

Lesson 14. Sourdough

Sourdough

[Wardee] The topic of sourdough *anything* starts way back at the microscopic level with wild yeasts and bacteria. We capture them and help them thrive and proliferate in a starter. A starter is an active colony of wild yeasts and beneficial bacteria that do the marvelous work of rising breads and baked goods, and also deactivating anti-nutrients such as phytic acid and enzyme inhibitors. It is kept alive through constant feeding; the organisms feed on starch in various flours. With consistent care, a starter can perform reliably for your lifetime and more! In this lesson, I'm going to tell you the story of what's happening with all sourdough foods ... as well as walk you through obtaining and reviving a sourdough starter, and using it to make sourdough baked goods!



You'll find links to all books and ingredients mentioned in this lesson on the [Recommended Resources Page](#) for this eBook/class.

If you're a member, [go online](#) to the Member Area to watch the videos that correspond to this lesson: **Nutrition of Sourdough, Rehydrating a Sourdough Starter, Sourdough Bread Recipe** and **Tracey's Sourdough Waffles**.

The History of Sourdough Bread

Sourdough bread is old-fashioned bread where wild yeasts do the work of rising the bread and souring it. Baker's Yeast or Active Dry Yeast were not used prior to 130 years ago. People cherished their sourdough starter, keeping it alive through constant use and consistent feedings. They made everything out of it — bread, pancakes, pastries and more.

The breads from the Bible had to be leavened through sour leavening, or sourdough; commercial yeast didn't exist then. We will learn in a bit how much more healthful sourdough bread is than modern, quick-rise breads. I am left to conclude that the Biblical bread was much more healthful. That's why I am excited to return to this age-old baking method!

To put this lesson in perspective, let me remind you that this is the third and final method of grain preparation. The first method is acidic soaking, where the acid triggers the release of the enzyme phytase to neutralize phytic acid. We learned this method through the soaking of both whole grains and whole-grain flour. The second method of grain preparation is sprouting of grains, where the germination of seeds neutralizes phytic acid and enzyme inhibitors, breaks down hard-to-digest components such as gluten, and transforms seeds into young plants.

The third method, and the topic of this lesson, is the souring or fermenting of seeds (in this case, grains) to neutralize phytic acid and enzyme inhibitors. This method happens to be far more effective in these tasks than either of the former, because of the bacterial action of the various lactic acid-producing bacteria that are present in sourdough starter.

Please note that sourdough action is a form of lacto-fermentation which we will study in future lessons: cultured dairy and cheeses, nourishing beverages such as water kefir, and naturally pickled foods such as sauerkraut. Lacto-fermentation is one of the most amazing methods of food preparation and preservation. However, keep in mind that in sourdough bread lacto-fermentation does the work of preparing the grains for optimal nutrition and digestion, and to rise the bread, but after baking, the beneficial organisms expire.

The Science of Sourdough

Let's contrast modern, commercial bread-baking practices with traditional sourdough bread. In commercial bread baking, people purchase a laboratory produced, selected strain of yeast — we call it “Baker's Yeast” or “Active Dry Yeast.”

What are the differences between today's rapid-rise yeast breads and traditional wild yeast-leavened sourdough breads? Why is sourdough bread better for you than quick-yeasted bread? Let's see what Sally Fallon has to say. She quoted Jacques DeLangre in [Nourishing Traditions](#):



“In books on baking and even in nutritional/medical writings, the two techniques for making bread, natural leaven (sourdough) and baker's yeast, are often mingled and confounded. ... Baking with leaven is in harmony with nature and maintains the integrity and nutrition of the cereal grains used. ... The process helps to increase and reinforce our body's absorption of the cereal's nutrients. Unlike yeasted bread that diminishes, even destroys, much of the grain's nutritional value, naturally leavened bread does not stale and, as it ages, maintains its original moisture much longer. A lot of that information was known pragmatically for centuries; and thus when yeast was first introduced in France at the court of Louis XIV in March 1668, because at that time the scientists already knew that the use of yeast would imperil the people's health, it was strongly rejected. Today, yeast is used almost universally, without any testing; and the recent scientific evidence and clinical findings are confirming the ancient taboos with bio-chemical and bioelectronic valid proofs that wholly support that age-old common sense decision.”

That's a pretty long quote (I find it beautifully written); what we learn from it is that the process of making sourdough bread helps our body to absorb the nutrients in grains, while yeasted breads work to destroy much of the grain's nutritional value. Sourdough bread resists going stale and keeps moisture much longer.

Reading further in Sandor Ellix Katz's [Wild Fermentation](#) and consolidating his points with the information in [Nourishing Traditions](#), I've put together this summary of the physical and functional differences of the yeasts.

Pure Yeast – Baker's Yeast – Commercial Yeast (Active Dry Yeast, Quick-Acting Yeast, etc.)

- ▶ selected strains of yeast that are chosen as superior, isolated and bred – a monocrop
- ▶ each confers desired characteristics for flavor, reproduction, ideal temperature
- ▶ engineered in a laboratory in a scientific quest for better breeds
- ▶ need to act quickly, before any wild microorganisms have a chance to get established
- ▶ depends upon more precise factors for success
- ▶ became commercially available in the 1870s
- ▶ diminishes much of the grain's nutritional value
- ▶ bread leavened with this yeast stales easily

Wild Yeast (Sourdough Starter)

- ▶ motley crew of yeasts growing with other microorganisms – an ecosystem, if you will
- ▶ unique flavors
- ▶ is everywhere – on the flour, in the air, always ready to stop and feast upon carbohydrate-rich food
- ▶ slower fermentation, allowing yeast to add B vitamins and break down hard-to-digest gluten into more easily assimilated nutrients
- ▶ accompanied by *Lactobacilli* and other bacteria, which produce acids, contribute complex sour flavors, and neutralize anti-nutrients such as phytic acid and enzyme inhibitors
- ▶ easily propagated in the home kitchen, where it can be maintained for a lifetime, even generations
- ▶ breads until 130 years ago were made with this natural leavening
- ▶ versatile with regard to temperature or other growing conditions
- ▶ does not stale easily, retains original moisture much longer than baker's yeast-leavened breads

As you can see, commercial yeast must be purchased again and again, because it gets used up in the recipes. It has to work quickly or it gets overtaken by wild organisms. Bread made with commercial yeast stales easily. Also, it is pretty picky about its environment in order to work well. Namely, the temperature must be just right, and also it can't abide acidity, so you won't ever find this yeast in the presence of *Lactobacilli*. Consequently, bread made with baker's yeast won't offer the neutralization of phytic acid or enzyme inhibitors, because that job is performed by the *Lactobacilli*.

What's so bad about phytic acid? What are enzyme inhibitors? Phytic acid is an anti-nutrient that binds to minerals in your gut, preventing mineral absorption and leading to mineral deficiencies. Enzyme inhibitors suppress the proper functioning of your digestive enzymes, leading to poor digestion and digestive discomfort.

On the other hand, consider the wild yeasts (and accompanying bacteria) that produce sourdough bread. They are naturally occurring, and when cultivated, make a home in a sourdough starter. We (the cooks) keep the starter alive through use and constant feedings. A sourdough starter can last for hundreds of years! It is an ecosystem of wild yeasts and beneficial bacteria that work together to add B vitamins to grains, to break down gluten for better digestion, and to neutralize phytic acid and enzyme inhibitors. The sourdough starter's organisms are much more versatile with regard to temperature or other conditions, and the bread doesn't stale as quickly.

The bottom line? Sourdough bread methods are much to be preferred over modern bread-making methods. Let's talk about the wild organisms that are sourdough at the microscopic level — then you'll really understand what's going on in any sourdough food, from bread to the cinnamon rolls, cakes, pizza, muffins and more, which we'll make in this lesson and also in our Sourdough eCourse.

Wild Yeast

The **wild yeasts** are single-celled fungi that feed on simple sugars in flour. The flour contains some simple sugars ready to go, but most are bound up in complex starch molecules. The yeasts and bacteria release enzymes to break those down into hundreds or thousands of simple sugar molecules.



The wild yeasts need oxygen. If oxygen is not given to the yeasts, other organisms that don't need oxygen are encouraged to proliferate instead, such as the yeasts that make beer and wine. As the yeasts eat the sugars, they give off a small amount of ethanol (an alcohol), acetic acid (vinegar), and lots of carbon dioxide.

The carbon dioxide produces the bubbles you see in a sourdough starter, and it also puffs up a rising bread dough. A good starter will have more yeasts than *Lactobacilli*, which is necessary to get a good rise. The ethanol and acetic acid lend a sour smell and flavor to dough and bread. Acetic acid also helps keep the bread fresh longer.

Bacteria: Lactobacilli

The beneficial bacteria in sourdough are called *Lactobacilli*. They eat simple sugars, too, but unlike the yeasts, they don't need oxygen. They neutralize phytic acid and enzyme inhibitors. Their byproducts are ethanol, lactic acid and carbon dioxide.

The carbon dioxide helps rise the dough. The ethanol and lactic acid give a distinct sour taste to sourdough bread (the lactic acid more so than the ethanol). And the lactic acid acts as a natural antibiotic, preventing any bad organisms from getting a foothold.

The Starter Cycle

All sourdough foods begin with a sourdough starter — an active colony of wild yeasts and *Lactobacilli* suspended in a batter of flour and water. The wild yeasts and *Lactobacilli* are everywhere — in the air, in unprocessed whole-grain flours, on your fruits and veggies, and on your skin. Unbleached, unprocessed flours in particular have loads of wild yeasts and *Lactobacilli* that are perfectly suited for baking, so these are the best flours to use for making your own starter.

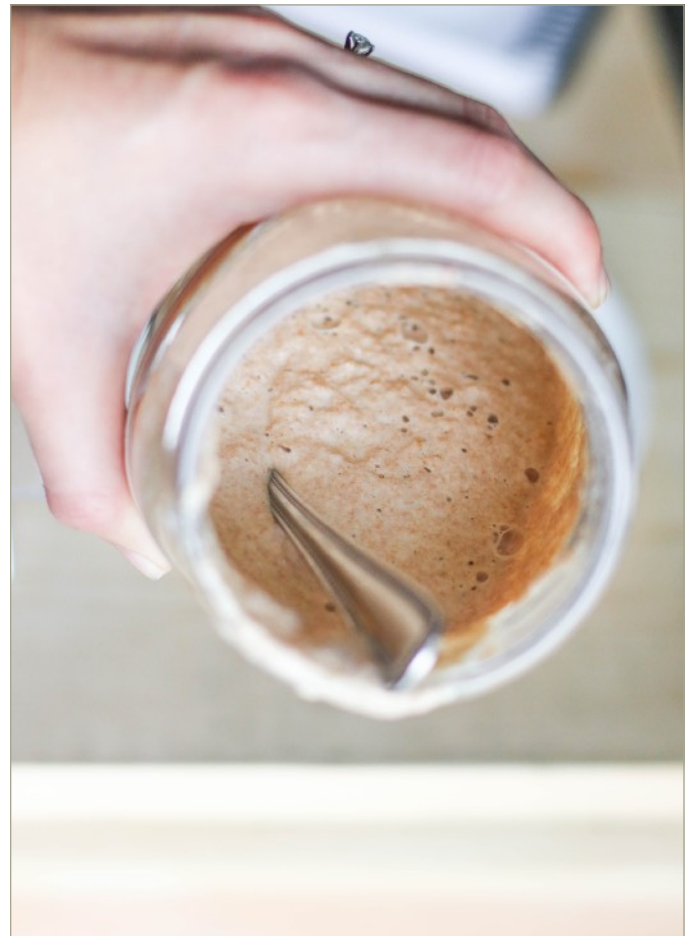
Creating and maintaining a starter is a process of feeding the naturally present organisms to encourage them to multiply over and over until the jar is full of millions of them.

During a feeding, as the yeasts and bacteria begin feasting on the simple sugars, they give off carbon dioxide and ethanol and multiply. The mixture builds up to a peak of activity, what we call a fully active starter. The starter at this point is bubbly and domed, and it smells sour. A thick starter may also rise significantly.

When the yeasts run out of food, their activity slows and the peak recedes. Liquid, called hooch, separates out.

This hooch is the home for the sour *Lactobacilli* and, understandably, it is the most sour part of the starter. The *Lactobacilli* are still active at this stage, as they keep eating the expired yeasts and yeast wastes. This keeps the starter fresh, so we should be thankful!

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Sourdough Terms

Here is a non-exhaustive list of everyday sourdough terms you're likely to come across in this eCourse or on the web, explained in simple terms.

Elasticity. The ability of the dough to spring back and have tension. During the rising of a dough, elasticity as well as overall strength allows the dough to stretch to a larger size, yet be strong enough to hold the gases produced by the wild yeasts and *Lactobacilli*.

Feed or Refresh. Adding nutrients (flour and water) to re-activate a starter to a (ideally) peak level of activity. Usually, feed equal parts flour and water at a feeding, judging the amounts by the quantity of starter required. When feeding with spelt flour, use 3/4 to 7/8 cup water for each cup of spelt flour; otherwise, the starter is too runny.

Fermentation. As the wild yeasts and *Lactobacilli* feed on the simple sugars in a dough, they release carbon dioxide, alcohol and other byproducts, all of which flavor the bread and cause it to rise. Also known as leavening or rising.

Fully Active Starter. A starter when the *Lactobacilli* and wild yeasts are at peak activity. Signs are bubbles, slight doming and sour smell in a starter/sponge. There may be frothy liquid at the very top, and with thick enough batters, the overall volume may have doubled or more. Some recipes don't require a fully active starter (e.g., pancakes) and some do (e.g., sandwich bread).

Hooch. The liquid that separates out and rises to the top of the starter. May be stirred back in or poured off. Pouring off may lessen the sourness of the baked good(s).

Hydration. A way of quantifying how thick or thin an active starter should be. It expresses the water as a percentage of the flour added, by weight. (One baker named Ed Wood uses hydration differently.)

Take 60 percent hydration as an example. The liquid added should be 60 percent of the flour amount added. So, let's say you add 2 pounds of flour. The water added should be 60 percent of that — or 1.2 pounds.

This works for all weight measurements. Volume measurements don't work so well (a cup weighs differently depending on what flour is being measured). With experience, you'll learn to adjust the hydration based on how your dough feels.

Lactobacilli. "Friendly" lactic acid-producing bacteria. They assist the process of fermentation (rising) in bread, adding sour flavor and leavening. They are the chief bacteria at work in lacto-fermentation of vegetables or cultured dairy foods, too, as well as other fermented foods.

Sponge. A wet, rather than firm, mixture of liquid, flour and starter that is allowed to ferment for a few minutes to a day, or more. Using a sponge helps improve flavor and build up the strength of the natural yeasts for leavening. Begins as a starter, and often is called a starter.

Starter. A batter-like or dough-like mixture of flour and water containing an active colony of wild yeasts and *Lactobacilli*. Used as leavening in doughs. A small amount is reserved from each baking session to perpetuate the colony indefinitely.



Rehydrate a Dehydrated Starter

To ensure a higher success rate with sourdough bread, in this eCourse I will walk you through the process of rehydrating an already established, dehydrated sourdough starter. If you would like to create your own starter from scratch, you may certainly do so. You will find in-depth instructions in our Sourdough A to Z eCourse, Einkorn Baking eCourse (for einkorn sourdough) and Allergy-Free Cooking eCourse (for gluten-free sourdough).

These are the ingredients and equipment you will need for this lesson. Please refer to the Ingredient and Equipment Notes for more information. **Please note: If you already have an active hydrated starter, then you can skip this part of the lesson.**

Ingredients

- ▶ [dehydrated sourdough starter](#)
- ▶ 15 cups (1800 g) whole-grain flour of choice, plus additional to maintain starter
- ▶ pure water

Equipment

- ▶ a wide-mouth, quart-size glass jar
- ▶ a cloth napkin (or paper towel) and rubber band

Which Starter to Use?

I highly recommend the Whole Wheat sourdough starter from [Cultures for Health](#) (use coupon code **TCS** for 15 percent off). I like it because it is easily adaptable to various flours — I routinely feed my starter different flours, and it keeps producing better breads. It is also quick rising; this makes bread baking easy and rewarding when I can see the starter working marvelously in my breads.

You may have gotten an active, hydrated starter from a friend or family member. If so, you can skip the steps that tell you how to rehydrate a starter. If you got the free starter from [Carl's Friends](#), you may follow their directions or my directions to rehydrate it.

As mentioned above, you can also make your own sourdough starter with flour and water. For in-depth information on how to do this, see the Sourdough A to Z eCourse, Einkorn Baking eCourse (for einkorn sourdough) or Allergy-Free Cooking eCourse (for gluten-free sourdough).

What Kind of Flour to Use?

Preferably, use an organic flour — whether whole wheat, spelt, einkorn, another whole-grain flour of choice, all-purpose, white or soft wheat. You can also grind your own such as with the Mockmill. I usually recommend using whole-grain flour instead of all-purpose when making a starter from scratch, since whole grain is more abundant in wild yeasts and *Lactobacilli*. If you're rehydrating an established sourdough starter, using whole grain doesn't matter, so feel free to use all-purpose if you wish.

If you're interested in milling your own flour, my favorite affordable home grain mill is the Mockmill. Get 5 percent off by using my link to shop: TradCookSchool.com/mockmill (5 percent off automatically applied at checkout). If you do buy a Mockmill, then claim your free gifts worth \$128 from me at TradCookSchool.com/millbonus!

How to Rehydrate a Sourdough Starter

Open your package of dehydrated starter, and empty it into a clean, quart-size, wide-mouth glass jar. Add 1/4 cup of water and mix well. Then add 1/4 cup of whole-grain flour of choice, and mix vigorously, incorporating much air into the mix.

Cover with a cloth napkin or paper towel, secure with a rubber band, and place in a warm area or room temperature area for about 24 hours. The warmer the temperature, the faster the rehydration process; but don't exceed 85 degrees if you can help it. The mixture may or may not be bubbly at the end of this first step.

Mix in 1/2 cup water and 1/2 cup whole-grain flour of choice, once again stirring vigorously to incorporate much air. Cover and return to the warm spot for 12 hours. Repeat this process every 12 to 24 hours until the mixture is light and bubbly and smells sour.

Discard starter as needed, before each feeding, throughout this process, keeping the amount of starter (before each feeding) around 1 to 1-1/2 cups. Consider keeping a towel under the jar as a very active starter might bubble over.

The starter will increase in size until it reaches a peak and then begin to collapse and liquid will separate out. This is all normal; the liquid may be stirred back in. If you happen to catch the starter at its peak, the starter will look domed and bubbly. Then it collapses and the liquid starts separating.



