

EASY SOURDOUGH BREAD

I grew up with good homemade bread, made by my mother (with us children "helping"), and my grandmother. I never had time to bake bread from scratch, but bread machines became commonplace a few years after I married. We purchased a floor model that was on sale, and have had one or two bread machines ever since. It was indeed fascinating that you could dump in the ingredients, push a button, and come back later and enjoy a loaf of good, hot bread. For a number of years we made bread regularly. Quite a few ingredients were required. We simplified the process by pre-measuring the dry ingredients and storing them in a zip-lock bag. All that was required to bake was to dump this in the machine, add yeast and water, and push a button.

As we got busy with life, the breadmaking fell by the wayside. It was a lot of work premixing the ingredients. Everything had to be perfect, or we would end up with something that ranged from poor to inedible bread. And while the results of the successful bakes were very good, they were never quite as good as I remembered grandma's bread to be.

A local newspaper columnist shared her adventures of sourdough baking. It sounded like fun, so I tried to grow my own starter from scratch. I had successfully made Indian dosa batter, a fermented rice and lentil batter that fries into a thin wafer. However, after a few unsuccessful tries at making sourdough starter, I gave up. My wife surprised me with some commercial starter for my birthday. I followed, more or less, the single sheet of instructions included in the package. Sure enough, in a few days I had some yeasty, sour-smelling starter. My first loaf of bread was not the best bread I have ever had, but it was the best I had ever baked. And it was easy! The only ingredients besides the starter are flour, water, and salt! Measurement was not critical. I kneaded the dough in my bread machine as always, put it in a pan, waited for it to rise, then baked. I was soon making the best tasting, best-smelling, and best-textured bread I had ever tasted, bar none. Furthermore, it was easy to digest (even in large quantities), and stayed fresh longer. I have rarely had a loaf get moldy.

Over the past couple years I have been learning more about sourdough bread and perfecting my technique. Now I am sharing it with you. There is plenty of information on the web. Most of it requires learning a whole new lingo with terms such as hydration percentages, autolyze, bulk proofing, etc. that would warm a biochemist's heart. Then there are the instructions that come with commercial starter – just a page of instructions to get you started. This document falls between these two. It is simple, assuming little or no kitchen skills, but will answer some questions that a one-page sheet will not. It will not teach you how to bake award-winning artisan bread. But it will help you make the best tasting, large, fluffy loaves of white bread you ever had.

If you do not like the sourdough that you have eaten in the past, please read on. Sourdough is a method of making bread, not a flavor. The sourdough bread you buy is in most cases not sourdough bread at all – it just has a sour flavoring added to it, or is ordinary yeast bread with sourdough starter added for flavoring. Real white sourdough bread may be hardly sour at all. I could give you some, and if I didn't tell you it was sourdough, you probably wouldn't notice. It just tastes like really good homemade bread. If you like the sour flavor, there are ways to achieve that. Contact me for help or search the internet, especially culturesforhealth.com.

Don't let the size of this document scare you. I put a lot of extra information and notes to myself here.

When I get time I will make a summary version.

WHY SOURDOUGH BREAD?

Making homemade sourdough bread is easy. It is actually easier than baking conventional yeast bread. Measuring ingredients and rise and bake times are less critical than when baking conventional yeast bread. The taste and texture will be the best you have ever tasted. It is simple, needing only flour, starter (which you grow yourself), water, and salt. Yes, you have to keep some starter going, but it is really low-maintenance, requiring only a few minutes a week. If you want to quit making sourdough for a while but don't want to lose your starter, it can easily be dried and stored indefinitely

Sourdough stays fresh longer, due to the lactic and acetic acid it contains.

Best of all (next to the taste :-), it is more nutritious, and easy to digest. A lot of people who think they are gluten-intolerant and cannot eat regular bread can eat sourdough bread with no problem. My father confirmed this. I am not in any way intolerant of conventional bread, but I can eat as much sourdough as I want and not get that full, heavy feeling in my stomach that I get when eating a lot of conventional yeast bread.

