

The Kneading Conference

2010

Workshop on

Sourdough

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Syllabus

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 - a) Flavor
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Down Deep.
 - a) Grain and milling
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- c) Proteins, including gluten
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6. Fermentation

- a) Basics
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7. Sourdough as a complete dynamic ecosystem. Why it works as is does.

- a) homo- vs. hetero-fermentative bacteria
- b) sugar availability and fermentability driving the system

Sample Recipes for Sourdough

These recipes were chosen as being fairly typical. I have tested all of them, and most are my own adaptations of existing, published recipes, as noted and referenced. None are just as they appeared initially, but bear my own modifications. They await your modifications. They assume you are maintaining a one cup starter in the refrigerator and that you will begin refreshing this for at least three times before use. You will have approximately one cup of this starter in a fully active state.

Khuzb Arabi. Middle Eastern Pita bread. Based loosely on Ed Wood's version with an added fermentation after the sponge.

First build: Sour. Double starter to two cups by mixing 1 ½ c bread flour with 1 ½ cup warm water. Add all of your starter. Let ferment through the day.

Second build: Sponge. Make a thick batter with 2 2/3 c bread flour and 2 2/3 c warm water. Add the above sour and let ferment, covered, overnight.

Third Build: Dough. **Remove one cup of the above sponge to keep back for maintaining your starter.** Refrigerate or whatever suits your needs. Stir in 1 c tepid water, 1 Tbsp sugar, 1 Tbsp olive oil, 1 tsp sea salt, and around 7-8 c bread flour ("depending", keep it from being too sticky as you knead, but don't get it too stiff). Stir the additional flour in until it is too stiff, the balance to be kneaded in. The amount will vary based on the kind of flour you use. Whole wheat is fine if you are used to working with it. Add some Graham flour for flavor if you like.

Fermentation: Let dough ferment for 1 ½ h. It may not seem to be rising much. No problem. This is SOURDOUGH. It will be fine.

Proof: Scale the dough at 3 oz, or cut it into 16 roughly equal sections and round them into balls. Let them sit 10 minutes under cover to relax, and then roll them out to ¼” thickness. Place on wax paper, parchment paper, or linen in trays, which should be stacked with spacers to prevent sticking. You can also stack them a few thick separated by wax paper sprayed with oil lightly, but expect sticking most times and irregular breads. Proof for another hour.

Bake: Bake in a HOT oven. Here, we will be using a masonry hearth oven heated to a wall temperature in excess of 600° F, with a moderate live fire. A home oven on the highest setting will work using trays. The breads will puff up quickly into spheroids. Do not let them brown more than a bit, or the crust will be too hard. It needs to be leathery. Cool and keep in plastic to prevent hardening of the crust, which, unlike many of our other artisan loaves, is NOT desirable in this bread. These will have the classic deep pocket and a strong sour taste.

Chleba, Dark Silesian Rye. Based on Daniel Leader, *Local Breads*, p 323 ff., with modifications.

Strong, sour version. In this version, there is an overnight liquid sponge (poolish) that sits and builds up flavor and acidity. I am keeping the amounts the same as in the book, but I always scale up. This is much easier when using a scale set to metric. Always be sure your basic starter is up to speed by as many refreshments as needed. You should just more than double your starter and take out one cup BEFORE starting this recipe, as none is removed after this point.

Liquid rye starter	¾ c	200 g
Warm water	1 ½ c	350 g
Unbleached bread		
Flour	2 ¼ c	350 g
Whole rye flour	1 c	150 g
Sea salt	1 ½ tsp	10 g
Caraway seeds (Opt.)	2 Tbsp	

Begin with the starter, all the water, all the rye flour, and ½ c of bread flour. This is mixed for an overnight poolish ferment at room temperature. It should be very active by morning. Longer is OK for even stronger flavor. Rye flour is especially receptive to sourdough (and baker’s yeast).

Next morning, add the rest of the ingredients, stirring in the flour and beginning kneading in the usual manner. This is a wet dough, so don’t add too much flour beyond what is called for, and machine mixing (Kitchen Aide on 4) is preferred. It will be lighter than you might expect.

Ferment: 2 to 2 ½ h at room temperature.

Shape one round loaf and put in a colander lined with a linen towel, or a heavily dusted banneton.

Proof: 1 ½ to 2 h.

Bake in a moderately hot oven. If using a masonry oven, make sure it is well tempered with wall temps not in excess of 500°

Sourdough Pancakes. Based on “Sourdough Jack” Mabee’s recipe which we have used literally hundreds of times over the years, initially with a starter that came with his book. I still have his starter, dried and frozen. This is a most excellent way to keep your starter in the pink without a refreshment schedule that wastes flour. We have pancakes every Sunday morning. You can use other flours, but if they are coarse, like whole buckwheat, you need to have separate starters. I keep one for just such a purpose, and buckwheat pancakes are hard to beat. Just use half and half all purpose unbleached or whole wheat, and keep that starter separate.