Why Discard Half?

Why “discard half” when making a sourdough starter? Well, the sourdough starter is not a viable starter until it has been light and bubbly for at least three successive feedings. It takes that long for the organism balance to get reestablished. Discarding half is actually the MOST FRUGAL way to do this. Think about it: If you don't discard some each time, you have to feed it MORE flour each time (because it's a larger quantity of batter to keep going).

Some say they want to keep the “other half” and give to a friend. The problem with this is that at every feeding, there's another half which becomes other HALVES at each new feeding. First two, then four, then eight, then 16 ... up to 256 from the first mixture after just four days! And each one needs to be built up to maturity (three to five days with two feedings a day).

Who has that much counter space, abundance of flour or friends? It's much less wasteful to discard some each time (which can go in compost or be tossed into something else you're baking — it doesn't have to be wasted) than to use tons of flour or try to make tons of starters. Make sense? I hope so!

I recommend considering a starter reactivated when you've seen it light and bubbly for at least three successive feedings. In cooler spots, it may take several days to complete this process.

When starter is reactivated, discard all but 1 cup and transfer to the refrigerator. Cover loosely as it will still give off gas in the refrigerator, but much more slowly. Tighten the lid when the mixture becomes dormant.

If you're ready to move on with one of the recipes, there is no need to store the starter in the refrigerator.

Signs of an Active Starter

An active starter has these qualities: It's bubbly, domes slightly, produces hooch (yellow liquid) and smells fresh and sour. It may even double in size, though often that depends on the type of flour used, so don't worry if yours does not.

Care for a Starter

OK, you've got an active, rehydrated starter. Now what do you do? How do you keep it alive? This is really simple. Meet the following needs of a starter, and it will be very happy and make great food for you.

Warmth. Ideal temperature, so the wild organisms will flourish, is right around room temperature, or between 65 and 85 degrees Fahrenheit. A gas oven with the pilot light or a food dehydrator with a low temperature setting (below 90 degrees Fahrenheit) are good places to put your starter and/or sourdough dough. I also like the spot on my counter right next to the oven vent, near the wood stove, near a turned-on slow cooker, or on top of the refrigerator. Even right out at room temperature is fine. To take this further, use warm flour (from milling) or comfortable to the touch water during feedings.

Food. The wild yeasts feed on the simple sugars in flour. Feed your starter equal parts flour and water. Or if using spelt flour, use 3/4 to 7/8 cups of water for every cup of flour, otherwise it will be too thin.

How much starter is needed for a recipe will help you determine how much to feed your starter. Keep in mind that you will need some for the recipe, and some to reserve to keep going indefinitely. Always remember to hold some back!

If you always keep around 1/2 to 1 cup starter, it usually works out to feed it the same amount of flour and water as the amount of starter you need for a recipe. For example, let's say you have 1 cup of starter, but you need 2 cups for a recipe. Feeding 2 cups of flour and 2 cups of water will give you the 2 cups of starter for the recipe and plenty to reserve. (You can do a little more than 2 cups of flour to keep a thicker starter.)

If you need quite a bit of starter, you can build up the quantity through successive feedings. For instance, when I need 9 cups of starter for my triple batch of bread, I feed the starter two or three times throughout one day until I have the 9 cups of starter, plus reserved starter to keep going.

As a general rule, never feed the starter more flour than three times its volume. If you have 1 cup starter, don't feed it more than 3 cups flour (and 3 cups water).

Oxygen. When you feed your starter, mix it with some vigor to incorporate oxygen. The yeasts will thank you — the yeasts involved in bread baking need oxygen to flourish and multiply.

Container. Choose a non-reactive container such as glass or ceramic. Avoid plastic containers because over time, the acidity of the starter can cause the plastic to leach into it. Always remember to choose a container that gives your starter room to double or triple in volume if it needs to!

Utensils. Use wood, stainless steel or plastic utensils. Other metal utensils are reactive and can degrade the quality of your starter over time.



Two Methods of Caring for a Starter

So the starter's working, and you know what it needs to keep it going. Now the question is, how often do you want to use it? You might not know this yet. After all, you need to get some experience working with it and seeing what it can do. But still I should tell you what your options are. How often you want to use it will determine where you keep your starter.

Room Temperature. This method involves keeping the starter at room temperature at all times, feeding it equal parts flour and water twice daily. This is ideal for people that use their starter on a daily basis. After all, any overflowing amounts can be used for quick batches of crepes, pancakes, waffles and more! As a general rule of thumb, keep the starter's volume less than half the container's size.



Refrigerator. This method involves storing the starter in the refrigerator in between baking days. You'll take it out of the refrigerator when you want to bake with it, warm it up, feed it, use it, and then store it again. Follow the directions below under "Storing the Starter."

Storing the Starter in the Refrigerator

Storage of a starter is a bit different than when a starter is working. You see, during storage, it is dormant. So it does not have to be warm, and it doesn't need to be fed so often either. The starter should be fed once per week, following one of these two scenarios (for refrigerated starter). I recommend storing 1 cup of starter in the fridge, and building up its volume as needed. It is much easier to find room in the fridge for storing it in this small quantity.

The starter is in the refrigerator and needs to be fed, but you won't be baking with it. Bring it out of the refrigerator, add a cup or two of flour, and the same amount of water. Cover it loosely and let it sit out at room temperature until it is light and bubbly. Stir it down, reincorporating any liquid that has separated out, discard all but about 1 cup, and transfer back to the refrigerator. Cover loosely until it chills completely and is dormant again.

The starter is in the refrigerator and needs to be fed, and you will be baking with it. Bring it out of the refrigerator. Feed it with equal parts flour and water (no more than three times the amount of flour as the volume of the starter). Depending on the recipe, you may need to add additional successive feedings spaced several hours apart to get up the volume needed. Use in the recipe, but hold back and refrigerate 1 cup of this fed starter. Cover loosely until it chills completely and is dormant again.

Daily Maintenance Feedings: A Middle Ground to Starter Care

I developed another starter care method as a compromise between room temperature and refrigerator storage. This routine makes it easy to bake with sourdough for several days in a row, without putting in marathon baking days or becoming overwhelmed with too much starter.

Here's how to do it: Feed the starter only what you need to build it up for when you need it. If you are going to bake something that requires a bit more, feed it a bit more on that occasion. Otherwise, feed it a maintenance amount: a tablespoon or two per cup of starter or less, every morning and evening. For more information, [see this #AskWardee](#).

A Starter Ready for Baking

After a feeding at room temperature, you can tell if your starter is ready to be used in a recipe (or ready to be fed again if you're building up its volume) when it is domed and bubbly, and it smells sour. When you scoop into it, it will be gloppy and gel-like. Some recipes (like sandwich bread) require a starter in this bubbly, active state. Most do not, which makes feeding flexible.

After more time has elapsed, the starter will collapse and get liquid-y and runny. A starter past its peak works wonderfully in baked goods such as pancakes, waffles, English muffins — just not so good for bread.

For all these other recipes, use a starter that was fed at least 12 hours before, whether or not it is at its peak. Of course, you can always use starter in its active state for all recipes. Just with some recipes, it doesn't matter so much.

Getting Ready for Baking

Before we get into the recipes, I want to share with you my best tips for sourdough baking success.

Not-too-sour sourdough. While some like a very sour bread, most do not. There are certain strategies you can take to ensure that your sourdough baked goods are not too sour.

- ▶ **Feed a room temperature starter twice daily to keep the yeasts more dominant than the *Lactobacilli*.** The *Lactobacilli* make the bread sour and they will eat long after the yeasts do, because they eat not only the simple sugars but expired yeasts and yeast wastes. So, regular flour feedings will make sure the yeasts have plenty of food too, and therefore dominate over the *Lactobacilli*.
- ▶ **Pour off the hooch, which is where the sourness from the *Lactobacilli* mainly resides.** This is optional and not really necessary if you keep up regular feedings. If you do pour off the hooch, you might need to add more water at the feeding to compensate.
- ▶ **Let your sourdough foods rise for shorter times, rather than longer.**
- ▶ **Use baking soda in the recipe.** Baking soda reacts with the acid in the starter and neutralizes the sour flavor ... thus the phrase "soda sweetens."
- ▶ **Use more starter in a recipe, not less.** This sounds strange, but here's why it works. More starter will work more quickly to rise and prepare the dough for digestion, resulting in less time for the dough to become sour. If you add more starter, you should use less water or liquid in the recipe.

Sour all of the flour. Many sourdough recipes, in cookbooks or across the internet, call for "souring" only a portion of the flour with the starter. But some of the flour in these recipes is not given a souring time at all, which means the grain is not optimally prepared for digestion.

Here's an example. In a regular recipe, the starter and some of flour and liquid are mixed up and allowed to sour for a few hours. Then, more flour and other ingredients such as oil, sweetener, spices, fruits and leavenings are added. Then the mixture is baked pretty soon after this. Do you see how some of the flour was soured and some was not?



For bread foods to be optimally nutritious, all the flour must be allowed a souring time. We recommend at least 7 to 8 hours, or overnight. In this eCourse, all the recipes are adapted so that the entirety of flour is “soured” or fermented — for best nutrition.

Best flours to use. You will be able to choose various flours for the recipes in this eCourse, such as regular whole wheat, whole wheat pastry, spelt or einkorn. In general, if a recipe calls for whole wheat and you’d like to use spelt, you’ll need to add additional spelt flour to achieve the same consistency.

Why Use Einkorn Flour

My family loves einkorn flour. Our sourdough English muffins, pizza crust, cakes ... everything turns out so light and fluffy. Sifted einkorn is a lot like the lightness of whole-grain spelt flour. It doesn’t behave the same (einkorn is sticky where spelt is gloppy), but the end result is really, really fantastic. Here’s why einkorn is so special:

Einkorn is the world’s earliest domesticated wheat, first grown more than 5,000 years ago in the mountains of Turkey. It is a “hulled” wheat, whereas modern wheats are not (spelt is, however). The hull can protect the grain from stray chemical contamination and insects, making it an easier grain to grow organically!

Overall, however, it is more difficult to grow and harvest, and it yields less than modern wheat or other ancient grains like emmer or spelt, which is why thousands of years ago, emmer and spelt quickly replaced it on farms.

Einkorn has half the phytic acid as wheat, so it’s better than wheat if you’re going to bake cookies or a cake without soaking or souring. But if you do include soaking or souring — WOW — even less phytic acid to inhibit mineral absorption.

While not gluten-free, einkorn has a form of gluten that is gentler on digestion, especially when coupled with sourdough! It also assimilates into the bloodstream more slowly, causing less of an effect on blood sugar. Finally, einkorn has a slightly nutty, mild taste that isn’t as off-putting for people as the heavy, “healthy” taste of whole wheat.

One downside for einkorn is that it’s high in Vitamin A. If you suspect Vitamin A toxicity, we recommend using ancient grains spelt or emmer instead. Get more info in our **Healthy Diets eCourse Lesson 8**.

To learn more about the nuances of baking with einkorn flour, refer to our **Einkorn Baking eCourse**.



Freshly ground flour. You can use freshly ground flour (like I almost always do — milled at home in my [Mockmill stone grain mill](#)) or not. To adapt the recipes below according to what’s on hand or your personal preference, follow these guidelines.

Pound for pound, fresh-ground flour fills up more space than flour which is not fresh-ground. You see, flour settles over time. So, if a recipe uses freshly ground flour, but yours isn’t, use a little less. I suggest using 2 to 4 tablespoons less per cup of flour. You can always add more flour if needed.



If a recipe uses flour which is not freshly ground, and yours is, expect to add more flour to get the right consistency. Usually, 2 tablespoons more per cup is the right amount, but it could be more or less.

Climate, temperature and altitude differences. In dry climates, flour is more dry and sucks up more moisture, which means you should start out with less flour, or use more liquid to account for the drier flour.

High altitude can also affect baked goods. In general, use any techniques you have found to be helpful in the past when adjusting our recipes for high altitude. [Here is our recommended resource for high-altitude baking.](#)

Hotter temperatures (in addition to longer souring times) make for runnier batters, so often more flour is needed when making a recipe in the summer than in the winter.

Doughs that need to be rolled out. In general, the longer the souring time, the better for nutrition. Yet in the case of doughs that you need to roll out, such as tortillas, crackers and pizza crusts, be aware that souring too long results in a dough that has no elasticity left. In other words, the dough breaks and cannot be rolled out very well.



We suggest no more than 8 or 12 hours of souring at warm temperatures for these recipes. If your temperature is cooler, you will be able to lengthen the souring time without negative results.

Tips for Lighter, Less-Dense Sourdough Bread

While the baking tips above applied to sourdough in general, here is a list of tips for sourdough bread-baking specifically. These are all the things I can think of to help you get lighter, less-dense sourdough bread!

Use a lighter flour. Whole wheat flour (hard red) is the heaviest flour I know. Now, the hard white variety of whole wheat is lighter and sweeter, so that one thing could improve your bread. If you go with spelt or even einkorn, you will get even lighter results, in my experience.



Use some (or all) sifted flour. Sift your flour to remove the heavy parts (bran) and the resulting flour is lighter. You can combine this with whole flour or use all sifted flour in your recipe. This tip helps no matter which type of flour you're using.

Make sure your starter is strong and ready for bread. As mentioned above, bread baking requires a starter in its active state. Yet more than that, it requires a mature starter. To achieve best results, your starter should be at least two to three weeks old, and have been fed regular, twice-a-day feedings for at least three days in a row (this means if you keep your starter in the refrigerator and have trouble with dense loaves of bread, try moving it to room temperature a few days prior to baking day).

Your starter should also be bubbling and rising up the sides of its container within 4 hours of feeding. An easy way to gauge this is to mark the outside of the jar with a piece of tape, then feed the starter. In 3 to 4 hours,

14. Sourdough

check the level of the sourdough. It should be bubbly and have risen at least a few inches above the initial mark. It also helps to use a glass jar you can see through.

Adjust the moisture level of the dough. Both too-wet or too-dry dough can result in dense bread. One mistake people make when using whole-grain flours is they add the flour and move on with the recipe. Yet, whole-grain flours take awhile to absorb moisture, so it's better to add some of the flour and give it 15 minutes or so to absorb water. Then come back and add more flour to get the right consistency. In kneaded bread doughs, I look for somewhat sticky dough — not dry and not too sticky. This is something you learn as you practice.

Add baking soda before shaping. Not only will baking soda “sweeten” the dough and make it less sour, it reacts with the acids in the dough (which the starter produces) in a fizzy chemical reaction. You won't necessarily see fizz in your bread dough, but you will see it lift before your eyes. Add 1/2 to 1 teaspoon to a loaf's worth right before shaping into a loaf by sprinkling it on the dough, then folding it in, then shaping into a loaf, letting it rise and baking it.

Knead shorter or knead longer. If it's a kneaded recipe, you may not have kneaded enough — or you may have kneaded too much. The dough needs to have a nice stretch so that when the yeasts are giving off gas and wanting to lift it up, the dough network can accommodate that and follow along. It's teamwork. The yeasts push; the dough lifts. If the dough is not kneaded enough, it's not stretchy enough to lift much. If the dough is kneaded too much, those long strands of developed gluten that would stretch get broken and won't stretch because they're too short. To know if your dough is kneaded just right, do the “window test” — take a small amount of dough and stretch it between your fingers. Does it stretch out to about an inch where you can see through it but it doesn't snap or break apart? Then it passes.

Let it rise in a warm place. Sourdough needs a warm and comfy spot to rise. Too cold and the organisms are slowed way down to the point that they're nearly dormant. Liven them up by keeping them warm — in an oven with a pilot light on, near the fireplace, near the venting burner for your oven (while something else is baking), or even in a cube dehydrator like the Excalibur (just barely turn the fan on). It needs to be warm to rise, and rise is oh-so-important for being lighter and less dense.

Bake in a hot, hot oven. When the dough is ready for baking, put it in the oven that's hot, hot, hot — aka pre-heated to a high temperature, like 450 degrees Fahrenheit. It can bake that way for the first 15 minutes or so, and then you turn down the temp. Or some recipes have you baking at that temperature the whole way through. Anyway, that heat acts like a “poof” for the dough and gives it a big lift.

Let go of perfection. I'm throwing this in there because some of the most tasty breads I've eaten are less than perfect. It's OK!

Use your less-than-perfect sourdough loaf for other things! If it's not perfect, turn your loaf into stuffing, bread pudding, croutons ... or toast! You'll find several such recipes below.

Converting Recipes to Sourdough

You have a bubbling sourdough starter, and it seems like such a betrayal not to use it when you're baking, right? So sooner or later, you might find yourself wishing you knew how to take the tried-and-true non-sourdough recipes and adapt them for sourdough.

It can take some trial and error to convert recipes to sourdough, but if you can grasp the overall principles and practice ... I think you'll soon be off to the races! Here's how I would approach adapting recipes for sourdough ...



Yeasted Recipes

A quick rule to adapt recipes to sourdough is: Substitute 1 cup of starter for each package of yeast, and then subtract about 1/2 cup of water and 3/4 cup of flour from the recipe to compensate for the water and flour in the starter.

You will need to play with the consistency of the dough — adding or subtracting liquid or flour. Aim for how you know the recipe should look and feel. And, you will need to add a rising time. Sourdough needs more rising time than quick yeast. Instead of an hour or whatever the original recipe calls for, aim for at least 5 to 8 hours total of rising. Which might be broken up into a first or second rise (when you punch down the dough in between).

See note below for baking soda and liquid acids.

Quick Breads

Conventional quick breads probably don't have a soaking stage already worked in. If they did, this would be really easy. Here's how to adapt recipes to sourdough for quick breads with and without soaking stages:

If there is a soaking stage: Use sourdough starter in place of the acid medium. Proceed with the recipe. No other changes should be necessary.

If there is not already a soaking stage (most likely): At the beginning of the recipe, combine just the flour and liquid (and maybe the fat if there isn't enough liquid to wet the flour) and also add 1 tablespoon sourdough starter for each cup of liquid. Let that batter/dough sour 5 to 8 hours. Then add everything else in the recipe and proceed with the directions for baking.

See note below for baking soda and liquid acids.

Alternate Quick Bread Adaptation

Rather than adding a small amount of sourdough as above, you can replace more of the flour and water with sourdough starter (sourdough starter is a mixture of flour and water after all). Let's say you tend to feed your sourdough starter equal parts flour and water — 1/2 cup flour and 1/2 cup water at a time, for example. Then use 1/2 cup of your starter to replace 1/2 cup of flour and 1/2 cup of water/liquid in the recipe.