I am often asked if sourdough bread contains yeast. Yes, it does. It is different than the yeast you buy for baking however. Bakers yeast was developed only about 150 years ago to aid in the mass-manufacture of bread. The yeast that is in sourdough is naturally-occurring wild yeast. It is possible, though difficult, to get sourdough starter by mixing flour and water and letting it stand. Flour, and possibly air, contain wild yeast, as well as lactobacillus bacteria, which give sourdough bread its sour flavor.

There are several breeds/cultivars or whatever you call it of yeast and bacteria that can be found in sourdough. Scientists have discovered 6 different cultivars of yeast and 20 different breeds of lactobacillus bacteria. I have read that the flavor of sourdough will vary slightly depending on what geographical area the starter lives.

Another interesting fact about wheat. Raw or boiled wheat is not readily digestible by the human body. In a survival situation, you could have an unlimited supply of wheat, but would eventually die from malnutrition if you just ate the wheat. But bake that wheat into bread, and the nutrients become absorbable by the body and you could survive indefinitely on it. This is true of conventional yeast bread as well as sourdough bread. However, sourdough is more nutritious, as the bacteria digest parts of the wheat that yeast can't.

OK, let's get started!

INGREDIENTS YOU WILL NEED:

*Sourdough starter



You can buy mail-order sourdough starter for about \$14 from culturesforhealth.com. By the way, this is a great web site for any questions you may have. There is a lot there and it can be overwhelming, so if you just want a loaf of sourdough bread, this document will get you started. Cultures for Health sends you a little packet of powder that you repeatedly add water and flour to, letting it ferment, until you get enough to bake your first loaf of bread. This takes about a week of twice-a-day feedings. This is where I got my starter initially. Get the San Francisco starter. It is by far the easiest type of starter to work with.

It is much easier, not to mention cheaper, to ask someone to simply give you some of their starter. These instructions are based on the assumption that someone gave you fresh sourdough starter. If you are starting with dry starter see instructions under Activating Dried Starter below.

If you want to try to make your own starter from scratch, there is plenty of information on the web to help you. However, unless you just want the challenge, save yourself a lot of time and grief and buy or beg some starter. The aforementioned newspaper columnist was unsuccessful after several attempts, and as I recall, ended up adding a little bit of commercial yeast to the concoction to get it going. This is not true sourdough bread, and will lack the advantages that sourdough offers. Keep commercial yeast well away from any sourdough baking you do.

*White Bread Flour.

Look for a 4 grams per serving (1/4 cup) protein content. King Arthur flour is easy to find most anywhere nowadays, and has a good reputation. However, it costs almost twice as much as other brands (White Lily, Gold Medal), and I can't tell any difference in the finished product. Unbleached and unbromated bread flour is best from a health standpoint and is readily available in 5 lb. Bags in the grocery store.

If you will be baking a lot, bleached and bromated flour is available for about \$16 for 50 pounds. I got Ardent Mills Kyrol Premium High Gluten flour from Restaurant Depot. The results are excellent. Bromated flour works a little better than unbromated. It makes a stronger, more elastic dough that rises more. Ascorbic acid reportedly has the same effect. I haven't tried it as I currently have 100# of bromated flour. But the next time I use unbromated flour, I plan to add a couple ground-up Vitamin C tablets to see what happens. Don't eat raw dough or starter made from bromated flour. Potassium bromate has been linked to cancer in animal studies (what hasn't?) Heating of the potassium bromate during baking renders it safe.

It seems most people use all-purpose white flour for their starter. This is what King Arthur Flour specifies for their starter. The instructions with Cultures for Health's San Francisco starter just says "white flour." I used bread flour, since it has more gluten and is, well, bread flour.

Whatever type of flour you choose, stick with it. The starter does not do well when switching to flour made of different types of wheat. (Bread flour is made from hard wheat flour and a little barley. All-purpose flour is a mixture of hard and soft wheat.) I tried to use all-purpose flour once to feed my starter because that's all I had. The starter did not grow well, and the bread did not rise well. You can change flour types, but you have to do it gradually. See

<https://www.culturesforhealth.com/learn/sourdough/how-switch-sourdough-new-type-flour/>

However, in my experience, you may freely switch between various brands of white bread flour, including bleached/unbleached and bromated/unbromated without problems.

If you are going for maximum nutrition and health benefits from your bread, whole wheat is best. However, it is much more difficult to bake with. Get started with white flour first to learn the ropes before venturing into whole wheat.