In a large non-reactive bowl,

Overnight sour: 2 ½ c unbleached white all purpose flour. NOT bread flour!
 2 c warm water, 35 ° C, or just near body temperature. No hotter.
 1 c starter. OK if not refreshed in several weeks.

Mix well and leave overnight for tomorrow’s breakfast. I cover the bowl with a dinner plate and leave the empty starter jar on it so I don’t forget to take out the starter the next day. **YOU CANNOT PROPAGATE THE STARTER WHEN YOU HAVE MIXED IN THE OTHER INGREDIENTS, YOU WILL HAVE TO START WITH THE REMAINS OF THE PURE STARTER IN THE JAR.** Been there, done that. Once. Enough for 3-4 people.

Morning: Remove 1 c starter, put in your sourdough pot, and return to the fridge.

Add 1 egg (Use two for waffles)
 2 tbsp cooking oil
 ¼ c instant dry milk

Mix well, and don’t spare the elbow grease to get the gluten awake. Use a mixer if you must. It must be satiny smooth.

Dry Ingredients: 1 tsp salt
 1 tsp baking soda (NOT powder)
 2 tbsp granulated sugar

Mix these thoroughly dry. A mortar and pestle are useful, but a small bowl and a spoon are fine. Now sprinkle this mixture gradually on the batter as you FOLD it in. It will immediately begin to release CO₂ and you don’t want to stir out the leavening gas. It will rise markedly, and even the sound of the bowl when you set it down changes. Let it sit a minute, and bake away on your favorite griddle. You will find these flapjacks to be the lightest, tastiest you have ever had, and will NEVER go back.

Upping the recipe: As with all sourdough, don’t overtax your starter. Keep it in proportion, so that you always have about the same ratio of starter to finished batter.

Troubleshooting: Make sure your starter is no more than a few weeks old before using. If it gets older than that, it may need refreshing to get up to speed, but it does not need to be as frisky as if you are baking bread.

English muffins: This is a sourdough version of a muffin recipe from *Laurel's Kitchen Bread Book*. I worked this version up from several other sources as well, and can't remember them all. Her recipe is for yeasted dough. You don't need a fancy muffin form or anything, just a good, old-fashioned cast iron griddle (essential). You can't buy these anymore at any of the places I shop. They are not masonry hearth breads, but so what?

Overnight sour (sponge preferment)

Liquid starter	1 ½ c (400g)
Water	2 ½ c (600g)
Bread flour	3 ¾ c (500g)

Mix well, and cover loosely in a non-reactive bowl. Keep in a warm place. You can increase the fermentation time for a more sour product, but this is pretty sour as is. NB: Make sure you have enough starter to keep out a full cup, you will not be removing any from the sour in the morning.

Dough

Preferment	All of it (see warning above)
Bread flour	3 ¾ cups (500g)
Salt	20 g

This results in a 60% hydration dough, so it may be a little sticky. Don't add any more flour, as the rounds must be wet enough to "slump" while proofing and baking.

Ferment 2 ½ h

Form into balls. I scale them at 3 Oz. on an old balance scale, but you can play with the size to suit you. A ball about 2" in diameter is a good place to start.

Proof 1 ½ to 2 h. Use your judgment. These should be well risen, and when tested with your finger, should not bounce back at you or they will not flatten very well. But don't over do the rising. Sourdough is very forgiving. I get a baking yeast like rise out of these.

Bake on a moderate, not searing hot, griddle with no grease. Throw on a light dusting of coarse corn meal on a space on the griddle and simply pop on a round and you are good to go. It will start to flatten as it bakes. You should turn them a few times, this will ensure both sides bake flat and that the thickness is uniform. They will come out surprisingly even. I test for doneness with a fast-reading baker's thermometer. It takes several minutes to bake through depending on the temperature of your griddle. Don't let them burn. Let 'em cool and you are set for a real taste treat. These freeze very well, but they keep so long you probably will not need to do that, unless you scale up and make a few months' worth.

An exhaust fan helps, but I don't have one and don't much worry about the smoke. Never sets off the alarm, anyway.

Essential techniques for managing sourdough.

Activating a dry starter: Take about a teaspoon of the dried starter, or however much you got from me or whoever, and put it in a small bowl. Add a Tbsp of warm water and mix in, allowing it a half hour or so to hydrate. Stir in a Tbsp of unbleached all purpose or bread flour and let it sit, loosely covered, for 6-8 h. Stir in another Tbsp of flour and water and let it sit again. Do this one more time, moving up to a larger bowl as needed. The starter should begin to show signs of activity after a couple of refreshments. After it is bubbly and fragrant, it is ready to move into whatever refreshment and storage schedule you choose.