If you tend to feed a bit more flour than water (which is what I do), you can use your starter to replace a bit more flour than water in the original recipe. Create the batter with as few ingredients as possible — starter, flour, liquid. Let sour for 5 to 8 hours. Add the rest of the ingredients and bake.

See note below for baking soda and liquid acids.

Pancakes, Waffles and Crepes

Pancakes, waffles and crepes are very easy to convert to sourdough because starter is just right for these batters and there's no need to add additional flour. This means you can skip the soaking!

Pancakes and waffles: Sourdough starter can replace all the flour and liquid in the recipe as is. It is usually already the right consistency for batters like this.

Crepes: Use the sourdough starter in place of the flour and water and then thin (after mixing in the other ingredients) with milk or other liquid to a crepe batter consistency.

See note below for baking soda and liquid acids.

The Baking Soda Issue

Baking soda reacts with acids and puffs it all up. But ... sourdough starter is acidic. So keep in mind that if your original recipe has baking soda and there was no acid in the recipe (like yogurt, lemon juice, vinegar), sourdough starter will act as an acid and cause a reaction that you may not have seen before in your recipe. This is OK most of the time and will actually allow your quick bread or breads to turn out light and fluffy!

You want to add that baking soda at the very end, or maybe just before mixing in any add-ins like chocolate chips or dried fruit. Then bake while the batter is still billowy. This isn't a batter you want to let sit around. You can also choose to reduce the amount of baking soda (if too much fluffy happens). Or use baking powder instead (which creates both an immediate and delayed rising action).

The Acid Issue

If your original recipe depends on using an acidic liquid such as buttermilk or yogurt, you could use milk or even water along with sourdough starter. The sourdough provides the acid and the milk/water provides the liquid.

FAQs: Sourdough

Q: Does the sourdough process make sourdough gluten-free by the end?

A: No, although the gluten protein will be degraded by the sourdough process, making it easier to digest. Some sensitive individuals will still have trouble with it, though. [This post goes into why regular sourdough is not gluten-free in much more detail.](#)

Q: What kind of flour can I feed my starter?

A: For mature starters, use whole wheat, spelt, einkorn or whole-grain flour of your choice, preferably organic, or even all-purpose, white or soft wheat flours. You can also grind your own, such as with the Mockmill (save 5 percent at TradCookSchool.com/mockmill). I feed my starter whatever flour I'm using for the recipe in front of me, or whatever flour I've got leftover at the moment.

For new starters, whole grain is preferred to all-purpose flour because it is more abundant in wild yeasts and Lactobacilli, which we're trying to catch and nurture into a sourdough starter. The process of refining flour removes the microorganisms, which are on the outer hull of the grain.

Q: Can I feed sprouted flour to my sourdough starter?

A: Yes! The only thing to watch for with sprouted is that the grain is already partially broken down because of sprouting. This means your starter may run out of food faster and you might have to do three-times-daily feedings. You'll know that's the case if it's producing a lot of hooch early on, rather than toward the 12-hour mark.

However, sourdough is the most effective method of traditional food preparation when it comes to deactivating anti-nutrients and enhancing nutrition, so there's really no need to use sprouted flour in your starter or in sourdough baking. Regular flour will yield the same results nutritionally, so you might want to save your sprouted flour for baking where sourdough isn't an option. This will save you time (if you're sprouting the spelt yourself) or money (if you're buying sprouted flour).

Q: Can I feed my starter something other than flour?

A: Yes! If you have cooked oatmeal or cooked rice, that can be used to feed the starter. It's very simple; just stir that in instead.

Q: Do I have to keep feeding my starter the same flour, or can I switch?

A: Yes, you can switch flours.

Q: How should I store my flour before feeding it to my starter?

A: Room temperature flour is best for a young starter. After it's mature, you can feed it flour that has been kept in the fridge or freezer.

Q: How long does flour stay fresh?

A: Use flour within three days of grinding (room temperature), or refrigerate for up to seven days, or freeze up to six months. Milled grains should not be stored at room temperature for more than three days because of the danger of rancidity. Sprouted flour should be used/stored similarly. Although it does last longer than unsprouted, we follow these guidelines to be on the safe side of rancidity.

Q: How do I know how much flour to feed my starter?

A: If you always keep 1/2 to 1 cup of starter on hand, it usually works out to feed it the same amount of flour and water as the amount of starter you need for a recipe. For example, let's say you have 1 cup of starter, but you need 2 cups for a recipe. Feeding 2 cups of flour and 2 cups of water will give you the 2 cups of starter for the recipe and plenty to reserve.

If you need quite a bit of starter, you can build up the quantity through successive feedings. For instance, when I need 9 cups of starter for my triple batch of bread, I feed the starter two or three times throughout one day until I have the 9 cups.

As a general rule, never feed the starter more flour than three times its volume. If you have 1 cup starter, don't feed it more than 3 cups of flour (and 3 cups water). If you have 2 cups starter, don't feed it more than 6 cups of flour (along with the 6 cups of water).

Q: What is the minimum amount of flour I can feed my starter?

A: With 1/2 cup or less of starter, the minimum amount is a tablespoon or 2 of flour. With larger amounts of starter, the need to feed more increases. I don't really have a rule for when it's larger, I just feed more than a couple tablespoons. I would do 1/4 cup or 1/2 cup for a 1 to 2 cup starter and increase from there. If you notice it's going through food faster or producing hooch sooner or not as active, that will tell you you underfed it, so increase next time. I hope this helps!

Q: What is the maximum amount of flour I can feed my starter?

A: As a general rule, never feed the starter more flour than three times its volume. If you have 1 cup starter, don't feed it more than 3 cups flour (and 3 cups water).

Q: Can I feed my starter once a day instead of twice?

A: It's best to feed every 12 hours. When the starter is ready (three to five days), it's best for its performance to feed twice daily and not to skip. Skipping creates a less powerful starter. Of course, there are variations with every situation! We have to do a little guessing and a little following the formula!

Q: How long after feeding the starter can it be used?

A: Ideally, you should let your starter sit for a good 7 to 8 hours after feeding. However, you can use it in 3 or 4 hours in a pinch. Just keep in mind not all of the flour will be soured.

Q: Can I feed my starter more than twice a day to build it up for baking?

A: Yes! You can feed your starter three or four or five times a day. Just wait for it to show that it's absorbing/using what was fed (it should be domed and bubbly) before feeding again. So that way you can build up quite a bit in a day if you need to.

Q: Does it matter what kind of water I give my starter?

A: Yes, it matters! Do NOT use contaminated well water or straight city water, which may contain chlorine, chloramine or fluoride, among thousands of other contaminants. If your water is not clean or you don't filter it, I recommend purchasing spring water or filtered water. If your water is filtered and does not re-add minerals back (as the Drinking Water Filter from Radiant Life does; see TradCookSchool.com/rlwater), consider fortifying it with natural mineral drops.

Q: Can I keep my sourdough starters next to each other, or do I need to separate them like other ferments?

A: You can keep them side by side. You might find they influence each other, though, like one might behave better than the other or vice versa, until they get used to each other's presence.

Q: My starter mixture is very thick and pasty ... is this OK?

A: Thick is totally fine; however, you can add a bit more water if it's hard to stir. Somewhere between cake batter and cookie dough is a good consistency! All amounts are approximate and geography/humidity/flour variety has an impact on thickness.

Q: My starter isn't bubbly!

A: It's OK! Stir vigorously, feed as normal, and give it time! There's an ebb and flow to starting or reviving a starter. And even seeing a lull after activity is normal as the organism balance shifts as it gets reestablished. Hang in there!

Q: Why isn't my starter doubling in size? It looks so flat.

A: Not everyone gets doubling or tripling in volume. It depends on the flour and water ratio, among other things. You could try making it even stiffer. The other thing is, you might be missing when it gets high because often a starter collapses at the end of the 12-hour cycle. Don't give up and don't worry ... if it's bubbly and active, it's doing great!

Q: I forgot to discard 1/2 my starter. Did I ruin it?

A: It's fine! Next time, discard first (you can discard 3/4 of the starter instead of 1/2 to get it back down to manageable amount), but don't worry about it this time.

Q: How long do I have to discard starter?

A: You're only discarding during the first three to five days of creating a new starter, or while reviving a dehydrator starter. After that, "discard" actually goes in your recipes as the starter it calls for. Always remember to hold some back!

Q: My starter smells unpleasant. Is something wrong?

A: If it's a new starter, off smells are within the realm of normal. The organism balance is shifting ... please give it all time. Also, if you have your new starter near an established starter, this can cause it, too.

If your starter has an alcohol smell, then you might have to do a little troubleshooting. The wild yeasts need oxygen. If oxygen is not given to the yeasts, other organisms which don't need oxygen are encouraged to proliferate instead, such as the yeasts that make beer and wine. Try using a cover for your jar that encourages more air flow.

Q: My sourdough starter has spots of mold growing on it. What should I do?

A: Bummer! It's probably best to toss it, although sometimes you can just skim it off and with TLC the mold won't return. It's OK to start over, too!

Q: When should I give up on my starter and try to make another one?

A: It's hard to tell whether or not you should start over. It's kind of a heart decision. If you've checked all the variables — what kind of flour you're using, what kind of water you're using, the temperature of both and the temperature of your house, that it's not too close to other ferments, etc. — and your starter still isn't showing signs of activity, then it would be clear that you should start over.

Q: How often should I change containers for my starter?

A: A good rule of thumb is every week. Another way to do it is to change containers about every time you bake with it, because at that point you're removing a lot of the starter, which inevitably leaves behind residue that's impossible to remove completely. Feel free to find what works for you! You'll know it's past time if there are black spots on the dried starter remnants.

Q: When is a starter considered mature?

A: If it's bubbling, producing hooch, doming up/enlarging in size, and has a fresh/sour smell, you can bake recipes with your new starter when it is five days old. Once all of those things have been happening regularly for three weeks, it is considered established and mature ... at which time we say it's ready for bread! It's also ready for maintenance feedings and refrigeration at this point.

For a dehydrated starter you're reactivating, you're looking for it to be light and bubbly for at least three successive feedings. You don't have to wait as long as when creating a new starter since the organisms are already present.

Q: What does a starter in its active, domed state look like?

A: It has a curve on the top of it with lots of bubbles all around, and hasn't begun to spill out hooch. Spilling out hooch is a sign that it's past the height of activity.

Q: How long can I store my starter in the fridge?

A: You can store it for several weeks, though I recommend using/feeding the starter once a week to keep it active and healthy. However, giving it a vacation every once in awhile is fine, and others report no ill effects from leaving the starter in the fridge, untouched, for months.

Q: I live at a high altitude. Do I need to do anything differently when baking with sourdough?

A: Yes! [Here is our recommended resource for high-altitude baking.](#)

Q: Should I stir my starter to get all the bubbles out before measuring it to use for baking? Or be gentle to retain as many of the bubbles as possible?

A: Starters tend to deflate significantly when being measured out, so unless it is super bubbly there's no need to stir it first. However, if you want the most accurate measurements and results, feel free to use a scale instead of volume measurements. Keep in mind that 1/4 cup of sourdough starter is 60 grams, and you can scale up from there.

Q: What is the black liquid at the top of my starter?

A: That's hooch. It is normal for it to come up over time; it is the acids produced by the beneficial organisms in the starter. You may stir it back in, or pour it off. Pouring it off makes the starter less sour.

Q: When you are multiplying your starter for baking, do you leave it out on the counter after adding the flour or put it back in the fridge?

A: When I am building up a starter for baking, I leave it out on the counter. When I am storing the starter in between uses, I put it in the refrigerator.

Q: What should you do if your starter goes past the gloppy stage and becomes runny? Would it then need to be fed again to get to the sponge stage before making bread with it?

A: You can use your starter if it is runny, but the bread won't be as fluffy and light. If you want to revive the starter, you can stir it up, discard some of it, feed it again, and then catch it at the right time. The discarded starter can be used for English muffins, sourdough waffles and other recipes, too. Those links are at the end of the print materials and in the lesson area.

Q: When I'm rehydrating my starter, at what point is it OK to discard/remove starter? Can it be done at any point or is there a specific time that it should be done? It seems at the baking stage you do it when the starter is domed, but I'm not sure if it matters during the rehydrating stage.

A: You should discard/remove starter any time after, but not before, it has reached a domed, bubbly state.

Q: I have been rehydrating my starter, but I am not clear on how to tell when my starter is ready to begin using for baking.

A: You want to see it get bubbly for three feedings to ensure it is ready for baking. Even if it goes to the liquid stage after being bubbly, this counts. As long as you go through the cycle three times, you can consider it hydrated and ready.

Q: My starter is dehydrated and ready for baking, but I'm not! What should I do with it?

A: If your starter is ready, but you are not, you can move it to the fridge. However, it will still go past the bubbly, domed stage in the fridge, so I'd suggest you feed it when bringing it out. Not only to get it to room temperature, but to get it domed and bubbly again.

Homemade Sourdough Bread

[Wardee] Here's a little bit of the "why" behind how I came up with my bread-making method, below.

Whole-grain flours take awhile to absorb liquid. This is why I include rest periods during the making and kneading of the dough. If I don't give my dough time to absorb moisture, then it being overly wet during kneading begs for the addition of more flour. However, the result of that is that by the time the dough is done absorbing flour, too much flour has been added and the bread turns out dry and dense. Perhaps failed loaves of your own are making sense now.



Whole-grain bread loaves turn out better all around if the dough is a bit on the sticky side. Not wet, just sticky. So, in all my recipes, I caution you against adding flour. Add more flour only if you absolutely cannot work the dough, and only after you've given the dough a rest period so the flour can absorb liquid. This is especially true when working with spelt; the good dough will actually be really floppy and gloppy. It can still be worked, but easily flops out of one's hands!

My everyday bread recipe calls for a greater ratio of starter than some recipes. This serves a purpose! You might be surprised when I tell you that it makes the loaf less sour. Yes, more starter makes a less sour loaf. Here's why. The more starter one uses, the less overall rising time, therefore cutting down on the time to develop sourness. If you prefer a more sour loaf or longer rising time, cut back on the amount of starter in my recipes and add more water in place of it.



I have adapted my overall method to depend on the time of day and time I have available to bread baking. You'll see two recipes following this explanation. One is for a "One-Rise Method" and the other for a "Double-Rise Method."

The **One-Rise Method** is wonderful if you're creating your bread dough in the morning. You'll make the dough, shape the loaves, let the loaves double in size and then bake. All in one day, with around 5 to 8 hours of rising time for phytic acid reduction.



Even though we've been taught that souring should take place for 24 hours for full phytic acid reduction, one study shows this happening in 8 hours! Keep in mind that not all 8 hours are created equal, though. A warm 8 hours will be more effective than a cool 8 hours (remember, those yeasts work better in warmth).

The **Double Rise Method** is wonderful if you're creating the bread dough in the late morning or afternoon. You'll create and knead your dough, let it rise in a big bowl, shape the loaves before bed, and bake the loaves in the morning. This gives an overall longer time for the yeasts to reduce phytic acid and do their other work, and yields a more sour loaf.

But the downside is that you might be sleeping when the bread reaches its peak rise, yielding a collapsed and therefore flatter loaf of bread. However, this last consequence depends on temperature. If your house is cool, the loaves could be perfectly doubled by morning and therefore turn out beautifully.

Here are real examples of how I use both methods. Suggested times will vary depending on room temperature.

Suggested timeline for the One-Rise Method:

- ▶ 6 a.m.-9 a.m. Get out starter and build it up.
- ▶ 9 a.m.-10 a.m. Create dough, rest dough, knead dough, put dough in loaf pans.
- ▶ 10 a.m.-6 p.m. Loaves rise in loaf pans.
- ▶ 6 p.m.-7 p.m. Bake loaves.

Suggested timeline for the Double-Rise Method:

- ▶ 9 a.m.-3 p.m. Get out starter and build it up.
- ▶ 3 p.m.-4 p.m. Create dough, rest dough, knead dough, put dough in big bowl to rise.
- ▶ 4 p.m.-8 p.m. Dough rises.
- ▶ 8 p.m. Shape dough into loaves, put in loaf pans.
- ▶ 8 p.m.-5 a.m. Loaves rise.
- ▶ 5 a.m.-6 a.m. Bake loaves.

Both of these methods can be started at different times of the day, too. Depending on the time of year, the schedule will vary. For instance, warm weather will speed the whole process up, and cool weather will slow it down. Find what works for you!

Make Sourdough Bread — One-Rise Method**Ingredients**

- ▶ 3 cups (720 mL) sourdough starter
- ▶ 1 cup warm water (900 mL), comfortable to the touch, plus 2-1/4 to 3 cups additional to build up starter
- ▶ 1 rounded tablespoon (15+ mL) sea salt (adjust to taste)
- ▶ 5 to 6 cups (960 to 1080 g) organic whole wheat, spelt or einkorn flour, preferably fresh ground, plus up to 3 cups additional to build up starter
- ▶ unrefined coconut oil, extra-virgin olive oil or butter

This recipe yields 2 loaves of bread.

Stage 1: Building up the Starter

Put 1 cup of ready-to-be-fed starter in a fairly large bowl. If using whole wheat flour, add 3 cups of flour and 3 cups of warm water (comfortable to the touch). If using whole spelt flour, add 3 cups of flour and 2-1/4 cups of warm water. Mix fairly well. Cover with a towel and let sit at room temperature or in a warm place until starter is domed, bubbly, and smells sour. It will be globby and gel-like.

**Stage 2: Making the Dough**

Put 3 cups of the built-up starter in a big mixing bowl — glass, ceramic or stainless steel. Add 1 cup of water and 1 rounded tablespoon of sea salt. Mix. Transfer the remaining starter to the refrigerator or build up for other recipes.

Add 3 cups of flour and mix with a wooden spoon. Add flour, 1/4 to 1/2 cup at a time, to make a shaggy dough. Use your hands to turn the dough when it gets too stiff to stir. It will be sticky, but make sure it is not too wet by pressing your finger into it — do you hear water? Then it is too wet. You want a sticky dough that is not sopping wet.

This whole-grain flour in the dough will continue to absorb flour for 15 to 30 minutes. So cover it with a towel and let it do so, undisturbed, for about 15 minutes.



Stage 3: Kneading the Dough

Sprinkle flour on a clean counter or work surface, and put the dough on it. Knead for 5 minutes. The kneading motion is:

1. Fold the dough toward you with both hands.
2. Press the dough away from you with the heel of both hands.
3. Rotate the dough one-quarter turn on the counter.
4. Repeat steps 1 through 3 for the duration of the kneading time.