*Water.

Distilled water, well water, or spring water is recommended, especially for growing and feeding the starter. You want it to be free of chlorine and fluoride if possible. Bottled drinking water is fine, but culturesforhealth.com warns that it may still have fluoride. Boiling will remove chlorine, but not fluoride.

I have used water out of our refrigerator's filter, which has charcoal to remove chlorine, for routine feeding of the starter and making bread. I use distilled when growing the initial starter from dried crumbs, and in the winter or anytime the starter growth seems sluggish. The filtered water you buy from dispensing machines at Wal-Mart or Publix for about 40 cents per gallon seems fine. I use it for all my sourdough baking. I called the company that owns the machines, and they assure me that virtually free of chlorines.

I have accidentally used tap water and it worked fine. If the starter ever starts getting sluggish -- you feed it and it doesn't froth up as fast or as much as it used to -- you could try switching to distilled water for the feedings for a while.

*Salt.

Regular old table salt. Don't leave this out. It is for more than just flavor. See the [Salt](#) in the Appendix.

*Other ingredients

When I bake conventional yeast bread (which I haven't actually done since discovering sourdough), in addition to salt, I add soy lecithin, oil and shortening, all to make the texture of the bread better. I have tried adding these additional ingredients to sourdough, and have found that only are they not necessary, the actually detract from the quality if the bread.

EQUIPMENT

*The usual measuring cups and measuring spoons, **or** a kitchen scale.

*A bread pan or two.

*Something to grow and keep the sourdough starter in. Any covered medium mixing bowl will do. Glass is preferable to plastic. I use a 2-quart batter bowl made by Anchor-Hocking and sold by Wal-Mart. This bowl has measurement markings and a cover, which you will use if you do not have a scale. The batter lid keeps your starter from drying out and allows gas to escape. Even if you don't keep making sourdough bread, this is something you will probably use for other purposes. (This is no longer available from Wal-Mart. Check our web site for alternatives. Go to

<http://www.heavenlysour dough.com> and click the Products link.

If you use a regular mixing bowl for your starter, cover it with plastic wrap. Punch a few small holes in the wrap to allow gasses to escape.

Some people use wide mouth Mason jars. However, they are more difficult to stir and remove starter from.

*Rubber Spatula for mixing the starter and scraping the sides of the bowl. Wal-mart has a package of 4 silicone ones with wooden handles for under \$4. Spatulas without wooden handles are preferable. I found some all-silicone ones at Michael's crafts store.

Optional: Spray bottle of water. Wal-Mart sells a spray bottle for ironing for less than a dollar.

Optional: a heavy-duty mixer with dough hooks or a bread machine for kneading. You CANNOT make real sourdough in a bread machine. (The sourdough recipes for bread machines that you find on the web actually use conventional yeast in addition to sourdough starter). The rise timing is all wrong. Sourdough takes longer to rise, and the rise time is more variable than with yeast bread. But you can use it on the dough cycle to save the work of kneading the dough by hand. They are available for a few dollars at any thrift store.

Optional: quick-reading meat thermometer. Used to check the internal temperature of the bread to determine if it is baked sufficiently.

REACTIVATING DRIED STARTER

If you were given some dried flaked starter, follow the instructions in this section. If you were given fresh starter, skip to the [next section](#).

To reactivate, put the flakes in a small container such as shot glass. Tamp it down, and just barely cover with distilled water. Allow the flakes to soften for several hours.

Stir. You now have a little bit of starter!

It's time to feed the starter. If the hydrated flakes are now the consistency of thick pancake batter, add water to approximately double the volume. Unless your home has spring or well water, I recommend splurging on a gallon of distilled water.

You will need some flour of the same type as used to make the dried starter. Brand doesn't matter, but don't feed bread flour starter with all-purpose flour or vice versa. If you want starter for a different type of flour than the flakes were made of, proceed to resurrect the starter using the same type of flour, then transition it to your desired type:

See

<https://www.culturesforhealth.com/learn/sourdough/how-switch-sourdough-new-type-flour/>



Add flour to get to a pancake batter consistency. Stir thoroughly.

