will migrate to the crust and you will no longer have the dry chewy crust of a great artisan loaf.

This sourdough bread is to die for. The prolonged rising gives the yeast plenty of time to convert the starch to sugars and the friendly bacteria a chance to impart their nut-like flavors.

Storing your crusty bread:

Unused crusty bread should be stored in a paper bag at room temperature. If the bread is stored in a plastic bag, the crust will become soft.

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## Bonus: How to Bake Bread on the Grill

One of the slickest tricks we know is baking bread on the grill. Once you get to know your grill, it's easy—like baking your favorite recipe in the oven.

We can think of all kinds of reasons to use the grill. You can enjoy fresh baked bread while camping, or at the cabin, or at the next family reunion. Sometimes, it's just nice to get out of the kitchen, enjoy the spring air, and bake outside. (Watch the neighbors turn their noses upwind when the smell of fresh baked bread wafts over the fence.) And in the summertime, you don't have to heat up the kitchen to bake. Finally, if there is ever an extended emergency when the power is off, you may have the only fresh bread in town.



You can bake nearly anything with a covered grill. (If your grill doesn't have a cover, improvise with a large inverted pot.) The heat rises and circulates in the covered area just as it does in your oven. The heat source can be charcoal, gas, or even wood. We prefer gas because it is easier to control and does not impart a smoked taste to the bread. Since it is hottest near the flames, elevate the bread even if you have to improvise. In our grill, there is a secondary shelf for baking potatoes and such. (See picture.)

For this demonstration, we used Old-Fashioned White Bread mixes though any mix or recipe will do. We mixed according to package directions. After it had risen, we formed one batch into oval country loaves, one into hamburger buns, and another into dinner rolls.

The trick to grilling bread perfectly is controlling temperature and time. If your grill comes equipped with a thermometer, you've got it made (though ambient temperatures and winds may impact how well your grill retains heat). If you have a thermometer, just heat to the temperature designated on the package or in the recipe. If not, guess. After a few loaves you'll have it perfect and we bet that the first batch off the grill will be just fine.

Rolls and buns will probably bake in 15 to 20 minutes and loaves will take 20 to 30 minutes depending on size and temperature. An occasional peek to see how your bread is doing as it nears completion is okay.

We made twelve giant-sized hamburger buns, just the ticket for that quarter-pounder. (With our Old-Fashioned White bread mix, the buns scaled out at 4 ounces each.) Form the buns as you would dinner rolls then press them flat several times until they look like those in the picture to the left. (The dusting that you can see on the pan is cornmeal.) Cover and let rise.

Just before baking, we washed the buns with an egg white wash (one egg white plus one tablespoon of water). We then sprinkled them with sesame seeds. On our grill, we baked them with the heat turned about two-thirds open for about 18 minutes.



For the dinner rolls, we used a 8 1/2 x 15-inch pan and made 20 rolls scaled at 2.5 ounces each.

We made two country style loaves from one mix. If you look closely you'll see that we forgot to slash the tops to release the steam and consequently ended up with a split on the side of the loaf. Don't do as we did—score two or three quarter-inch deep slashes on the top of the loaf just as you begin baking.

Here are a few more hints to help you along the way:

- Bake the bread before the burgers. The bread can cool while you cook the rest of the food. Burning grease in the bottom of the grill makes the temperature harder to control and the soot can stain the bread.
- If you are letting your bread rise outside where the temperature may be less than indoors or where breezes may swirl around the bread, consider using a large food-grade plastic bag as a greenhouse. Simply slip the bread dough--pan and all--inside the bag, inflate it slightly, and close it. If the day is cool, set the bag and the bread in a sunny warm place to capture a little solar energy.
- Grills tend to not circulate the hot air as well as ovens. To keep the bottom of the bread from burning, place one pan beneath the other. The second pan will tend to insulate the bottom of the bread and keep it from burning. Sometimes place a wire rack between the pans for even more insulation.
- If your bread is baking faster on one side than the other, turn the pan 180 degrees part way through the baking cycle.
- The tendency is to burn the bottom of the bread. Place the bread as far away from the flames as you can even if it means elevating the bread.