Add more flour to the countertop as needed. Avoid adding flour to the dough unless it is sticking to the counter even though the countertop is dusted or if your hands are a sticky mess. It is OK if some dough sticks to your hands, though.

Cover with a towel and allow to rest for 5 minutes. This prevents overworking of the dough, and allows more time for the dough to absorb water. Repeat the kneading process for another 5 minutes.

Stage 4: Shaping the Loaves

This recipe will yield one or two loaves of bread; in a loaf pans or free-form on a baking sheet. Choose whatever you'd like. If you used around 3 cups of flour only, you'll probably only make 1 loaf of bread. If you use 5 to 6 cups of flour, you'll end up with 2 loaves of bread.

Please note: Ancient grains such as spelt or einkorn (especially spelt) will want to spread out if you're making a free-form loaf.



Grease the loaf pans(s) well with coconut oil, butter or olive oil. Put a piece of parchment paper on a baking sheet and sprinkle it with flour, or grease the baking sheet (omitting the parchment paper and flour).

Divide the dough into two equal parts. For a free-form loaf, tuck the dough under itself, joining the ends underneath the loaf. Shape into a smooth, round loaf. Smear the top all over with butter or coconut oil. Using a serrated knife, cut an X into the top.

For a regular bread loaf, refer to **How to Shape Bread Loaves**, on the following pages. Feel free to use two hands, which I could not do while taking the pictures.

Place the shaped tube of dough in the loaf pan. Smear the top all over with butter or coconut oil. Make three or four diagonal cuts into the top of the loaf with a serrated knife, a criss-cross for a free-form loaf, or whatever pattern you'd like. Slashing a loaf helps it rise evenly.

Stage 5: Letting the Dough Rise

Put the two loaves in a warm place to rise until doubled in size, about 5 to 8 hours, depending on room temperature. You may let them go longer, though the yeast will be done feasting and the loaves will collapse from their peak, leaving less aesthetically pleasing bread. However, it will still be tasty and healthy.

Stage 6: Baking

Place the loaves in a cold oven.* Turn on the heat to 375 degrees Fahrenheit. As the oven preheats, the slowly increasing heat will give the wild yeast a final boost and create burst of height in the shape of the loaves.

Bake for 50 to 60 minutes, until the loaves are golden brown and yield a hollow sound when tapped.



*This baking method works best if the yeasts are not spent and still have sugars to consume. If they've eaten everything, have reached their peak and are beginning to collapse, it is best to bake in a pre-heated oven (375 or 400 degrees Fahrenheit).

Transfer to a cooling rack. Smear the top with butter or coconut oil. Allow to cool for 30 minutes before cutting into the loaves. Store in an airtight container at room temperature, or freeze for future use.

Make Sourdough Bread — Double-Rise Method

Follow the One-Rise Method through Stage 3. Then return here to proceed from Stage 4 and beyond.

Stage 4: First Rise

Place the dough in a very large, greased bowl (more than double the size of the dough). Cover with a damp, clean towel. Put the bowl in a warm place and allow the dough to rise until doubled in size, or spilling out of the bowl. This will take 3 to 8 hours, depending on room temperature.

Stage 5: Shaping the Loaves

This recipe will yield one or two loaves of bread; in a loaf pans or free-form on a baking sheet. Choose whatever you'd like. If you used around 3 cups of flour only, you'll probably only make 1 loaf of bread. If you use 5 to 6 cups of flour, you'll end up with 2 loaves of bread.

Please note: Ancient grains such as spelt or einkorn (especially spelt) will want to spread out if you're making a free-form loaf.

Grease the loaf pans(s) well with coconut oil, butter or olive oil. Put a piece of parchment paper on a baking sheet and sprinkle it with flour, or grease the baking sheet (omitting the parchment paper and flour).

Divide the dough into two equal parts. For a free-form loaf, tuck the dough under itself, joining the ends underneath the loaf. Shape into a smooth, round loaf. Smear the top all over with butter or coconut oil. Using a serrated knife, cut an X into the top.

For a regular bread loaf, refer to the Fact Sheet: How to Shape Bread Loaves. Feel free to use two hands, which I could not do while taking the pictures. Place the shaped tube of dough in the loaf pan. Smear the top all over with butter or coconut oil. Make three or four diagonal cuts into the top of the loaf with a serrated knife, a criss-cross for a free-form loaf, or whatever pattern you'd like. Slashing a loaf helps it rise evenly.

Stage 6: Second Rise

Put the two loaves in a warm place to rise until doubled in size, about 5 to 8 hours depending on room temperature. If it is late evening, let the loaves rise overnight for morning baking. Letting them rise for the longer amount of time may leave less aesthetically pleasing bread (it will be flat or collapsed). However, it will still be tasty and healthy.

Stage 7: Baking

Place the loaves in a cold oven.* Turn on the heat to 375 degrees Fahrenheit. As the oven preheats, the slowly increasing heat will give the wild yeast a final boost and create burst of height in the shape of the loaves.

Bake for 50 to 60 minutes, until the loaves are golden brown and yield a hollow sound when tapped.



*This baking method works best if the yeasts are not spent and still have sugars to consume. If they've eaten everything, have reached their peak and are beginning to collapse, it is best to bake in a pre-heated oven (375 or 400 degrees Fahrenheit).

Transfer to a cooling rack. Smear the top with butter or coconut oil. Allow to cool for 30 minutes before cutting into the loaves. Store in an airtight container at room temperature, or freeze for future use.

How to Shape Bread Loaves



1. Create some edges as you press your fingers into the center of the ball, pressing the air out and drawing the edges into the center of the ball of dough. Keep tucking in the edges as you roll the dough back and forth on the countertop into a tube shape. Use firm, but gentle, pressure.



2. Still using firm but gentle pressure, continue rolling the dough back and forth between your palms and the counter, all the while still using your fingers to tuck in the edges.



3. The dough will lengthen into a tube shape. Keep rolling it back and forth and tucking in the edges.



4. When it is about as long as you want (about 7 inches), press the tucked-in edges together and roll the loaf over so the tucked in edges are down on the countertop.



5. Using your hands, alternate their position between the ends of the loaf and the center of the roll to gently press the dough smooth.



6. You are done when the loaf is beautiful and smooth. In reality, this process should be very quick, like less than 30 seconds.

FAQs: Sourdough Bread

Q: My free-form spelt loaves have a flat top! What did I do wrong?

A: The gloppiness of spelt dough makes it less than ideal for free form loaves. They tend to spread out instead of up. You didn't do anything wrong. Spelt will rise better in a loaf pan, however. The Sourdough eCourse lesson on spelt sandwich bread has many more details about working with spelt.

Q: What is the best way to store the bread that you are eating? Countertop, fridge, dark cupboard?

A: I let my loaves come to room temperature, and then bag them in bread bags for the freezer. If left out, I keep them in a bread bag. One thing you can do is cover the loaves with a (clean) towel when they come out of the oven. This makes them do the condensation thing right on the crust, softening it. Then when cool, store out at room temperature for eating, or freeze for later.

eCourse member Peg wrote: "I've used the "Artisan Bread in 5 Minutes a Day" method, and they say to leave the bread out. When you cut into it, place the loaf cut-side-down on a plate. The crust will keep the bread from getting stale, but as soon as you cut into the crust, air can get in, making it stale ... hence, the plate, to seal out the air."

Q: My loaves are flat! What did I do wrong?

A: I would suggest baking a little sooner next time, before the yeast expires (consumes all its food). Then the loaves will still have some puffing to do in the oven, rather than deflating. This is something you learn. To help you learn this, listen to the "crackling" sound your loaves are making during rising. If you've been listening during the entire rise, you can hear when it slows down. When the crackling slows down, it is time to put the bread in the oven.

Also, for loaves that have already reached their peak, it is best to bake in a pre-heated oven, even a little hotter, like 400 degrees Fahrenheit.

Q: I live in a warm climate and my bread is rising much faster than yours. What should I do?

A: Because your temperature is warmer than mine, your dough is fermenting and rising much faster. It being past its peak can lead to deflation in the oven. It is best to bake just before it reaches its peak (when in a not preheated oven). If it has reached its peak, try a preheated oven.

You can slow down the fermentation action by using a bit less starter. Try reducing it by 1/2 cup, and use water instead. You'll need more flour. But overall, there will be less starter and it will slow the action down, hopefully guarding against deflation. This is covered more in the spelt bread lesson in the Sourdough eCourse, regardless of whether you're using spelt flour.

Q: Can I add oil to my dough?

A: Yes, about 1/4 cup is good. This will make it more moist and help it last longer. Refer to the spelt sandwich bread lesson in the Sourdough A to Z eCourse for more information.

Q: My bread is too sour. What can I do?

A: You can do several things to make your bread less sour. First, use more starter in the recipe, in place of some of the water. More starter means faster rising, which means less time to develop sourness. Second, pour off the hooch (the liquid that separates out). And third, ferment your dough for a shorter total amount of time. Use a hotter oven to help it puff up more, if it hasn't risen that much by the time of baking.

Q: In the lesson, the bread rose for 5 to 8 hours, but mine was rising out of the pan in less than 2 hours. I put it in a cold oven at 375 degrees Fahrenheit, and it poured over the side of the pan until the oven got hot enough to cook it. What did I do wrong? I really wanted the 7 hours of fermentation for good nutrition.

A: I suggest using the double-rise method for your current scenario. Then your bread will have a longer total time of souring, but two rounds of rising since it is so active. Another option is to lessen the amount of starter in the recipe. Say, cut it back to 2 cups and add about 1/2 water in place of the 1 cup of starter that came out. If there is less starter, it works less quickly.

Sourdough Sandwich Bread

[Valeria Weaver] This sourdough sandwich bread is my tried-and-true staple. I could make it in my sleep!

For the sponge:

- ▶ 1 cup pure water
- ▶ 1 tablespoon sourdough starter, active
- ▶ 1 cup all-purpose spelt flour

For the dough:

- ▶ 1 sponge (see above)
- ▶ 1-1/2 cups pure water warm
- ▶ 2 cups all-purpose einkorn flour
- ▶ 1 cup oat flour, from whole ground oats
- ▶ 1-1/2 teaspoon sea salt

Yields 1 loaf.

To make the sponge: Whisk water with active sourdough starter until dissolved and frothy. Add spelt flour. Whisk to combine. Cover and leave at room temperature for 4 to 8 hours, or until it becomes soft, airy and puffy with visible bubbles.

To make the dough: Whisk warm water with sponge. Add the rest of the ingredients. Mix with a spoon until no dry bits remain. The dough should resemble thick pancake batter. Cover and leave at warm room temperature until it rises well. This should take between 2 and 5 hours, but no longer to avoid over-souring.

Prepare a bread pan, preferably one that allows for vertical expansion. I also line my loaf pan with parchment paper to prevent possible sticking, but it's not necessary (photo at right). Transfer dough into bread pan. Let rise for 45 to 60 minutes. Preheat oven to 375 degrees Fahrenheit. Bake for 45 minutes. Finally, cool on wire rack. Enjoy!

Recipe Notes: I keep my dough at an almost batter-like consistency (photo at right). This way, it produces dough that doesn't crumble and holds together well. Perfect for sandwiches. Plus, no kneading necessary!

Using just whole-grain flour yields loaves that are more dense, but delicious nonetheless. Spelt flour (all-purpose or whole ground) makes much taller loaves, while einkorn flour by itself produces short ones. Also, feel free to use up to 50 percent of non-gluten or low-gluten flours such as oat, millet or rye (any more will change the bread consistency too much).

Finally, this sourdough sandwich bread doesn't brown much at the top, especially when using oat flour. If you want more browning, bake at 420 degrees Fahrenheit for the first 20 minutes. Higher temperatures create a crispier crust. The crust will soften eventually if the bread is stored tightly covered.



Not-So-Dense (or Sour) Sourdough Bread

[Tracey Vierra] This bread rises in less time so it isn't as sour ... and the loaves turn out soft and light!

For the sponge:

- ▶ 1 cup sourdough starter, active state and fed 2 to 3 times before use (this will lessen the sour taste)
- ▶ 1 cup raw whole milk, dairy-free milk of choice, or water
- ▶ 1-1/4 cups whole-grain spelt flour
- ▶ 1 cup hard wheat flour



For the soaked dough:

- ▶ 1/4 cup coconut oil or butter, melted
- ▶ 1/4 cup raw honey
- ▶ 1-1/2 cups raw whole milk, dairy-free milk of choice, or water
- ▶ 1/4 cup Sucanat or Rapadura
- ▶ 2-3/4 cups whole-grain spelt flour
- ▶ 2-3/4 cups hard wheat flour

Additional ingredients:

- ▶ 2 pastured eggs
- ▶ 3-1/2 teaspoons sea salt
- ▶ coconut oil or butter, for brushing

Yields 2 loaves.

The night before: Mix the sponge ingredients together in a bowl. Loosely cover with a cloth to sit overnight. In a separate bowl, mix the soaked dough ingredients together, and also loosely cover to sit overnight.

The next morning: Add 2 eggs to the soaked dough mixture and incorporate well. Put both the soaked dough and sponge in a stand mixer of your choice and mix for 2 to 3 minutes, until well incorporated. Let the dough sit in the mixer for around 30 minutes. Add the sea salt to the dough and mix for 3 to 4 minutes. Depending on the temperature, let dough rise for about an hour. Turn on mixer for 20 seconds. Let dough rise again for an hour, and then mix again for 20 seconds.

After dough has risen for the second time, remove from mixer, knead on a floured surface and separate the dough into two separate halves. Knead each half just enough to remove excess air, and form each half into a loaf to fit your bread pan. With a knife, slash the loaves of bread with a few marks down the center. Brush each loaf with butter or coconut oil.

Cover both of the loaves and let rise in a warm spot. In the winter in our kitchen, this last rise takes a couple of hours. It may be only an hour in the summertime. Once the loaves have risen satisfactorily, preheat the oven to 350 degrees Fahrenheit. Bake loaves for 40 to 45 minutes until they sound hollow if you tap them. Remove bread from oven and cool out of pans. Enjoy!

Sourdough Soda Bread

[Erin Vander Lugt] Enjoy slice after slice of nourishing, whole-grain, sourdough goodness!

- ▶ 1 cup sourdough starter
- ▶ 2 cups milk of choice (non-dairy or cultured dairy works, too)
- ▶ 4 cups whole-grain flour of choice, plus more as needed
- ▶ 1 tablespoon extra-virgin olive oil
- ▶ 2 teaspoons sea salt
- ▶ 2 teaspoons baking soda



Yields 1 loaf.

Whisk together sourdough starter and milk in a large bowl. Stir in flour until combined. Let sit for a couple minutes to let flour absorb liquid. Continue to add flour by the 1/8 cup, if needed, until dough can be molded into a ball that holds together nicely and sticks only slightly to your hands. Add 1 tablespoon of flour at a time if the dough is too sticky — but a little sticky is good. Put dough ball back in the bowl. Roll in a tablespoon or so of olive oil. Cover bowl with a tea towel and plate. Set aside for 8 hours or overnight — less time if you have a very warm kitchen.

When souring time is up, grease loaf pan and dust with a bit of cornmeal or flour if necessary. Sprinkle baking soda and sea salt on dough. Knead for 3 to 5 minutes, and until dry ingredients are evenly incorporated into dough. Shape dough into a loaf and place it in bread pan. I like to shape my dough into a flat-ish rectangle, fold it into thirds, and rolls it up, tucking in the edges of the dough as I go. Slice dough across the top to allow for expansion.

Place loaf into a cold oven. Set to 375 degrees Fahrenheit, and bake for about 70 minutes. Check at 40 minutes, and perhaps cover with a piece of parchment paper at that time to prevent over-browning. Once baked, remove from oven and rub with a bit of butter over the top. Let bread rest for a few minutes, then transfer to a cooling rack. Cool completely. Store in a sealed container on the counter, or pop in the freezer for future enjoyment.

Tasty Rye Bread Variation: Replace 1 cup of flour with 1 cup rye flour, and add about 4 tablespoons caraway seeds to your flour mixture as well.

Buckwheat/Whole Wheat Bread Variation: Replace 1 cup of flour with 1 cup buckwheat flour.

Cinnamon Swirl Bread Variation: At the time of kneading, add 4 teaspoons cinnamon and 1 cup raisins. Flatten dough into a rectangle. Sprinkle with 1/2 cup Sucanat and an additional 2 tablespoons of cinnamon. Roll into a loaf shape and place in the loaf pan. I do not slit this loaf along the top.

Asiago Herb Dinner Rolls Variation: After dough has soured, knead in 2 cups grated hard cheese, 2 teaspoons dried basil and 1/2 teaspoon dried oregano. Roll dough into 24 1-1/2-inch balls. Grease baking dish and tuck dough balls next to each other. Bake as directed above for 20 to 25 minutes. Check after 15 minutes and cover with parchment paper if necessary to prevent over-browning. [See this recipe for gluten-free sourdough dinner rolls.](#)

Rosemary Bread Variation: After dough has soured, knead in several teaspoons dried rosemary. Brush top with butter and sprinkle with sea salt before baking.

Mini Loaves Variation: Simply halve above ingredients, follow instructions, place in a mini loaf pan, and bake for about 45 minutes. Don't forget to place in a cold oven and cover with parchment paper for the last 10 minutes or so.

Sourdough Croutons

[Lindsey Dietz] Making these croutons in the dehydrator couldn't be easier! Then topping your favorite salads or garnishing your favorite blended soup recipe is a guilt-free indulgence.

- ▶ 1 loaf sourdough bread, two to three days old (about 2 pounds)
- ▶ 1/2 cup grass-fed butter, ghee or lard, melted
- ▶ 2 tablespoons dried parsley
- ▶ 2 tablespoons dried oregano
- ▶ 2 teaspoons sea salt
- ▶ 2 teaspoons garlic powder
- ▶ 1 teaspoon onion powder
- ▶ 1 teaspoon white pepper

Yields about 14 cups, though the size of the loaf of bread ultimately determines the amount of croutons made.

Place all seasonings in a small bowl and whisk to combine. Set aside. Cut bread into 1/2-inch slices, then cut each slice into 1/2-inch cubes. Place cubed bread into a very large bowl.

Melt fat of choice in a skillet on low heat. When melted, drizzle about half of it over the cubed bread. Sprinkle on half of the seasoning mix. Use tongs to toss well. Follow with the rest of the melted fat and the rest of the seasoning mix. Toss again.