Keep the starter in a 70-85 degrees F (20 – 30 C) environment. See the next section for how to use your oven and its light to make a warm place in the winter.

Feed several times at 12 to 24-hour intervals. Add water to double the volume, then add flour as necessary to keep the thick pancake batter consistency. After a few feedings, you will need to transfer to a larger container.

The starter will get more robust as you repeatedly feed it. After the first feeding or two, you may notice a few bubbles and it will start to smell sour. When it gets frothy within a few hours of feeding, it is ready to use. Proceed to the Growing More Starter section. If you have not yet reached the bubbly-within-hours stage and have a half-cup or more of starter, discard all but a quarter cup before each feeding. Otherwise you will end up with A LOT of starter!

Cultures for Health says that it can take up to a week to reactivate the starter. It took about 5 feedings and 2 1/2 days to get my home-dried starter going. As I recall, it took about 5 days of twice-daily feedings to activate what I originally purchased.

GROWING MORE STARTER

By now you should have some fresh, active starter. To grow more starter, you just add flour and water to your existing starter, and mix.

Ideally, you will add equal parts, **by weight**, of flour and water to the existing starter. You may add up to the weight of the existing starter. So if you have 100 grams of starter, you may add up to 100 grams of water and 100 grams of flour, yielding a total of 300 grams of starter.

However, measurements when growing starter are not at all critical, and does not require a scale. Just estimate the volume of starter that

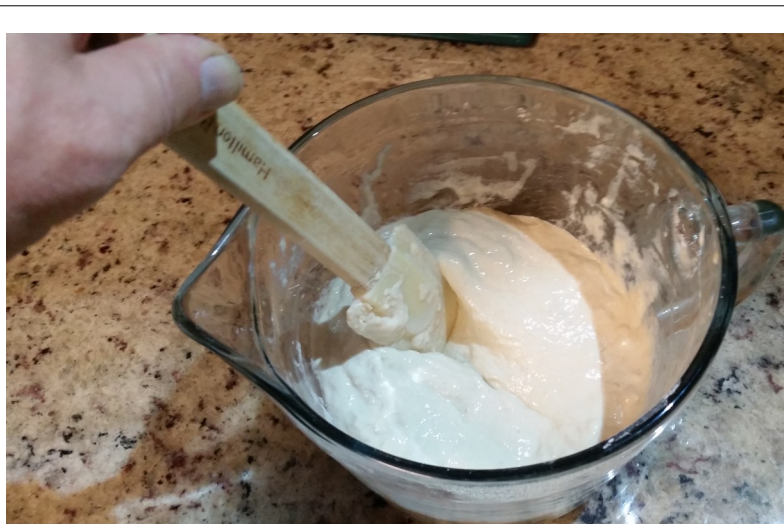
you have. Stir out any bubbles before measuring. You may use the markings on a batter bowl, or just estimate. Add up to the same amount of water. You will need almost twice as much flour by volume as water. So if you have a half-cup of starter, add a half-cup of water, and approximately a scant cup of flour. The result should be considerably thicker than pancake batter. It should stick to your spatula.

Cover the bowl to keep the starter moist to prevent a crust from forming on the surface.

Set the starter aside. It will get bubbles in it, get foamy, and eventually grow to about double the volume you started with. It should have a strong alcohol and yeast smell with a crisp, clean sour-smelling component.

The recommended temperature for growing starter is 70 - 85 F (20 – 30 C). The warmer it is, the faster it will grow. At around 80 degrees, it will complete the growth cycle from one feeding in a few hours. In the winter, I place the starter in the oven with the oven light left on. Be careful, it can get too hot. I left some starter in overnight with the light on and made it sick. I replaced the factory 40-watt bulb with an 11-watt S14 bulb from Ace hardware or Amazon.com. See our Products page on <http://www.heavenlysourdough.com>. It keeps the oven about 8 degrees warmer than room temperature.

Starter will grow at lower temperatures, even in the refrigerator. But it takes much longer. Starter grown at cooler temperatures will have a more robust, complex flavor.



Starter after feeding. Note consistency.

When the starter foams up to approximately double the starting volume before feeding, and has a noticeable sour, yeasty, alcohol smell, it is time to feed it again or make bread! If it has little or no smell, let it sit a while longer. It takes approximately two to six hours for it to grow to double the volume.

Grow enough starter for your needs (see [Baking the Bread](#) below). Grow what you need for baking, plus a tablespoon or two extra for starting your next batch of starter. Scraping the starter from the sides of the bowl will be enough.

If you need less than a full feeding of equal parts starter, water and flour to get your desired quantity of starter, it's ok to add less water and flour.

If you want to bake a second batch soon after the first, you can make more extra starter so you have more starter to start your next batch of starter with. Otherwise, just grow enough for your immediate needs plus a little.

Cleanliness is important in growing and maintaining starter. Do not touch the starter. Do not use wooden spoons to stir it. They may contain foreign bacteria.

If you make beer, keifer, yogurt, cheese, or yeast bread, keep it away from the area where you have your sourdough starter.



Several hours after feeding

BAKING THE BREAD

Here is the recipe for a regular 1½ lb and a large 2 lb. loaf. The 1½ lb recipe should be good for pans which are approximately 4” x 8” long. Use the two lb. recipe for larger pans such as the 5” x 9” silicon pans which you can occasionally find at Aldi. You may ignore the Baker’s % column.

Quantities are given for weighing or measuring. If you have a kitchen scale, you know how much more convenient weighing ingredients is. See [Weighing vs. Measuring](#) in the appendix. If you cook a lot, consider investing \$25 or so in a kitchen scale.

Ingredient	1 ½ lb. loaf	2 lb. loaf
Starter (made with approximately equal parts flour and water by weight)	$\frac{2}{3}$ cup (230 grams per cup) 159 grams	Generous 7 fluid oz 212 grams
Water	6.5 fluid oz. 196 grams	9 fluid oz. 261 grams
Salt	$\frac{1}{2}$ tablespoon (or 1 teaspoon + $\frac{1}{2}$ teaspoon) 9 grams	2 teaspoons 13 grams
Flour	Approximately 2.6 cups 395 grams	Approximately 3.5 cups 527 grams

Mix the starter, water, and salt.

Add the flour to get the proper consistency. Note that the flour measurements are approximate. Measuring flour with measuring cups is not very precise. The exact amount you get depends on how tightly-packed the flour is. For more information, see [Measuring Flour](#) in the appendix. The approximate measurements given for this recipe is for merely scooping the flour out of the bag and leveling.

If you are weighing ingredients, including the water and flour used to feed the starter, the given weights will be very close. You may just mix them all together. However, you may have to add a small bit of water or flour to adjust the consistency of the dough. This is due to moisture variations in flour due to humidity and age of the flour.

The starter quantity is not critical. If you have extra starter you want to use up rather than discard, simply add it to the mix and use less flour and water. [There is a bread calculator at our web site](#) that will do the math for you.

If you've never baked bread before, watch any video on kneading bread. This is a good video that goes through the whole process of baking sourdough bread: <http://www.culturesforhealth.com/learn/sourdough/how-to-make-sourdough-bread>. (This recipe is different than the one in the video. I use more flour and less starter because there is more food for the

starter and it will rise more. But the recipe in the video works fine. Note that the recipe in the video is for two loaves – two smallish loaves in my experience.) You want the same consistency dough that you would have if making conventional yeast bread. Mix the ingredients, adding flour slowly while kneading until you get the proper consistency. If you add too much flour, add a little water until it is the correct consistency.

The dough should be moist, yet not so moist that it sticks to your fingers.

If using a mixer, run it on low speed. My KitchenAid chugs along at the lowest speed. A friend with a Bosch mixer has to use speed 2 to get enough power.

Knowing how long to knead is the biggest challenge to a new bread baker. The standard advice is to do a "window pane" test, in which you take a lump of dough and stretch it out in a sheet. Numerous web sites advise that the dough is sufficiently kneaded if you can hold it up to light and see light shine through. This is NOT the case. You can see light through any dough after minimal kneading.

The best way I have found to determine sufficient kneading is to watch the texture and sheen of the dough in the mixer. It will get smooth and have a satiny, almost a wet or oily appearance. It will get stretchier and the mixer will start pulling harder. A window pane test will stretch so that the dough is almost paper-thin. Not only that, but when you try to poke your finger thru the pane, it stretches over your finger. I usually knead in a mixer or bread machine for 20 or 25 minutes.