Line two to three dehydrator trays with unbleached parchment paper or **Paraflexx liners**. Spread croutons out in a single layer on each tray. Slide the trays into the dehydrator and dry the bread at 155 degrees Fahrenheit for 3 to 5 hours, or until the croutons are your desired crispness! Store finished croutons in airtight containers in the pantry for several weeks.

Recipe Notes: If your croutons become stale before you use them, simply place them in a warm oven for a few minutes or back into the dehydrator to dry them out again.



Savory Sourdough Stuffing

[Katie Mae Stanley] Serve this stuffing alongside the traditional turkey, a pastured chicken or another cut of meat.

- ▶ 1 loaf sourdough bread, about 1 pound, in large cubes
- ▶ 1 pound ground Italian sausage, nitrate-free
- ▶ 2 cups turkey broth or chicken broth, preferably with drippings (reduce butter to 1/4 cup if using drippings)
- ▶ 1/2 large yellow onion, finely chopped
- ▶ 4 celery ribs with leaves, roughly chopped
- ▶ 1/2 cup fresh parsley, finely chopped
- ▶ 1/2 cup grass-fed butter
- ▶ 10 fresh or dried sage leaves, finely chopped
- ▶ 1-1/2 teaspoons sea salt
- ▶ 1 teaspoon ground black pepper

Yields an 8-inch-by-13-inch pan full.

Preheat oven to 350 degrees Fahrenheit. In a large pan, heat 1/4 cup butter over medium heat. Add onions and celery. Sprinkle with 1/2 teaspoon salt. Sauté until tender, stirring occasionally, and then place in a large bowl. Break up the sausage and fry in the same skillet until cooked through.

Melt remaining butter. In a medium-size bowl, whisk the broth, butter, salt and pepper together. Add the sausage and bread cubes to the vegetables. Drizzle the broth mixture over the bread and gently toss with your hands so that all the pieces of the bread are covered.

Grease an 8-inch-by-13-inch pan. Pour in the stuffing, spreading it out smooth. Cover with foil. Bake the stuffing for 25 minutes. Remove the foil and bake for an additional 10 minutes.



Sourdough English Muffins

[Erin Vander Lugt] Mercy! I cannot express with words how good these sourdough English muffins are! They're the perfect use for all my leftover sourdough starter. I love making up a double or triple batch, then freezing them to have on hand throughout the following months.

- ▶ 1/2 cup sourdough starter
- ▶ 1 cup milk, kefir, water or non-dairy milk of choice
- ▶ 2 cups whole wheat flour or flour of choice (plus more as needed)
- ▶ 1 tablespoon raw honey
- ▶ 1 teaspoon sea salt
- ▶ 1 teaspoon baking soda
- ▶ add-ins like seeds, dried fruit or chopped nuts (optional)



Yields 8 muffins.

In a medium-size bowl, mix until incorporated 1/2 cup sourdough starter and 1 cup milk (or water). Add to that 2 cups of flour. Stir well to combine. Take note of your dough consistency. If it is very wet, add another 1/4 cup flour. Stir again. Continue adding flour by the tablespoon until you have a somewhat sticky dough. You do not want it too dry, as the flour will continue to absorb liquid as it sours. Nor do you want it too wet, as this will make the dough a bit difficult to knead after the souring time is complete.

Rest easy, though. I have made these English muffins with a dough I would now call much too wet and a dough that was probably a bit too dry. Find the consistency that works right for you, and know there is a measure of flexibility on either side! Once your dough is made, cover the bowl with a plate and set it aside for 8 or more hours to sour.

Preheat your griddle/cast-iron skillet to medium-low heat. I usually set my cast-iron to 4, the front of my stovetop griddle to 5-1/2, and the back of the griddle to 4-1/2. Each place distributes heat differently. You will figure out what works best for your situation. You don't want the muffins to brown too quickly because the insides need a chance to cook. I also have found that I do not need to grease my skillet/griddle. Do what you think is best here, as well.

Sprinkle 1 teaspoon sea salt, 1 teaspoon baking soda and 1 tablespoon honey onto soured dough. Use a wooden spoon to push in the newly added ingredients and turn the dough onto itself a few times. Remove the dough to a clean countertop. If you think sticking will be an issue, pour a tablespoon of olive oil onto your counter, spread it around, and rub the excess into your hands before kneading. Knead for a couple of minutes, concentrating primarily on incorporating the dry ingredients.

Once you feel all is combined, pull portions of dough from the large dough ball and shape into muffins directly on your griddle. They can be as big or little as you like. My husband enjoys a large sandwich for lunch, but my boys find a smaller size just right. Flatten the dough to about a 1/2 inch.



14. Sourdough

Using a spatula, check your muffins after about 3 minutes to make sure they are not browning too quickly. Adjust the heat as you go, remembering what works best for you and your stove. Carefully flip the muffin once the first side is nicely browned. Try not to flip carelessly as you do not want to lose the rise.

Cook the second side until it, too, is nicely browned. If you find that the sides of your muffins are not quite as firm as you'd like, feel free to pop them into a 350-degree-Fahrenheit oven for 5 to 10 minutes to finish the cooking.

If your tops and bottoms are browning before your insides have a chance to cook, try decreasing the heat, decreasing their thickness, or covering with a lid while they cook.

*Note from Wardee: I put a lid on my cast-iron skillet while the muffins are cooking and I keep the heat low. This creates an "oven" and ensures they cook fully through. No need to pop in the oven.

Remove from heat and set on a rack to cool. Allow muffins to cool for at least 5 minutes before cutting into them. Once cool, slice and freeze your English muffins or place them in a sealed container for immediate consumption. To cut, use a serrated knife and make short shallow cuts around the entire muffin before twisting the two halves apart.

Spelt or Einkorn Variation: There are no changes needed to use spelt or einkorn flour, other than to ensure you maintain a sticky dough. I usually use between 3 and 3-1/2 cups of fresh ground flour. The dough will be sticky, so I usually go from the bowl to the pan, scooping out chunks of dough with a spoon. That keeps down the mess. These turn out beautifully!

Recipe Notes: Using milk or a fermented dairy such as kefir really lends to a lighter and fluffier muffin. You can use water if you'd like, but we recommend using dairy. If you need a dairy-free alternative, try using coconut milk.

Some have noticed a color change in their muffins after they sit out for a time. This is the uncooked sourdough reacting with the oxygen. It may appear unappetizing, but it will not hurt you. Take note and cook them more completely next time.

Flavor Variations:

- ▶ Rye and whole wheat flour combined with poppy and caraway seeds.
- ▶ Cinnamon and raisin/dried apple pieces.
- ▶ An "Everything Muffin" with onion, sesame seeds and poppy seeds.
- ▶ Replace some of the flour with corn meal for a delicious corn muffin.
- ▶ Include nuts and seeds in with your souring flour for a delicious change in taste and texture.

Einkorn Sourdough Chapatis (Indian Flatbread)

[Wardee] Chapatis are a thick, soft, chewy, Indian flatbread — so delicious! Use them for wraps, as a side bread to dip in a soup or stew, or simply eat alongside a salad. They're so similar to pocket bread (yet easier to make) that we enjoy them for our Thanksgiving and Christmas Middle Eastern feasts! This recipe is a sourdough variation of the Soaked Einkorn Chapatis found in Lesson 12.

- ▶ 2-1/2 cups einkorn flour or other flour of choice
- ▶ 1 teaspoon sea salt
- ▶ 2 tablespoons extra-virgin olive oil
- ▶ 1/4 cup sourdough starter
- ▶ 3/4 cup pure water, warm
- ▶ grass-fed butter (or coconut oil for dairy-free)



Yields 6 chapatis. Recipe adapted from my friend Christina (creator of the No-Knead Sourdough Bread in our Sourdough eCourse).

At least 7 hours before: Combine flour, sea salt, olive oil, sourdough starter and water in a medium-size mixing bowl. Mix to get all the flour wet, and at the end when it gets harder to handle, you can switch to your hands. You should have a shaggy dough; don't worry about it being smooth or anything. Put it back in the bowl and let it sit for 5 to 15 minutes while the flour absorbs the water. Cover with a tea towel.

Then sprinkle a little flour on a clean countertop and start kneading the dough. It should be a little sticky, but if it's too sticky to work, you can sprinkle a little flour on the countertop. Knead for 5 minutes, until you have a smooth dough. Drizzle a bit of olive oil in the mixing bowl. Put your dough ball inside and turn over to coat with oil. Cover the bowl with plastic wrap and let it sit out in a room temperature location for 7 to 8 hours or overnight.

To cook: When you're ready to begin cooking them, heat up one or two cast-iron skillets over medium heat. You'll be adjusting the heat as you go; you always want them hot but not quite smoking. Uncover the dough and pull apart into 6 pieces. A good way to do this is to break it in half and then pull each half into 3 equal-size balls. Put them back in the bowl and keep lightly covered so they don't dry out.

Sprinkle flour on a clean countertop. Grab a ball of dough and roll into smooth ball. Then press it flat in the flour, turn it over and coat the other side with a bit of flour. Then start rolling it into a circle that's about 6 inches wide and 3/8-inch to 1/4-inch thick. When that one is done, set it aside and begin rolling out another. You're going to continue rolling them out as you can while they're cooking.

When the skillet is hot and almost smoking, it is ready. Put a chapati on the dry skillet. Let it cook a minute or two, until it begins to bubble up. Flip it over. While it's still in the skillet, spread a pat of butter on the cooked side (you can take off any extra). When the bottom side has cooked, another minute or so, flip it onto a waiting baking tray and spread butter on that second side. Repeat with all chapatis until they're all done.

If you're not quite ready to serve, put them in a warm oven (or you can use a clay tortilla keeper). They are best served fresh. Stack them up on a platter and let everyone dig in. Store leftovers in an airtight container; reheat by warming up each side on a dry skillet over medium-low heat. Or freeze for later! This recipe easily doubles or triples.

Sourdough Lavash (Traditional Armenian Flatbread)

[Valeria Weaver] Sourdough lavash is an ancient Armenian flatbread — popular throughout the Caucasus and Middle East. Use it as a wrap for cheeses, greens, and herbs, or dry it for a crunchy snack! Or, use it as a plate. Pile on some rice, meat, or veggies, and use another piece of lavash as a spoon.

- ▶ 1 cup milk kefir or liquid yogurt, such as *matsoni*, at room temperature
- ▶ 1 tablespoon sourdough starter
- ▶ 2 cups whole-grain spelt flour
- ▶ 1/2 teaspoon sea salt

Yields 12 flatbreads.

Condition, soften and strengthen the dough: Whisk together kefir and sourdough starter. Add sifted spelt flour and salt. Knead by hand (or in stand mixer fitted with a dough hook attachment) until the dough becomes nice and pliable and absorbs all the dry bits. Cover and leave in the warmest place of your house for 3 to 4 hours. The goal is not to sour or raise the dough, but to condition, soften and strengthen it.

Cook the lavash: Sprinkle the dough with flour. I use all-purpose spelt flour at this point because whole grain is a bit rough for rolling. Give it a couple of hand kneads. Then transfer to a well-floured work surface.

Preheat a large cast-iron skillet. Divide the dough in 12 pieces. Cover the pieces you are not using, to prevent drying. Roll each piece out to 1/8-inch-thick circles. Slightly stretch it by hand when you transfer it to the skillet. This helps to prevent air pockets. Cook each lavash on medium to medium-high heat for a minute or less. Flip over.

Adjust heat as needed. It will take some practice to find out the best setting for you. You want lavash breads to have dark spots. If the spots don't appear, the skillet is not hot enough. That would make breads too brittle. Once cooked, cool lavash between two towels to prevent moisture from escaping.

Recipe Notes: If you want crisp lavash, either cook it longer, or leave it uncovered after baking. White, all-purpose spelt flour also works well in this recipe. If using water instead of kefir, add a tablespoon of olive oil to the dough. It will make it easier to handle.



Sourdough Einkorn Rosemary Focaccia

[Jenny Cazzola] This delicious recipe is so very simple. Feel free to add seasonings and additional toppings of your choice: fennel, oregano, cracked pepper, gorgonzola cheese, dried olives, etc.

- ▶ 1 cup sourdough starter, fed within the past 12 to 24 hours
- ▶ 1/2 cup pure water, warm
- ▶ 1/4 cup extra-virgin olive oil
- ▶ 3-1/3 cups einkorn flour
- ▶ generous sprinkling of sea salt and dried rosemary

Yields 1 loaf. Recipe adapted from [Trattoria Grappolo by Leonardo Curti and James O. Fraioli](#).

Combine the starter, the water, the olive oil and the flour in a large bowl the night before, thoroughly incorporating all of the ingredients. Cover and let set overnight or up to 24 hours.

The next day, stretch the dough into a large free-form rectangular shape on a greased cookie sheet. Use your finger or the end of a wooden spoon to make indentations on the surface. Sprinkle with salt and rosemary. Set pan in oven and heat on the lowest temperature setting. Allow it to rise for 1 hour or until doubled.

When loaf has risen, drizzle with additional olive oil (optional). Increase oven heat to 400 degrees Fahrenheit and bake for about 30 to 40 minutes — until loaf makes a hollow noise when tapped. Note that einkorn tends to bake faster and brown a bit more than regular wheat, so watch it carefully. To serve, break into pieces. Serve with additional oil and salt if desired.



Sourdough Crepes

[Wardee] This recipe uses leftover starter to make instant sourdough crepes! No souring time required!

- ▶ 1 cup sourdough starter — fed with any flour except for spelt, which turns out too sticky
- ▶ 3 organic or pastured eggs
- ▶ 3 tablespoons grass-fed butter, melted
- ▶ 3 pinches sea salt
- ▶ about 1/4 cup raw whole milk to thin, more or less

Yields 9 10-inch crepes.

In a medium-size bowl, whisk eggs, melted butter and salt until combined. Add sourdough starter. Stir well. Add milk until you get a thin batter.

Preheat lightly greased cast-iron skillet over medium heat. Once preheated, pour 1/4 cup or more of crepe batter into the center of skillet. Quickly pick up the skillet and roll the batter outward into a circle shape. Put the skillet back on the burner.

Let cook until crepe edges are a bit dry, and small bubbles dot the surface. This may take less than a minute! Flip. The second side will take less time to cook than the first. Stack finished crepes on a plate until ready to serve. Enjoy!

Sourdough Tortillas

[Wardee] These sourdough tortillas are chewy, soft and pliable! Perfect for stuffing with your favorite taco fillings. I even heated them up in a warm skillet on the second day — STILL soft!

- ▶ 1-1/2 cups pure water
- ▶ 1-1/2 cups sourdough starter, just fed
- ▶ 1/2 cup extra-virgin olive oil or coconut oil, butter or ghee + additional oil for frying
- ▶ 1-1/2 teaspoons sea salt
- ▶ 6 cups hard whole wheat flour, preferably freshly ground



Yields 24 large or 32 small tortillas.

In bowl of mixer, combine water, starter, oil and salt. Mix to incorporate. Keep mixing and adding flour, 1/2 cup at a time until dough cleans sides of bowl and forms ball in center of bowl. Let the machine knead the dough for 2 minutes. Remove dough. Place in a bowl that is oiled with coconut oil or extra-virgin olive oil. Rotate the dough around so all sides get coated with the oil. Cover with a damp towel or plastic wrap. Let rest for 12 hours or overnight. The dough will rise, and that is normal.

After rest time is over, divide the dough into 32 equal pieces for small tortillas or 24 equal pieces for large tortillas. Roll each piece into a ball and put the balls back in the bowl. Cover the bowl again to prevent the dough from drying out.

Heat a flat cast-iron frying pan over medium heat and add a small amount of oil. Oil a clean, flat work surface, such as a countertop. With an oiled rolling pin, roll out one ball of dough into a circle that is approximately 1/8-inch thick, or your desired thickness.

Place rolled out tortilla in the pan. Let it cook for about 25 seconds or until there are several bubbles in the tortilla. Flip the tortilla with a spatula and cook the other side for another 15 to 25 seconds, or until the bubbles are browned. Adjust heat or cooking times to account for your stove, pan, or thickness of tortilla. Remove tortilla from pan and place between towels to stay warm and moist.

Meanwhile, roll out the next tortilla. Repeat until all of the balls have been rolled out and cooked. Add oil to pan and/or rolling pin as needed. Store in a zipper seal freezer bag in refrigerator or freezer.

Sourdough Pizza

[Erin Vander Lugt] Pizza and sourdough ... two of our favorite things! My husband and 3-year-old like to call such combinations a “gourmet feast.”

- ▶ 1-1/2 cups sourdough starter
- ▶ 1/2 cup pure water
- ▶ 1-1/2 tablespoons extra-virgin olive oil
- ▶ 1 teaspoon sea salt
- ▶ 1 to 1-1/2 cups flour of choice
- ▶ toppings — meat, cheese, sliced veggies

Yields 1 thick crust or 2 thin crusts.

The morning of the evening you’d like your pizza, combine sourdough starter and water into a medium-sized mixing bowl. Stir. Add oil and salt. Stir. Add 1 to 1-1/2 cups of flour to the mixture. Mix well. Sprinkle your counter with flour. Place dough mixture on top and begin kneading. Add flour as necessary. Knead dough until all ingredients are happily combined. Remember, you are looking for a dough that is soft and not sticky. If you find your dough is too wet, add more flour. If it is too dry, add more water, starter or whey.

Once dough is complete, place dough ball back in the (lightly greased) bowl, cover with a plate, and leave to sour till the evening. Or, let dough rest for 30 minutes, then roll it out, and leave it to sour as an unbaked crust ready to go. Make sure to cover it with plastic wrap to keep it from drying out. (Don’t resort to aluminum foil!)

Once it’s time to bake the pizza, preheat oven to 450 degrees Fahrenheit or hotter for the pre-bake. (If you have a pizza stone, preheat it here!) While the oven is preheating, if you haven’t already, roll out your dough. Poke rolled-out dough several times with a fork. Pop it in the oven for about 5 minutes while keeping an eye on it. Don’t let it get too dark. This is just the pre-bake.

Take the pizza out of the oven. Cool and freeze for not-immediate baking, or brush with olive oil and add your favorite toppings! Bake your decorated sourdough pizza for 10 to 25 minutes, depending on oven temperature, toppings and crust thickness. Enjoy!

Thin Crust Variation: For thin crust pizza, halve the dough and roll out two pizzas instead of one.

Gluten-Free Variation: For a gluten-free sourdough pizza crust, [check out this recipe](#).