Insufficient kneading will result in the loaf collapsing during rise or baking or a texture that is crumbly and hard.

Dough can be over-kneaded. The consensus is that it is virtually impossible to overknead by hand, but is a potential problem with machine kneading. I have overkneaded in a mixer. The dough will start to get sticky, then collapse into a gooey mess. From all of my reading, there is no way to fix it. But in my experience, underkneading is a much bigger danger. If in doubt, knead some more.

Be sure not to use all of your starter! You will need it to start your next batch of starter. You don't need much – one or two tablespoonfuls. The scrapings from the side of the bowl is enough.

Oil the bread pan (unless your pan is silicon), shape the kneaded dough into a little loaf, put it in the pan, and coat the exposed surface with oil. This keeps the surface of the dough from forming a crust during rising, which will inhibit further rising. Misting with a spray bottle of water periodically during rise will help keep the dough moist and soft. Chlorinated tap water is fine for misting.

Allow to rise. Sourdough will not rise as fast as yeast bread, but it **will** rise, as much or more than yeast bread. If you are rising the bread in a warmish place, you should notice some rising after two hours. The more it rises the softer and fluffier the bread will be. I estimate it rises by a factor of 4 or more. See the photos below. There should be some dough above the rim of the pan and puffing out over the sides. It should rise at least as much as yeast bread. It just takes longer. A good rise is important when using high-gluten flour. Otherwise the bread will be heavy, dense, and have a rubbery texture.

Your cool oven is a great place to let your bread rise. It will help keep the dough moist, especially if you mist with a spray bottle of water occasionally. In the winter, leaving the light on if the house is cool will speed rising.

It can rise too much. Poke it with your finger. It should feel springy, not hollow. If the dough does not eventually spring almost all the way back after poking it with your finger, it has risen enough or perhaps too much. If it gets so that if you poke the top with a knife it deflates, or deflates during baking, it has risen too much, or was insufficiently kneaded.

If your bread stops rising for a couple of hours and still is not as fluffy as you think it should be, go ahead and bake it. Perhaps you didn't make enough dough for your pan. It will still taste great.

If it is getting late and you don't want to go to bed or need to leave for some reason, put the partially-risen loaf in the refrigerator. Make sure the surface is oiled. Spray it with water and cover loosely with plastic wrap. It will continue to rise in the refrigerator, but it will be a slow rise.

A punch-down and second rise is not needed. However, there are advantages to a second rise. The sourdough bread made with a single rise will not be very sour. It will taste more like really good homemade yeast bread. If you punch it down and allow it to rise a second time, the result will be more sour, about as sour as the "sourdough" bread that you buy at Atlanta Bread Company or Panera Bread. (This is apparently not real sourdough -- just yeast bread with sourdough starter added for flavor. It is really good yeast bread however.) A punchdown and second rise will also improve the texture slightly. But start out with a single rise. The first time I did a second rise was to salvage a loaf that overrose and overflowed the pan.

Once it rises, proceed to bake like normal bread. Set the oven to 350 degrees and bake until it smells and looks right. I don't preheat the oven. If you have a thermometer, the internal temperature should be between 190 & 210 degrees F (88 – 99 C), with 200 (93 C) recommended. Cultures for Health recommends baking at 400 degrees (204 C). This makes a crustier bread. I like the softer crust as well as the texture of the loaf better when it is baked at 350 (177 C). But see notes on rolls. It takes about 45 minutes for a two-pound loaf in my oven, with no preheating.

This recipe does not rise very much during baking (called "oven spring" by the professionals) as yeast bread. Bromated flour seems to rise more during baking than non-bromated. But don't expect much, if any, rise during baking. If you feel that your bread needs to rise more during baking, try preheating the oven and baking at a higher temperature,

Once baking is finished, remove from the pan, lightly oil the surface of the bread, and allow to cool on a rack. It pops right out of my silicone pans. If using glass or metal, let it cool a bit before removing from the pan.



Newly-formed two-pound loaf. The surface has been oiled. Just waiting for it to rise!



Fully-risen loaf. Score the top, then bake!



Ready to...



...enjoy!