Recipe Notes: I feed my starter the night before the morning I want to prepare the pizza dough, usually a ratio close to 1:1 (flour/water). Depending on what I am making, I might use more flour for a thicker starter. For this recipe, it doesn’t matter how you feed your starter. You will correct any consistency deficiencies while kneading.

I like to do my second bake directly on the oven rack (I might turn down the heat, depending on amount of toppings). This creates a deliciously crispy crust. Because the crust is pre-baked, it slides easily off the cookie sheet and onto the oven rack. Once the pizza is finished, I slide it back onto the cookie sheet for easy cutting.



Grilled Sourdough Einkorn Pizza

[Wardee] Grilled pizza — we eat it at least weekly throughout the summer! A family favorite, for sure! I rely on weights for this recipe because the crust turns out reliably consistent every time.

- ▶ 3-1/4 cups einkorn flour (460 g)
- ▶ 1/2 plus 1/8 cup sourdough starter (155 g)
- ▶ 8 tablespoons extra-virgin olive oil (36 g), plus additional for brushing
- ▶ 1-1/2 teaspoons sea salt (13 g)
- ▶ 2/3 cup water (150 g)
- ▶ toppings — meat, cheese, sliced veggies



Yields 4 10-inch pizzas. Recipe pulled from our Einkorn Baking eCourse.

Combine flour, starter, oil, salt and water in mixing bowl. Mix together, and gently knead until you create a smooth ball of dough. Put dough back in the bottom of the bowl and cover. Let dough sour for 6 to 8 hours or overnight.

After the souring time, pick up the dough and split it in half, and split each half in half again so you have four balls of dough. Sprinkle flour on a clean counter. Press one dough ball into a disk, and coat it with flour on top and bottom. Roll out to 3/8-inch thick — about a 10-inch circle. Put the crust on a parchment paper-lined baking tray. Repeat with the other three balls so you have four pizza crusts.

On the grill, brush the grate with oil. Pre-heat two burners on medium to medium-high. Place each crust on direct heat to brown on one side. Remove each when browned, flipping each over (so the browned side is on top) as you put each back on its tray. Brush the browned side of each crust with oil, then top as desired.

On the grill, turn off one burner. Put one pizza on the other burner (indirect heat), then close the grill cover to finish baking it until cheese is melted and bubbly, about 5 to 10 minutes. Then slide the pizza over to the side where the burner is on so the direct heat can give the underside a final browning. This takes just takes a few seconds. Take the pizza off the grill; repeat with the other three. Slice and serve — and enjoy!

Oven Variation: Separate dough into two balls only. Roll out to the size of a baking tray or pizza stone. Preheat oven to 450 degrees Fahrenheit. Pre-bake each crust until lightly browned, about 8 minutes. Remove from oven. Brush with oil and top as desired.

Put pizzas back in oven for 5 to 15 minutes, until cheese is melted, bubbly and browned. If you baked a pizza on the bottom, bring it to the top (after the top one is removed) to let it brown a bit more before removing from oven. Slice and serve.



Einkorn Sourdough Bagels

[Valeria Weaver] Be still my heart! The deliciousness of a fresh bagel smothered in cream cheese can be yours ... made healthier, at home, using sourdough and einkorn.

For the sponge:

- ▶ 1 cup pure water warm
- ▶ 1 tablespoon sourdough starter
- ▶ 1 cup whole-grain einkorn flour

For the dough:

- ▶ 3/4 cup pure water
- ▶ 3 tablespoons evaporated cane juice + 2 to 3 tablespoons additional, for boiling
- ▶ 4 cups sifted all-purpose einkorn flour, or 2-1/2 cups sifted all-purpose einkorn flour + 1-1/2 cups sifted whole-grain einkorn flour
- ▶ 1 tablespoon sea salt

For the topping:

- ▶ 3 tablespoons extra-virgin olive oil
- ▶ 1 to 2 tablespoons poppy seeds or sesame seeds

Yields 10 bagels.

To make sponge: Whisk warm water with sourdough starter until frothy. Add whole-grain einkorn flour. Cover and leave at room temperature for 2 to 5 hours. Watch the dough, not the time. Einkorn sours quickly. The sponge dough needs to soften and become airy and bubbly. There won't be much rise.

To make dough: Add water to sponge. Whisk well. Add sugar, sifted einkorn flour and sea salt. Using a spoon and then your hand, knead dough until it softens. It will be sticky. Add olive oil. Knead some more, until the dough feels nice, soft, and not as sticky. Don't over-knead — einkorn dough gets stickier with longer kneading!

Cover the dough and leave at room temperature for 5 to 7 hours, or until the dough feels soft and airy. Sprinkle dough with flour, and form into a ball. Divide into 8 to 10 pieces. Next, form each piece into a ball. Using a finger, poke a hole in each ball, and stretch a little. Allow to rest on a very well-floured surface for an hour or so.

Preheat oven to 350 degrees Fahrenheit. Prepare a cookie sheet lined with parchment paper. Bring a medium pot of water to boil. Add 2 to 3 tablespoons of evaporated cane juice. Place bagels into boiling water (I do 3 or 4 at a time). They might sink at first but will quickly come to float. Boil 1 minute on each side, then transfer to parchment-lined cookie sheet. Sprinkle with your favorite toppings.

Finally, bake for 30 to 35 minutes, or until tops brown slightly. Don't let over-brown — einkorn can dry out!



Tracey's Sourdough Waffles

[Haniya] This recipe comes from TCS contributing writer Tracey Vierra. My family has loved it for years! It's our go-to breakfast for special occasions, whether a holiday or birthday morning. I like to make a huge (double or triple) batch and freeze the waffles in quarters. It's so easy to pop them in the toaster in the morning, and they last for weeks!

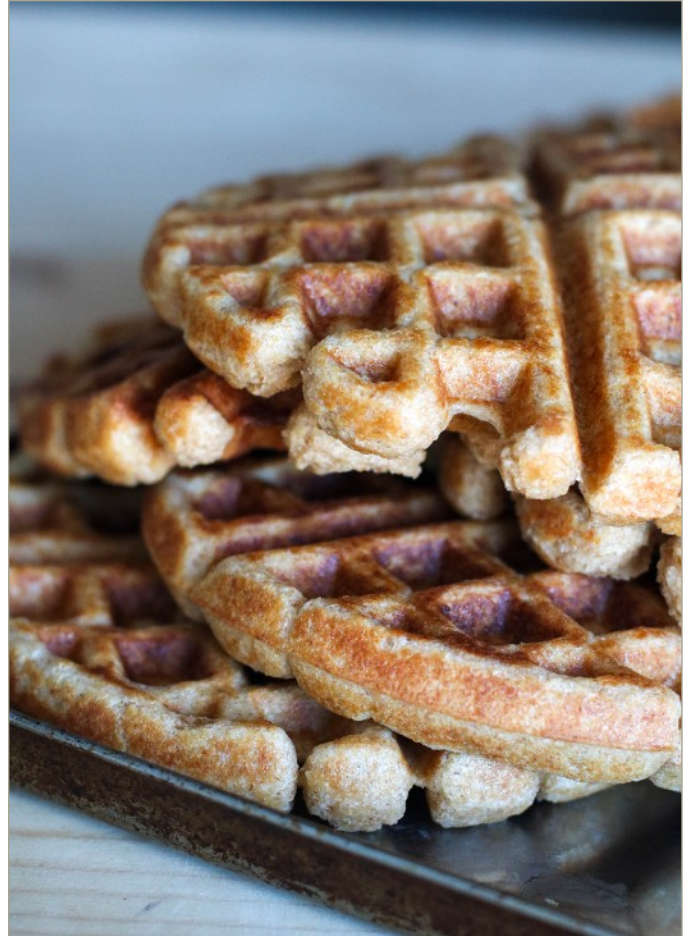
- ▶ 4 cups flour of choice (we often use 2 cups einkorn or spelt and 2 cups oat flour)
- ▶ 1/4 cup sourdough starter, fed in the last 12 hours
- ▶ 2-1/2 cups raw whole milk or dairy-free milk of choice
- ▶ 4 pastured eggs, separated
- ▶ 2 tablespoons baking powder
- ▶ 1/2 teaspoon sea salt
- ▶ 1 cup coconut oil, melted

Yields 8 Belgian waffles.

In a large glass bowl, combine flour, milk and sourdough starter. Mix well, cover and put in a safe place overnight.

In the morning, beat the egg whites until fluffy. While the egg whites are beating, add the egg yolks, baking powder, salt and melted oil to the sourdough mixture. Mix well, then fold in the egg whites.

Warm up your waffle maker. Once warm, pour about 1/2 cup of batter into it, depending on its size. Close the lid, turn the handle and wait for the red light on top to turn green — this, of course, means it's done. (If your waffle maker is different, follow the manufacturer's instructions.) Our waffle maker takes about 2 minutes per waffle, which is plenty of time to start cooking eggs or frying bacon. Enjoy with fermented strawberry sauce drizzled over top!



Fermented Strawberry Sauce

- ▶ 2 cups organic strawberries, fresh or defrosted
- ▶ 1/4 cup whey
- ▶ 1/4 cup evaporated cane juice
- ▶ 1/2 teaspoon sea salt
- ▶ splash lemon juice
- ▶ 3 tablespoons chia seeds

Blend together all ingredients to your desired consistency. Transfer to a glass jar and fill to within an inch or two of the top. Leave in a cool, dark place for two days. Then refrigerate.

Erin's Sourdough Waffles

[Erin Vander Lugt] Do you have 2 cups of sourdough starter out at room temperature? You can make whole-grain sourdough waffles right now! These waffles are delicious, quick, easy and nutritious! If you have your sourdough starter, you can whip them up at a moment's notice.

- ▶ 2 cups sourdough starter, fed 12 hours before
- ▶ 1/2 teaspoon sea salt
- ▶ 2 tablespoons raw honey or maple syrup
- ▶ 1/4 cup grass-fed butter or coconut oil, melted
- ▶ 2 pastured eggs
- ▶ 1 teaspoon baking soda
- ▶ 1 tablespoon pure water
- ▶ 2 tablespoons ground flax (optional)
- ▶ 1 splash vanilla extract
- ▶ pinch of ground cinnamon (optional)

Yields 8 large waffles.

Plug in waffle iron. It should be hot and ready to go by the time you have finished making your batter. In a bowl, combine melted but not too hot butter, salt, eggs and, if desired, the sweetener, flax, vanilla and cinnamon. Whisk until batter is nicely combined. Add starter. Cut it in and stir it with the whisk until incorporated.

In a little cup, combine baking soda and water. Stir and then add to batter. Whisk 4 or 5 times, quickly. The batter will look pillowy. Open up your hot waffle maker and pour batter on it. Experiment to find the perfect amount — it's all part of the waffle-making fun!

Finally, place your finished waffle on a plate and gussy it up a bit! We love to top ours with homemade yogurt, fresh fruit, and a slight drizzle of maple syrup. My boys also love eating them plain or toasted as a snack, a treat in the car or occasionally as the bread for their sandwiches. Just now, homemade raspberry sauce and fresh whipped cream sounds heavenly to me!

Chocolate Variation: For chocolate waffles, add a tablespoon or so of cocoa powder to the batter, as well.

Savory Variation: Add cheese and herbs instead of sweetener! Top with homemade chili, bean soup or a creamy sautéed veggie dish.

Recipe Notes: These waffles keep in the fridge or a week, or freeze beautifully. Just pop in the toaster, top with your favorite goodies and enjoy!



Oh-So-Fluffy Sourdough Pancakes

[Erin Vander Lugt] This method makes fluffy-beyond-your-wildest-dreams pancakes ... and allows you to sit with your family for breakfast! It's quick and easy — not to mention delicious and nutritious — it's totally doable! I also love getting all of my batter cooking at one time.

- ▶ 4 tablespoons grass-fed butter or coconut oil, barely melted
- ▶ 1/2 teaspoon sea salt
- ▶ 1 pastured egg
- ▶ 2 tablespoons sweetener (honey, maple syrup, Sucanat, etc.)
- ▶ 1 teaspoon vanilla extract (optional)
- ▶ generous sprinkle Mixed Spice Blend (see recipe below)
- ▶ 2 cups sourdough starter, fed 12 hours before
- ▶ 1 teaspoon baking soda
- ▶ 1 tablespoon pure water



Heat cast-iron skillet on stovetop. I turn my electric burner to level 3 (of 11). I want my pan hot, but not too hot or the bottom of the pancake will burn. If you don't get a perfect golden brown the first time you try this method, take note of what you did, and make a change the next time.

While the skillet is heating, whisk together melted coconut oil, egg, salt, sweetener, extract and spices in a medium-size bowl. Then pour in sourdough starter — make sure it has been fed the night before. Stir well with whisk and set aside.



In a small cup, combine water and baking soda. Set aside. Grease the bottom and sides of hot cast-iron skillet. Pour the water/soda mixture into your waiting pancake batter. Stir to incorporate. Pour the batter into your waiting skillet to about a 1-inch thickness.

Instead of letting your batter sit while waiting for skillet pancake to finish, I recommend baking regular griddle pancakes in the meantime. I make 1 large and 1 small cast-iron pancake and 2 griddle pancakes.

Now, watch for bubbles. I let mine cook for 4 to 5 minutes on the stove. If you choose, add fresh or frozen fruit by pressing it into the batter.

Toward the end of this initial cook time, I turn on the broiler. Finish your pancakes off in the oven, using the second or third shelf rather than the top shelf. Remember, your pancake bottom will continue to cook while the top cooks and browns.



Remove from oven once tops are golden brown. Finally, flip onto a cooling rack.

Mixed Spice Blend

- ▶ 1/2 tablespoon ground cinnamon
- ▶ 1/2 teaspoon ground coriander
- ▶ 1/4 teaspoon ground ginger
- ▶ 1/2 teaspoon ground cardamom
- ▶ 1/2 teaspoon ground nutmeg
- ▶ 1/8 teaspoon ground allspice
- ▶ 1/8 teaspoon ground cloves

Combine all spices in a small jar. Use whenever the need arises!

Sourdough Crackers

[Erin Vander Lugt] Crunchy and satisfying. Delicious with dips and spreads. Variations galore. Too simple! Too scrumptious! Give them a try, and let the smiles begin!

- ▶ 1 cup sourdough starter, fed 12 hours before
- ▶ 1/3 cup grass-fed butter, melted
- ▶ 1 cup whole wheat flour or flour of choice, plus more
- ▶ 1/4 teaspoon baking soda
- ▶ 1/4 teaspoon sea salt
- ▶ more sea salt, for topping



Yields a few dozen crackers. Easily doubled or tripled.

In a small bowl, pour in 1 cup sourdough starter and 1/3 cup melted butter. Stir to combine. Add 1 cup of flour to this mixture. Stir well. Add more flour until you have a stiff dough. You may have to do some kneading in the bowl to incorporate enough flour once it gets too stiff for stirring. Cover and set aside for at least 8 hours.

Preheat your oven to 350 degrees Fahrenheit. Place your dough ball on the counter and break apart a bit with your fingers. Sprinkle on 1/4 teaspoon sea salt and 1/4 teaspoon baking soda. Knead to incorporate dry ingredients. Take about a quarter of the dough and roll out onto a Silpat or a piece of parchment paper, or directly onto a lightly greased cookie sheet until thin. The thinner your dough, the quicker it will bake. It is possible to have a thicker crispy cracker (teething biscuit anyone?), but your bake time will be longer.

If your dough is stickier than you like, try placing a piece of plastic wrap on top of the dough and roll on top of that. Once your dough is rolled out as consistently thin as you are able, sprinkle with a large grained salt. I lightly roll over it to press the salt in a bit. Use a pizza cutter to cut into squares or triangles. Bake for 15 minutes or so. Check after 10 minutes. You might be really good at rolling a thin cracker! Transfer to a cooling rack and cool completely before placing in a sealed container. They won't last long!

Flavor Variations: Add 1 teaspoon of dried rosemary for herbed crackers. Or try adding 1/2 cup grated cheese, 1/4 to 1/2 teaspoon garlic or onion powder, and a healthy sprinkle of mustard powder for cheesy crackers.

Einkorn Variation: We use 1 cup freshly ground einkorn flour (about 140 g) in this recipe, plus more as needed to get a rollable texture.

Recipe Notes: This recipe is written using store-bought whole wheat flour, but works with any kind of flour (einkorn is pictured). Please don't use whole wheat pastry flour. The amount you add to the sourdough starter/oil mixture will depend on what type of flour you are using and the thickness of your starter.

Often, I will have to remove quicker-baking crackers (the very thin ones) from my cookie sheet to allow the slower baking crackers (the thicker ones) time to crisp up. I will often crack crackers in half as a way of checking if they are ready to leave the oven. They will crisp up a bit as they cool, but don't rely on that too much. It's good to get them crispy in the oven.

If you are in a hurry, feel free to increase the oven temperature. Just be sure to watch your crackers carefully. You may refrigerate or freeze this dough if you are unable to get to it on the day you planned. Wrap well before storing.

Soft Sourdough Pretzels

[Valeria Weaver] Light and chewy with the perfect bite, these easy homemade, soft sourdough pretzels are made from ancient einkorn or spelt flour.

- ▶ 1 small potato — boiled, peeled and chopped (about 100g)
- ▶ 1 cup pure water, warm + 10 cups additional, for boiling
- ▶ 1 tablespoon sourdough starter, active
- ▶ 1 tablespoon evaporated cane juice
- ▶ 4-1/2 cups all-purpose flour einkorn, spelt or a mix of both
- ▶ 2 teaspoons sea salt
- ▶ 4 tablespoons grass-fed butter, softened
- ▶ 2/3 cup baking soda, for boiling

Yields 12 pretzels.

Combine potato, water, sourdough starter and sweetener in a blender. Blend until uniform. Sift 4 cups of flour into a large bowl. Add potato/water liquid. Mix with spoon until no dry spots remain. Cover and leave for 30 minutes. In baker's terms, this is *autolysis* — the flour will hydrate and enzymes will begin breaking down starch, etc.

At the end of 30 minutes, add salt and butter. Knead it by hand or with a dough mixer. Once the dough starts getting too sticky, add the remaining 1/2 cup flour. Knead to incorporate. The dough should be nice and pliable, and maybe slightly sticky.

Cover and leave at room temperature to rise. It could take anywhere from a minimum of 3 to 4 hours, to a maximum of 6 to 8 hours. Watch the dough, not the time. It should rise significantly.

When ready to bake, turn the dough over to a well-floured surface. Give it a few folds by hand. The dough will be sticky at first but will quickly become nice and manageable. Prepare a baking sheet covered with parchment paper.