NOTES FOR ROLLS

Use the two pound recipe. After kneading, divide into 18 balls, and place them in three rows in a 9x13" pan. Bake at 400F. (350 won't work. The texture will be horrible. I don't know why this is. Thanks to my dear friend and bread guru Bonnie for telling me this.) I would have never figured this out. No one seems to know why this is. Oil the pan, then proceed as for loaves above. It will not take as long to bake of course. The internal temperature of 190-210 F (88 – 99 C) still applies. I let rolls get a little warmer (at least 200) because it results in firmer bread that is



easier to remove from the pan. Let cool a bit before attempting to remove from a glass or metal pan.

MAINTAINING THE STARTER

For your starter to remain healthy, all it needs is food and water. If you do not feed it, it will first develop a clear liquid on the top, then a brown liquid on the top, then eventually die. So you will need to feed your starter as described in the above section [Growing More Starter](#).

At room temperature, the starter will require feeding once or twice a day. Unless you will be baking every day or two, this is just too much work. Most of us are not looking for a new lifestyle centered around bread baking. So you will probably want to store your starter in the refrigerator. You should have a tablespoon or two of starter left over from your last bake. Scrape it all to the bottom of the bowl, feed it, and put it in the refrigerator.

How long can it be ignored while in the refrigerator? If you feed before refrigerating, it will go two weeks no problem. Keep an eye on it. It will froth up, then collapse just like it does at room temperature. But it will take weeks instead of hours. When the starter goes flat and has liquid on the top, take it out of the refrigerator and feed again.

Frequent feedings are good for your starter. If the starter gets sluggish, revive by giving it several full feedings. You will want to discard some starter before each feeding to keep a manageable quantity of starter.

If you have had your starter in the refrigerator for several weeks, it is a good idea to remove it, warm it up, and give several feedings even if you don't plan to bake.

When it is time to bake, remove the starter from the refrigerator, allow to warm, and repeatedly feed it to get the desired amount of starter. Remember, don't go over 1 part starter, 1 part water, and 1 part flour by weight per feeding. If measuring, don't add more water than you have starter, and add almost twice as much flour. As you are tripling the amount of starter with each feeding, it won't be long until you have as much starter as you need, even if you start with a small amount.

It is important to keep the starter bowl clean and prevent mold growth. I scrape down the sides of the bowl with a spatula after every use, and start with a clean bowl every week or two. I have two batter bowls and alternate between them. If you have only one bowl, transfer the starter to any clean container while you wash the bowl.

Culturesforhealth.com advises that sourdough can be preserved long-term by painting some starter on wax paper, letting it dry, removing it from the wax paper, breaking into flakes, putting the flakes in a little zip-lock bag, and storing in the refrigerator. (I have read that the flakes can be frozen. I've never tried it). They encourage you to do this to have a "backup" of your starter. I think this is how they prepare the crumbs they sell you when you buy starter. I tried this on crumbs that were 5 months old, and it did indeed come back to life very vigorously. I did some research on how long the dried starter will last. Cultures for Health says "at least a year". Someone else suggested 10 years. The truth is, no one really knows. I made a second batch after 6 months just to be safe.

By the way, this is a good way to share starter with a distant friend. Simply put about a tablespoon in an envelope and mail it.

Contact me using the information at <http://www.heavenlysourdough.com/> I would be happy to give you fresh starter if you are local. However, feel free to order from culturesforhealth.com. There is a wealth of information here which is worth more than the cost of the starter they sell.

Dennis Hevener
June, 2017

Copyright 2017-2019 by Dennis Hevener
<http://www.heavenlysourdough.com>

Revised Jan 2018, April 2018, June 2018,

December 2019 Corrected a Celsius temperature. Updated info on kneading.

Appendix

Measuring Flour

Getting an accurate measurement of flour with measuring cups is difficult. The amount of flour in a cup will vary significantly based on how tightly packed the flour is. King Arthur and others recommend fluffing the flour up then spooning it into the measuring cup. Most sources list flour as weighing 4¼ oz. or 120 grams per cup for sifted flour spooned into the cup. This is a lot of extra work. I used 150 grams per cup, which I determined by just scooping flour out of the bag and leveling it, then weighing,

Weighing flour is much easier and much more accurate.