Separate the dough into 8 to 10 pieces. Keep pieces you are not working on covered. Roll each piece into a rope (18 to 24 inches long) and shape into a pretzel. Place onto the baking sheet. Let rest 20 to 30 minutes.

Bring 10 cups of water and 2/3 cup baking soda to a rolling boil. Preheat oven to 450 degrees Fahrenheit.

Place pretzels into the boiling water (2 at a time) for 30 seconds on each side, then transfer back to the baking sheet using a spatula. Sprinkle with pretzel salt, sesame seeds, poppy seeds or cinnamon sugar. Bake for 12 to 15 minutes, or until deep golden.

Recipe Notes: Use all-purpose einkorn or all-purpose spelt in this recipe. All-purpose spelt makes the best pretzels, in my opinion. They rise more and are much softer than all-purpose einkorn. Whole ground einkorn is too hard to work with, although doable if you are an experienced baker. Whole ground spelt flour works pretty well, but it does make pretzels that are more dense and quite dark.



Baking Soda vs. Lye

In Germany, pretzels were traditionally dipped in a lye solution before baking them. This gave them a very dark brown color and unique taste.

Since lye is a powerful alkali (with a pH of 13 to 14) that must be handled with caution, many home cooks choose an easier route. Instead, we use baking soda. Baking soda is also an alkali, although less so (with a pH of 8). It produces a lighter-colored skin and a more subtle pretzel flavor.



Another alternative? Washing soda, with a pH of somewhere between lye and baking soda. The challenge is finding washing soda that's pure. If you're a DIY-type person, you just might want to tackle the project of [making washing soda at home](#). It requires heating baking soda to high temperatures and is quite simple, but is also just another step before enjoying these tasty treats.

All that said, if you decide to use lye, you'll get the most authentic-looking and -tasting sourdough pretzels. For the recipe above, we're calling for baking soda.

Coconut Sourdough Muffins

[Erin Vander Lugt] I just shake my head when I think of these muffins. They are truly one of our favorite recipes!

- ▶ 3/4 cup full-fat coconut milk (or cultured dairy, whole milk or preferred dairy-free milk)
- ▶ 1/4 cup sourdough starter
- ▶ 1-1/4 cup whole wheat flour
- ▶ 1 pastured egg
- ▶ 1/3 cup Rapadura or coconut sugar, plus more if desired
- ▶ 1/4 teaspoon sea salt
- ▶ 1 teaspoon vanilla extract
- ▶ 1/2 cup coconut oil or grass-fed butter, barely melted
- ▶ 1 teaspoon baking powder
- ▶ 1/2 teaspoon baking soda
- ▶ 1/2 cup unsweetened shredded coconut, plus a bit extra for sprinkling on top
- ▶ add-ins of choice: lemon or lime zest, chopped crispy nuts from Lesson 9, chocolate chunks or unsweetened carob chips, pieces of fruit, or favorite spices.

Yields 12 muffins.

In a small bowl, stir together the coconut milk and sourdough starter. Add whole wheat flour. (If you are using whole wheat pastry flour, spelt or fresh ground flour, you might have to add a bit more. You are looking for a thick batter consistency.) Cover the bowl with a cloth and a plate and set aside to sour for at least 8 hours or overnight. Your souring time could be significantly less if you have a very warm kitchen.

Once the batter has finished souring, preheat oven to 375 degrees Fahrenheit. Grease 12 muffin cups or line them with paper liners. In a medium-size bowl, whisk together the egg, Sucanat, vanilla, coconut, salt, and coconut oil or butter. Put the soured batter on top of this mixture and stir to incorporate. I like using my hands for this job, but I'm sure a mixer or a Danish dough whisk would work well, too.

Sprinkle the baking soda and baking powder on top of the dough and mix well. Divide batter among the muffin cups and top with a sprinkling of unsweetened coconut. I've found filling the muffin cups with a scant 1/4 cup makes 12 just-right-for-us muffins. Bake for 15 minutes or until a tester comes out clean. Larger muffins will take longer. Allow to cool for just a bit. Store up to a week in a sealed container.

Flavor Variations: Using plain yogurt and butter will allow you to create any flavor muffin you fancy. How about raspberry/lemon, apple/cinnamon, cherry/almond or blueberry/orange? Toasted fennel and orange zest is a new favorite over here. The possibilities are endless.

Egg-Free Variation: Use a mixture of 3 tablespoons water and 1 tablespoon ground flax seed instead of egg. Let the flax seed meal and water mixture sit for 5 minutes to get gummy; then add to the mixture. The texture of this muffin is slightly different, but the flavor is still delicious.

Soaked Variation: Add 1 to 2 tablespoons of your preferred acid (lemon juice, water kefir, kombucha, etc.) to a 1-cup measuring cup. Fill to the top with water, making 1 cup total of acidic water. In a medium-size bowl, stir together the acidic water and 1-1/4 cups flour of choice. You might need to add a bit more flour to achieve a thick batter consistency. Cover the bowl and soak for at least 8 hours. Proceed with recipe. Our preferred combo for this soaked muffin is to soak the flour with lemon juice and water, then add lemon zest and frozen raspberries to the batter just before baking.

Chocolate Sourdough Cake

Rich, moist and not sour at all, this sourdough chocolate cake recipe is heaven in a cake pan ... topped with a decadent, velvety chocolate frosting!

- ▶ 1 cup sourdough starter, fed 6 to 12 hours before
- ▶ 1 cup raw whole milk
- ▶ 1-3/4 cup spelt flour
- ▶ 1 to 1-1/2 cups evaporated cane juice, Rapadura or Sucanat
- ▶ 1 cup coconut oil, just barely melted
- ▶ 2 teaspoons vanilla extract
- ▶ 1 teaspoon sea salt
- ▶ 1-1/2 teaspoons baking soda
- ▶ 3/4 cup cocoa powder
- ▶ 1 teaspoon Teeccino (I used the Mediterranean Hazelnut blend — optional)
- ▶ 2 pastured eggs



Yields 1 9-inch-by-13-inch cake or 2 8-inch square cakes.

Combine the fed starter, milk and spelt flour in a mixing bowl. Cover and let rest at room temperature for 8 hours. If not ready to bake the cake, transfer this mixture to the refrigerator until ready to finish the cake, but allow it to come back to room temperature before proceeding.

Preheat the oven to 350 degrees Fahrenheit. Grease 1 9-inch-by-13-inch cake pan or 1 8-inch square or round cake pans with coconut oil. Set aside.

In a separate mixing bowl, combine the evaporated cane juice, coconut oil, vanilla, salt, baking soda, cocoa powder and Teeccino. Mix well. Add the eggs and beat well. Combine the sourdough mixture with the chocolate mixture. Mix gently until smooth. Pour into prepared pan(s).

Bake for 30 to 45 minutes, until a toothpick inserted in the center comes out cleanly. Remove from oven and set on a rack to cool. Once cool, if cakes are in square or round pans, tip them out onto a platter. Spread frosting (see recipe below) between layers and on top. If cake is in one rectangular pan, spread frosting on top. Serve!

Chocolate Coconut Cream Frosting

- ▶ 3/4 cup coconut cream
- ▶ 1/4 cup raw honey
- ▶ 1/4 cup cocoa powder
- ▶ 1 teaspoon vanilla extract

Combine all frosting ingredients in a blender or food processor. Blend until smooth. Frost a completely cooled cake immediately, or chill until ready to frost. Simply let it come back to room temperature before frosting.

Chocolate Raspberry Tea Cake

[Erin Vander Lugt] What is a teacake? Cake that doesn't crumble. Use your hands! Use a fork! It all works with this tasty treat!

- ▶ 1/4 cup sourdough starter
- ▶ 1 cup milk of choice, fermented dairy or dairy-free milk of choice
- ▶ 1-1/2 cups whole wheat flour + 1 tablespoon or more, if needed
- ▶ 2/3 cup coconut oil or butter, melted
- ▶ 1/2 cup Sucanat or Rapadura
- ▶ 1/4 cup raw honey
- ▶ 2 pastured eggs
- ▶ 2 teaspoons vanilla extract
- ▶ 2/3 cup cocoa powder + 1 to 2 tablespoons more, if needed
- ▶ 1 teaspoon baking powder
- ▶ 1/2 teaspoon baking soda
- ▶ 1/2 scant teaspoon sea salt
- ▶ 1/2 to 2/3 cup dark chocolate morsels
- ▶ 1 cup raspberries, frozen and broken up a bit
- ▶ 6 drops peppermint essential oil (optional) or 1 teaspoon natural mint extract



Yields 1 cake.

At least 8 hours before: In a medium-size bowl, whisk together milk and sourdough starter. Stir in flour until well combined. Cover with a tea towel and a plate and set aside on the counter for 8 hours or overnight.

When the souring time is up: If you are using spelt or whole wheat pastry flour, you may need to add a bit more flour to reach a thicker consistency. Preheat oven to 350 degrees Fahrenheit and place a rack in the middle of the oven. In a small bowl combine coconut oil, Sucanat, honey, eggs, salt, vanilla extract and cocoa powder. Stir well.

Pour the chocolate mixture on top of the soured mixture and combine in your favorite way. Mine? I squoosh the batter with my hands so I can mix thoroughly but not over-mix. Stir in the baking soda and baking powder with a wooden spoon. Finally, fold in the frozen raspberries and chocolate chips.

Distribute the batter into your greased baking vessel of choice. Bake for the appropriate amount of time (see Recipe Notes) and until a toothpick inserted in the center comes out clean. Take care not to over-bake. Cover with parchment paper to prevent the top from becoming too brown, and start checking for doneness about 10 minutes before the baking time is up.

This is delicious enjoyed warm or at room temperature and served on its own, or with a drizzle of homemade raspberry sauce for extra pizzazz (recipe below). Enjoy!

Recipe Notes: Choose your baking time according to your baking vessel: **full size loaf pan** (50 to 65 minutes), **mini loaf pan** (30 to 45 minutes), **standard muffin pan** (15 to 20 minutes) or **mini muffin pan** (8 to 12 minutes).

Raspberry Sauce

Keep in mind how much you need — a lot of sauce? Lots of berries and water. Do you prefer a drizzle of tart over your decadent cake? Less honey.

- ▶ 1 to 2 cups raspberries, fresh or frozen
- ▶ a few tablespoons of pure water
- ▶ raw honey, to taste

Add ingredients to a saucepan. Bring ingredients to a simmer. Allow to cook until the raspberries have completely broken down. Enjoy as is (a rustic sauce), whizzed up (seeds and all), or whizzed up and pressed through a sieve for smoothness. Store in a sealed container in the fridge.

Honey-Lemon Rhubarb Pie With Sourdough Crust

[Erin Vander Lugt] What better way to celebrate than with a slice of homegrown, homemade rhubarb pie?!

For the crust:

- ▶ 2 tablespoons sourdough starter
- ▶ 1/2 cup very cold water, plus more
- ▶ 2 pinches sea salt
- ▶ 2 cups whole wheat pastry flour, or flour of choice
- ▶ 1/2 cup chilled unsalted butter
- ▶ 1/2 teaspoon baking soda

For the filling:

- ▶ 4 cups rhubarb, heaping and sliced
- ▶ 1/2 cup unrefined dry sweetener of choice, to taste
- ▶ 1/4 cup sprouted or all-purpose flour, or your choice
- ▶ 1 grated lemon rind, 2 to 3 teaspoons
- ▶ 1/4 cup raw honey
- ▶ 1/4 teaspoon sea salt
- ▶ 1/2 teaspoon cinnamon
- ▶ 2 tablespoons unsalted butter
- ▶ milk or cream

Yields 1 9-inch pie with a top and bottom crust.

To make the crust: In a small bowl, stir together sourdough starter and cold water. Set aside. In a medium-size bowl, whisk a couple pinches of salt into the whole wheat pastry flour. Cut in the cold unsalted butter.

Make a well in the flour and pour in your sourdough starter/water mixture. Use a fork to carefully combine. Add small splashes of water as needed until the dough holds together. Cover the bowl with a cloth and a plate and leave to sit on your counter 4 to 6 hours, or in the fridge for longer. (A longer souring time works just fine, but your crust might fall apart a bit as you work with it, and you might have to use a bit of sprouted or all-purpose flour to make it a positive crust-making experience.)

After your dough has soured, sprinkle with baking soda and very lightly work into the dough. Consider refrigerating the dough for 15 or so minutes to firm up for easier handling. I usually just dive right in. Divide in two. Roll out the one half and place in your pie plate. Roll out the second half and have it on hold until needed.

To make the filling and assemble: Preheat oven to 450 degrees Fahrenheit. Line a 9-inch pie plate with half of the unbaked sourdough pie crust. In a large bowl, toss together the rhubarb, dry sweetener, sprouted flour, lemon rind, honey, sea salt and cinnamon. Pour into unbaked pie crust. Dot with butter and top with remaining pastry. Seal edges and brush with milk or cream. (Always fun to top with a sprinkle of sugar, too.) Don't forget to make a decorative slit.

Bake for 15 minutes at 450 degrees Fahrenheit. Lower the oven temperature to 350 degrees Fahrenheit and bake for another 45 minutes. You might need to cover the pie partway through if it is getting too dark. Cool. Serve at room temperature or chilled. Delicious plain or with a dollop of whipped cream, vanilla ice cream or plain yogurt. Keeps covered on the counter for two to three days, and in the fridge for about a week.

Sourdough Fruit Cobbler

[Erin Vander Lugt] I love sharing tasty sourdough recipes with friends, and this recipe is just that. I also enjoy recipes that can be tweaked to meet the needs of many. What fruit do you have in your freezer? Are you dairy-free? Grain-free? This recipe is as flexible as you dare to make it!



- ▶ 1/4 cup sourdough starter
- ▶ 2/3 cup raw whole milk, fermented dairy or dairy-free milk of choice
- ▶ 1 cup whole-grain flour of choice
- ▶ 4 cups berries (about 1 pound, frozen or fresh), or fruit of choice
- ▶ 1/4 cup dry sweetener of choice + 1/3 cup additional
- ▶ 1 teaspoon ground cinnamon or preferred spice (optional)
- ▶ 1/2 teaspoon baking soda
- ▶ 1/2 tablespoon baking powder
- ▶ 1/8 teaspoon sea salt
- ▶ 1/2 cup coconut oil or grass-fed butter

Yields 1 2-quart casserole, 9-inch round or 8-inch square baking dish.

In a small bowl, stir together sourdough starter and 2/3 cup liquid. Add flour and stir to incorporate. Cover with a tea towel and plate. Set aside for at least 6 hours.

When souring time is over, place oven rack in middle position. Preheat oven to 350 degrees Fahrenheit and place baking dish with 1/2 cup coconut oil inside. As your oven warms, prepare the following two additions.

First, in a small bowl, stir together fruit, 1/4 cup sweetener (or to taste) and spice. Set aside. Second, take bowl of soured dough and sprinkle on top the 1/3 cup sweetener (or to taste), baking soda, baking powder and sea salt. Use clean hands or mixer to thoroughly combine. I prefer the clean hands method.

Take the baking dish out of the oven. Drop tablespoonfuls of prepared batter on top of the oil. Cover all of the oil, but do not stir. Spoon prepared fruit on top of the batter. Cover the batter, but do not stir. Bake the cobbler for 40 minutes. Cover with parchment paper and bake another 10 minutes. The cobbler should be browned and no longer gooey in the middle. Continue baking and checking every few minutes until a toothpick inserted into the cobbler comes out clean.

Enjoy hot from the oven or warmed for a fresh-from-the oven experience. Delicious with plain yogurt for breakfast or ice cream for dessert. Tasty on its own or with a splash of cold cream. Store in a sealed container in the refrigerator.

Soaked, Gluten-Free and Dairy-Free Variation: Omit sourdough starter. Use 2 tablespoons lemon juice, plus coconut milk, to make 2/3 cup liquid instead of milk. Use coconut oil instead of butter. Replace flour with your favorite gluten-free flour blend, plus 2 teaspoons ground chia or flax seeds. Soak the liquid, flour and ground seeds for 6 to 8 hours. When you are ready to bake, sweeten the batter and fruit with as little or much sweetener as you like, add a bit of your favorite spice, and follow directions as written below. Oh, my! Absolutely delicious. It's guaranteed to bring smiles and requests for second helpings!

Sourdough Pumpkin Bread

[Erin Vander Lugt] Keep things cozy this fall and winter with tasty, nourishing pumpkin treats!

- ▶ 2 cups whole-grain flour of choice, plus more as needed
- ▶ 1 cup pureed pumpkin
- ▶ 1/4 cup sourdough starter
- ▶ 1/4 cup raw whole milk, fermented dairy or dairy-free milk of choice
- ▶ 1/2 cup grass-fed butter or coconut oil
- ▶ 2/3 cup Rapadura or coconut sugar, plus more if desired
- ▶ 2 pastured eggs
- ▶ 1 teaspoon ground cinnamon
- ▶ 1/2 teaspoon ground ginger
- ▶ 1/4 teaspoon ground nutmeg
- ▶ 1/8 teaspoon cloves
- ▶ 1 scant teaspoon sea salt
- ▶ 1/2 teaspoon baking soda
- ▶ 1/2 teaspoon baking powder
- ▶ optional add-ins: dried cranberries, chopped crispy nuts from Lesson 9, unsweetened coconut, chocolate chips, 1/3 cup cocoa powder, etc.



Yields 1 loaf or 16 to 18 muffins.

Combine flour, pumpkin, sourdough starter and milk in a medium-size bowl. The dough will be thick. Cover with a towel and a plate and allow to sit at room temperature for 6 to 8 hours (or overnight for a morning bake).

When the souring time is complete, preheat oven to 325 degrees Fahrenheit and grease the bottom of your baking vessel of choice. In a small bowl, combine melted butter, Sucanat, eggs, spices and sea salt. Mix well.

Pour on top of your soured dough and thoroughly combine. I like using my hands for this task. I feel it keeps the batter from becoming overly mixed and gives me a chance to break up any thicker portions of dough with my fingers. Sprinkle baking soda and baking powder onto the dough. Stir to incorporate. Add any optional ingredients you desire. Pour the batter into your greased loaf pan.

Bake loaves for about 70 minutes, but check after 55 minutes to see how things are coming along, and to cover if needed. Adding fresh fruit may increase your baking time. Bake until a toothpick comes out clean. Allow to rest for 15 minutes before tipping out onto a cooling rack. Once completely cool, store in a covered container on the counter, in the refrigerator or in the freezer.

Muffin Variation: Sour as instructed for bread. When the souring time is complete, preheat oven to 325 degrees Fahrenheit and prepare muffin tins. Mix and combine as instructed for bread. Add any optional ingredients you desire. Pour the batter into greased muffin cups or lined muffin tins. Bake muffins for 20 to 25 minutes, until a toothpick comes out clean. Allow to rest for a few minutes before tipping out onto a cooling rack.

Chocolate Peanut Butter Cookies

[Erin Vander Lugt] The coconut can be added to the batter and stirred in, or you could make cookie balls and roll in the coconut before baking. Delicious either way!

- ▶ 1 cup peanut butter or nut butter of choice
- ▶ 1/2 cup dry unrefined sweetener of choice, to taste
- ▶ 1/4 teaspoon sea salt
- ▶ 1 teaspoon vanilla extract
- ▶ 1 pastured egg
- ▶ 1/4 cup cocoa powder
- ▶ 1/3 cup sourdough starter
- ▶ 1/4 teaspoon baking soda
- ▶ unsweetened shredded coconut



Yields 24 1-1/2 inch cookies.

Preheat oven to 350 degrees Fahrenheit. Prepare cookie sheet. Combine all ingredients except unsweetened shredded coconut a large bowl. Mix well. Before baking, roll or stir in coconut. Roll and press onto prepared cookie sheet. Bake for 12 or so minutes. Check after 10 minutes. Allow to sit on cookie sheet for 5 minutes. Transfer to cooling rack. Once completely cool, store in sealed container on the counter, refrigerator or freezer.

Recipe Notes: For a tasty variation, add 1 teaspoon cinnamon and 1/8 teaspoon (or more) cayenne pepper to the batter.

Treasure in the Middle Cookies

[Erin Vander Lugt] Use your favorite jam or dark chocolate for these cookies.

- ▶ 1 cup peanut butter or nut butter of choice
- ▶ 1/2 cup dry unrefined sweetener of choice, to taste
- ▶ 1/4 teaspoon sea salt
- ▶ 1 teaspoon vanilla extract
- ▶ 1 pastured egg
- ▶ 1/3 cup sourdough starter
- ▶ 1/4 teaspoon baking soda
- ▶ jam or dark chocolate

Yields 18 1-1/2-inch cookies.

Preheat oven to 350 degrees Fahrenheit. Prepare cookie sheet. Combine all ingredients excepts add-ins in a large bowl. Mix well. Press dough out on cookie sheets, then use the end of a wooden spoon to make an indentation for the jam or dark chocolate. Fill. Bake for 12 or so minutes. Check after 10 minutes. Allow to sit on cookie sheet for 5 minutes. Transfer to cooling rack. Once completely cool, store in sealed container on the counter or in the refrigerator or freezer.

Peanut Butter Date Cookies

[Erin Vander Lugt] We love taking these cookies on hikes!

- ▶ 1 cup peanut butter or nut butter of choice
- ▶ 1 cup dates, chopped
- ▶ 1/4 teaspoon sea salt
- ▶ 1 teaspoon vanilla extract
- ▶ 1 pastured egg
- ▶ 1/3 cup sourdough starter
- ▶ 1/4 teaspoon baking soda
- ▶ add-ins of choice: cacao nibs, dark chocolate bits, carob chips, unsweetened shredded coconut, etc.

Yields 30 1-1/2-inch cookies.

Preheat oven to 350 degrees Fahrenheit. Prepare cookie sheet. I like mixing the ingredients for this cookie in a food processor. Mix well. Combine with any desired add-ins. Roll and press onto prepared cookie sheet.

Bake for 12 or so minutes. Check after 10 minutes. Allow to sit on cookie sheet for 5 minutes. Transfer to cooling rack. Once completely cool, store in sealed container on the counter or in the refrigerator or freezer. Enjoy!

Rye Sourdough Brownies

[Dawn Yoder] Healthy, chewy, fudge-y, with a dairy-free option ... what's not to LOVE?

- ▶ 1/2 cup grass-fed butter or coconut oil
- ▶ 1 cup coconut sugar
- ▶ 6 Medjool dates, pitted
- ▶ 1 cup sourdough starter
- ▶ 3 organic or pastured eggs
- ▶ 2 teaspoons vanilla extract
- ▶ 1 teaspoon baking powder
- ▶ 1/2 cup cacao powder
- ▶ 1/4 teaspoon sea salt



Yields 18 brownies.

Preheat oven to 350 degrees Fahrenheit. Grease a 9-inch-by-13-inch baking dish. Add fat of choice, coconut sugar and pitted dates to the bowl of a food processor and pulse several times to form coarse crumbs. Process on high until mixture almost forms a dough-like consistency.

Add remaining ingredients and process on high until smooth. Pour batter into prepared baking dish. Bake in preheated oven for 30 to 35 minutes, checking after 25 minutes. Let cool completely before cutting.

Impossible Sourdough Brownies

- ▶ 4 eggs
- ▶ 4 ounces chocolate of choice, melted or a combination of 1/4 cup cocoa + 2-1/2 tablespoons oil of choice + 1/4 cup (more or less) sugar
- ▶ 1/2 cup sourdough starter (fed 12 to 18 hours before)
- ▶ 1/2 to 1 cup Sucanat, Rapadura, honey or maple syrup
- ▶ 1/4 cup butter or unrefined coconut oil
- ▶ 1/2 teaspoon vanilla extract
- ▶ pinch or two of sea salt (eliminate if using salted butter)
- ▶ 1/2 teaspoon baking soda
- ▶ soaked and dehydrated nuts (optional — see Lesson 9)

Yields 1 9-inch round or square pan full. Recipe pulled from our Sourdough A to Z eCourse.

Preheat oven to 350 degrees Fahrenheit, and grease baking dish. In a blender, food processor or medium-size bowl with a wire whisk or beater in hand, combine all ingredients thoroughly until very smooth. Pour the batter into prepared dish. Sprinkle with nuts, if using them.

Bake for 25 to 30 minutes or until you feel it looks done. Remove from the oven and let rest for 10 to 15 minutes. Serve plain, with a dollop of whipped cream or a scoop of delicious homemade ice cream (see Lesson 16). These brownies freeze beautifully and keep in a covered container in the refrigerator for one week ... if you can get them to last that long! Warm slightly for a fresh-out-of-the-oven brownie experience!

Tip from Brandi, eCourse member: Use 3 eggs for a denser brownie (4 eggs make for a more cake-like brownie.)

Sourdough Pumpkin Cinnamon Rolls

[Megan Stevens] We love sourdough pumpkin cinnamon rolls! Traditionally prepared overnight for easy digestion, this recipe is a dream: no kneading of the dough, it rises beautifully, and it bakes up soft and tender. No yeast required!

For the dough:

- ▶ 2-1/2 cups unbleached all-purpose flour (use white flour for best results, or all-purpose einkorn or spelt flour)
- ▶ 1/2 cup sourdough starter, freshly stirred
- ▶ 1/2 cup pumpkin puree
- ▶ 1/4 cup pure water
- ▶ 1/4 cup grass-fed butter, unsalted (or coconut oil for dairy-free)
- ▶ 1 large organic or pastured egg
- ▶ 2 tablespoons coconut sugar
- ▶ 1 tablespoon raw apple cider vinegar
- ▶ 1/2 teaspoon sea salt



For the filling:

- ▶ 1 cup coconut sugar or maple sugar or Sucanat
- ▶ 1/2 cup grass-fed butter or coconut oil for dairy-free
- ▶ 1 tablespoon ground cinnamon
- ▶ 1 teaspoon vanilla extract

For the cream cheese frosting:

- ▶ 8 ounces organic cream cheese, at room temperature
- ▶ 1/2 cup grass-fed butter, melted and cooled (or coconut oil for dairy-free)
- ▶ 1/4 cup maple syrup

Yields 6 cinnamon rolls.

Making and souring the dough. Warm the pumpkin and butter in a small saucepan. Cool slightly. Add apple cider vinegar. Set aside. Add egg, starter and coconut sugar to the bowl of a stand mixer with a whisk attachment and a dough hook. Mix in the pumpkin mixture using whisk attachment. Add the flour, water and sea salt, and continue mixing with dough hook until a sticky dough forms, about 1 minute. Use a spatula or your fingers to scrape dough into a greased glass or ceramic bowl. Cover loosely with a wet towel and set in warm location for 8 to 12 hours.

Making the filling and assembly. Line a 9-inch pie plate or an 8- to 9-inch square baking dish with parchment paper. Prepare the filling by melting butter or coconut oil. When melted, stir in sugar, cinnamon and vanilla. Allow to cool while you roll out the dough. Generously flour your countertop to prevent sticking. Fold the edges of the dough into the center to deflate. Pour the dough onto the floured surface and pat it a few times to deflate any air. To roll out the dough, use a lightly floured rolling pin or your fingers.

14. Sourdough

Roll out to a 12-by-8-inch rectangle. (If using your hands, gently push and spread the dough to the desired shape, stretching slightly as needed.) Dump the buttery cinnamon sugar over the dough. Spread filling over dough's surface, leaving a 1/2-inch border around the edges.

Working with the long side of the dough, roll the dough tightly, pressing down as you go. Or, if you want fewer, fatter cinnamon rolls, work from the short side of the dough. Using dental floss or thin string, cut cinnamon rolls into 2-inch rings. (If larger cinnamon rolls are desired, cut into 3-inch rings.)

Arrange in baking dish, cover loosely with a wet dish towel, and allow to rise 4 to 8 hours. (You can also place the cinnamon rolls in the fridge overnight, and then allow them to rise at room temperature the next day for 4 to 6 hours.)

Preheat oven to 350 degrees Fahrenheit. Bake cinnamon rolls until browned and fully cooked, about 40 to 45 minutes. The internal temperature should read 190 degrees Fahrenheit.

Making the frosting: While cinnamon rolls cool, make cream cheese frosting. Place all frosting ingredients in a mixing bowl: cream cheese, butter or coconut oil, and maple syrup. Beat with a handheld mixer until they're evenly mixed, scraping down the sides of the bowl with a spatula as needed. Place frosting in the refrigerator briefly if the frosting is too runny, stirring and checking it regularly, until a spreadable consistency is achieved. When cinnamon rolls are fully cooled, spread on the frosting and serve.

Recipe Notes: Use organic unbleached all-purpose white flour in this recipe for best results, or another all-purpose flour such as spelt or einkorn. Your dough should be a little bit sticky. Don't add more flour. Grease the bowl in which the dough rises, and line the baking dish with parchment paper. Generously flour your work surface before forming the cinnamon rolls.

This recipe works well with two different time frames: If you start the process in the evening, the dough can ferment and rise overnight. The cinnamon rolls can be assembled and baked in the morning. However, the assembled rolls do need an additional 4 hours rising time, so this recipe will not work well for an early breakfast. Alternately, make the dough the morning of the first day. Allow it to rise for 8 hours. Form cinnamon rolls, and allow them to rise overnight. Bake in preheated oven first thing in the morning.



Sourdough Einkorn Cinnamon Rolls

[Valeria Weaver] These cinnamon rolls are soft, fragrant and beautiful — plus, naturally fermented for additional nutrients and easier digestion!

For the dough:

- ▶ 1/3 cup pure water (80 mL)
- ▶ 2 tablespoons sourdough starter, active
- ▶ 2/3 cup all-purpose einkorn flour + additional 3-1/2 cups + more for dusting
- ▶ 1 cup raw whole milk or dairy-free milk of choice, warm
- ▶ 1/2 cup evaporated cane juice
- ▶ 1/2 teaspoon sea salt
- ▶ 4 tablespoons grass-fed butter, softened, 55g
- ▶ 1 organic or pastured egg, beaten

For the filling:

- ▶ 4 tablespoons grass-fed butter, softened
- ▶ 1 tablespoon ground cinnamon
- ▶ 1/3 cup evaporated cane juice
- ▶ 1/3 cup pecans, finely chopped
- ▶ 1/2 teaspoon ground cardamom (optional)

Yields 16 cinnamon rolls.

Souring stage: Whisk water and sourdough starter until frothy. Add 2/3 cup all-purpose einkorn flour. Mix with a spoon until combined. Leave covered at room temperature until bubbly and airy. This could take anywhere from 3 to 4 hours up to 6 to 7 hours. It depends on your kitchen temperature, starter activity and type of starter (whole grain and rye ferment more quickly).

Once fermented, add warm milk to the bowl of a stand mixer. Add starter dough. Whisk until combined. Add 3-1/2 cups all-purpose einkorn flour. I use a medium sieve to sift it straight into the bowl. Add sugar and salt. Fit mixer with dough hook, and knead gently until everything is just combined. The dough will look dry and might be crumbly. Let rest for 20 to 30 minutes. During this time (called *autolyse* by bakers), the dough hydrates, becoming softer and more workable.

Turn mixer on low speed. Add softened butter one piece at a time. Knead for about 10 minutes. Let the dough rest at room temperature for 2 to 3 hours. Transfer dough to refrigerator for 8 to 12 hours. This cold fermentation keeps the dough from getting sour. Einkorn's simpler structure and high mineral content causes it to ferment more quickly than most other grains.

Baking stage: Bring the dough to room temperature. Dust work surface generously with flour. Turn the dough onto surface, and knead it into a ball. Roll it out to make a rectangular shape. The size isn't that important — you can stretch it later — but I aim for about the size of two large cutting boards. The dough will want to spring back at first, but keep rolling and it will stretch nicely.



14. Sourdough



To make the filling, combine all filling ingredients in a small bowl. Spread mixture on top of the dough. Fold dough in half. Cut dough longitudinally into 16 strips. I cut the dough in half, then each part in half again, and so on, until I get 16. Twist each strip and roll, tucking the ends underneath. Put rolls on a cookie sheet lined with parchment paper. Let rest again for 1 to 2 hours.

Preheat oven to 400 degrees Fahrenheit (200 degrees Celsius). Brush the rolls with beaten egg. Bake for 15 minutes, or until golden brown.

Whole-Grain Variation: Feel free to use whole-grain einkorn flour instead of all-purpose. Keep in mind that the dough will be slightly harder to work with. Also, don't ferment it as long since whole-grain flour sours much more quickly.

Cardamom Roll Variation: Substitute ground cardamom for cinnamon and almonds for pecans in the filling — and enjoy a lovely variation of Swedish cardamom rolls!

Recipe Notes: You will need a stand mixer with a dough hook attachment, a flat surface for rolling out the dough, a rolling pin and a cookie sheet.

Additional Links and Recipes

- ▶ [Gluten Sensitivity & Sourdough: Is Sourdough Gluten-Free?](#)
- ▶ [Does Sourdough Remove Phytic Acid From Grains? #AskWardee 016](#)
- ▶ [Is Store-Bought Sourdough TRUE Sourdough? #AskWardee 057](#)
- ▶ [Feeding Your Sourdough Starter... More Than Just Flour! #AskWardee 150](#)
- ▶ [When Is A Sourdough Starter Ready For Baking? #AskWardee 145](#)
- ▶ [Sourdough Troubleshooting: How To Know When Your Starter Is Strong Enough For Bread-Baking](#)
- ▶ [Where To Buy Whole Wheat Berries, Grains, and Flour #AskWardee 148](#)
- ▶ [How To Keep Ferments Warm #AskWardee 144](#)
- ▶ [Can I Use Reverse Osmosis Water For Fermenting, Culturing, & Sourdough? #AskWardee 138](#)
- ▶ [Is Aged Flour *Really* Better For Sourdough? #AskWardee 122](#)
- ▶ [Really??? Discard Half My Starter At Each Feeding? #AskWardee 113](#)
- ▶ [Do Sprouting, Culturing, Or Sourdough Reduce Carbs? #AskWardee 095](#)
- ▶ [How To Make A Gluten-Free Sourdough Starter](#)
- ▶ [How To Make An Einkorn Sourdough Starter \(Video Demo!\)](#)
- ▶ [How To Transition A Sourdough Starter To Einkorn #AskWardee 069](#)
- ▶ [The Best & Healthiest Flours For Sourdough #AskWardee 065](#)
- ▶ [How To Freeze Your Sourdough Starter {Best Way} #AskWardee 059](#)
- ▶ [2 Sourdough Routines With Einkorn — Daily & Weekly Care #AskWardee 052](#)
- ▶ [Is Sourdough Bread Low Glycemic? #AskWardee 035](#)
- ▶ [Is Using Commercial Yeast In Sourdough Bread Healthy? #AskWardee 031](#)
- ▶ [Sourdough Frequently Asked Questions \(KYF167\)](#)
- ▶ [What Is A Linen Couche Proofing Cloth? + How To Use & Care For One! #AskWardee 023](#)
- ▶ [Can I Feed My Sourdough Starter Different Flours? #AskWardee 021](#)
- ▶ [Can You Use Cold Flour Or Water In Your Sourdough Starter Or Recipes? #AskWardee 020](#)
- ▶ [What's Your Daily Sourdough Routine? #AskWardee 018](#)
- ▶ [Does Sourdough Remove Phytic Acid From Grains? #AskWardee 016](#)
- ▶ [Is Local Bacteria Making My Sourdough Starter Go Off? #AskWardee 012](#)
- ▶ [Gluten-Free Sourdough Starter Basics #AskWardee 009](#)
- ▶ [7 Sourdough Mistakes You Might Be Making \(KYF155\)](#)
- ▶ [17 Yummy Desserts Using Sourdough](#)
- ▶ [12 Yummy Snacks Using Sourdough](#)
- ▶ Traditional Cooking School's [Sourdough archives](#)
- ▶ Sourdough A to Z eCourse — we teach you how to master sourdough (including gluten-free!) with countless recipes: crepes, muffins, cookies, gingerbread, biscuits, crackers, pizza and more!
- ▶ Einkorn Baking eCourse — see Lesson 5 for how to make and use an einkorn sourdough starter, plus many sourdough recipes adapted for einkorn throughout
- ▶ Allergy-Free Cooking eCourse — for information on gluten-free sourdough

Your Assignment

Your assignment with this lesson is to obtain a sourdough starter from a friend or family member ... or follow our instructions for rehydrating a purchased, dried starter. Then, choose a few recipes to try and watch as sourdough transforms every meal into a highly digestible, nourishing feast! Which recipes sound good to you – sandwich bread, English muffins, pizza or maybe cinnamon rolls? If you're a member of Traditional Cooking School, be sure to stop by our private members group to share how it went, too. :-)

Your Notes

Please use this space for your notes, or to jot down your questions. If you're a Traditional Cooking School member, you can [go online](#) to watch the corresponding video(s) or chat about this in our private group.