Fortunately, accurate measurement of flour is not necessary for baking bread. Just measure the water and starter (which can be more accurately measured), then add flour to get the proper dough consistency. Chances are your grandmother baked her bread without measuring anything. In fact, exact measurement of water and starter is not critical at all. What is critical is that the dough be the right consistency. As long as the dough consistency is correct, the worst thing that can happen is that the size of the final loaf will be bigger or smaller than intended.

If you have extra starter, go ahead and use it up, and add less water. The bread calculator [here](#) will precisely calculate the adjusted amount of water and flour. Just make sure the final dough is the proper consistency. Worst case you end up with a loaf that is a little bigger or smaller than you intended.

Even if you weigh the ingredients, you may need to add a little bit of water or flour to adjust the consistency of the dough.

Weighing vs. Measuring Ingredients

Digital technology has made good, inexpensive, easy-to-use scales readily available. A scale is not at all necessary for making good bread. However, if you do even a modest amount of cooking, there is a lot to be said for purchasing a kitchen scale. First of all, you eliminate the plethora of measuring cups and spoons you have to get out, wash, and put away. Simply put the mixing bowl on the scale, press the Tare button to zero it, then add your first ingredient. Press the Tare button to again zero the scale, then add the second ingredient, and so on.

Weighing flour is as easy as weighing any other ingredient. It doesn't matter how packed it is. Likewise, you don't have to stir the bubbles out of your starter before weighing it.

Scaling recipes is much easier when you weigh. Try making a half recipe of 2½ cups of flour, a half-cup of sugar, ¾ cups of oil, etc. But scaling 300 grams of flour, 100 grams of sugar, and 150 grams of oil is trivial. Some scales have a feature that permits you to scale recipes using bakers' percentages without doing any math at all.

You have to convert your most-used recipes to weight. King Arthur has a comprehensive conversion table. <https://www.kingarthurflour.com/learn/ingredient-weight-chart.html>. Use grams instead of

ounces. That way you never have to deal with fractions or decimals.

A good, accurate kitchen scale can be had for \$20. Look for something that has at least a 5 kg/11 lb max limit with an accuracy of one gram. It needs to be able to handle the weight of your mixing bowl plus ingredients. Many scales can handle 8 kg/18 lbs. The scale must have a Tare button, and should be switchable between both grams and ounces. As far as I know, any scale you pick up will have these features.

Other less-common features to look for are an optional AC adapter, and adjustable auto-shutoff time.

Although most kitchen scales read down to the gram, they will not handle small weights of less than about 5 grams and may be up to a gram off. For bread baking, this is accurate enough to measure salt for all but the smallest batch.

For other recipes, you may have to continue measure things like salt, yeast, baking powder and spices. Since most kitchen scales do not display fractional grams, and no scale is 100% accurate, the displayed weight from even a good scale could be gram off. That is no big deal if you are weighting flour or water. But that error could be significant if you have a small recipe calling for baking powder. For less than \$20 you can get a “milligram scale” that is accurate to within a few milligrams (that’s $\frac{1}{1000}$ of a gram!) and have a capacity of 50 grams. Another worthwhile investment if you do a lot of cooking.

Salt

Salt acts as a conditioner, making the dough stronger and the texture of the finished product better, prevents oxidation which affects flavor, regulates yeast reproduction giving a more consistent rise rate, and improves shelf life.

I accidentally left salt out of a loaf I baked. It rose no problem, but the texture was poor. The no-salt loaf is shown in the right of the picture. It has a coarser, rubbery texture. The taste was nothing to write home about either.



Bread Calculator

At our web site <http://www.heavenlysourdough.com>, you will find a handy bread calculator. The main use for this is allowing you to use up all of your starter, adjusting the water and flour accordingly. The amount of starter used is not critical. If you have more starter than the recipe calls for and don't plan to bake for a while, you may simply use the extra starter, and lessen the amount of flour and water accordingly. The calculator figures out how much water and flour to use for a given amount of starter.

It also makes it easy to scale a recipe to make larger, smaller, or make multiple loaves. It has other features such as the ability to analyze other recipes to determinate total dough weight and hydration percentage, as well as other bread-related calculations.