Minimal refreshment for liquid starter: This is the easiest way to maintain a starter over the long haul, and is used to bring a starter back up to strength if it has been sitting. You will need to do this prior to baking bread every time if the starter has been languishing, but if you maintain the culture by regular use, for example by baking pancakes, it will be needed only to get it up to strength for bread baking, not for pancakes unless the thing has been sitting quite a while, say over a month without use. **Leave the top LOOSE!**

½ c flour, your choice
½ c warm water
½ c liquid starter

Empty out the starter jar, discarding the rest of the old starter, rinse well, or start with a fresh one. Mix the above thoroughly, return the start to the jar, and let it sit overnight or through the day. This is done 2-3 times in a 24-h period, depending. Keeping it warm speeds things up. This can be built up for large batches by building up the leaven keeping the ratio of 1 unit of starter to 2 units of flour and 2 units of water by volume.

Stiff starter: A stiff starter can be made from a liquid one by taking a Tbsp (15 g) of liquid starter, 1 Tbsp (15 g) of water, and 1/3 c bread flour (50g) and mixing up a tiny dough ball. Be sure it is adequately kneaded together. The basic refreshment of this is 1 ½ tsp (10 g) of stiff starter, 1 Tbsp and 2 Tsp water (25 g) and 1/3 c (45 g) bread flour. Soften the starter in the water, then add the flour to the point where you have to knead it. Knead in the remainder of the flour, and be sure you get it all mixed well. This will be done 2-3 times in a 24-h period (Based on Glezer, Artisan Baking). Leader uses about twice this amount with a pinch of whole wheat, and this is a good amount for larger batches: stiff starter: 45 g, ½ c (50 g) water, bread flour, 2/3 c (95 g), and whole wheat flour, 2 Tsp (5 g). You will find this a particularly good time to think about buying a kitchen scale that reads in grams or ounces, with a tare set. But you don't absolutely need one. I store mine in a loosely covered wide mouth Qt canning jar in the fridge.

“Washing” a sick starter. You may at one time or another have a starter that has sat in the back of your fridge just a dte too long. Or you may see, to your horror, that you treasured starter has an archipelago of green islands of mold. Not to worry, there is hope! This technique comes from Ed Wood. If you have been keeping your starter in a 1 qt jar (recommended), simply warm up some water to about body temp. and pour a cup or so in the jar. Whisk it into an even

consistency. You may want to remove the archipelago first, of course. Then stir in water to just about fill the jar. This does several things. First, it raises the pH to something livable for the flora. Second, it dilutes the “hooch”, or witch’s brew of strange alcohols. You can pour this off first if you like, which will help. Third, it shocks the critters into action. Take about a half cup of this and add to a scant half cup of flour, mix in, and hope. It should bump start the culture, and you can start refreshing, as above, after about 8 h. It may take a while to show activity. You may have to repeat this washing. Six months is not an outrageous interval of just sitting for this technique to rescue the starter. But regular use is the best medicine.

Miscellaneous:

Water: Municipal tap water is chlorinated. This can have a deleterious effect on sourdoughs, especially if you are trying to start one from scratch. You can age the water in a loosely covered jar for several days (as one might for tropical fish), use home-purified water, or purchase water. Well water is fine if it tastes good. If it has an off taste, for example from iron, you might not want to bake with it anyway.

Flour: Someone once left a 50# bag of bleached, bromated, commercial flour. Just trying to be nice. I was feeding out pizza to about 40 people. I thought it might be OK to use at least for pancakes, or at worst, for refreshing starters. Might just as well have been plaster of Paris. I use organic unbleached bread flour and all purpose flour, in addition to whole wheat, rye, etc. exclusively. Not much sense putting \$100 worth of effort in on ¢10 worth of plaster of Paris.

Tools: You don’t need much, but I have a few things that help. I use quart canning jars for my multiple starters and re-use the lid inserts or save one piece tops from commercial jars. I have a collection of wire whisks, bowls, spoons (wood and stainless), measuring cups and spoons, a bottle brush, and a fairly good kitchen scale that is accurate to 1 g. I use metric, but this one also reads in ounces and pounds. I have switched over nearly 100% to weighing ingredients, but seldom do so when refreshing liquid starters. “A half a half and a half” is easy to remember.

Conversions and rules of thumb:

1 c tepid water occupies 240 ml and weighs 240 g or 8 5/8 Oz

1 c bread flour “shook and struck” weighs 138 g, or 4 7/8 Oz

1 c flour + 1 c water makes about 1 ½ c batter

To get 4 c batter for a sponge, use all of your starter or sour (1 or 2 cups, depending), which will come back out eventually, plus:

2 2/3 c flour and 2 2/3 c tepid water. When you remove the starter, you will have four cups of sponge remaining.

Literature Cited

Dusty’s baking library. * means extraordinary.

- Alexander, William. 2010. *52 loaves: one man's relentless pursuit of truth, meaning, and a perfect crust*. Algonquin Books, Chapel Hill, .
- Beard, J. 1974. *Beard on Bread*. Knopf.
- *Braue, J. 1961. *Uncle John's Original Bread Book*. Exposition Press, New York.
- Brown, E. 1970. *The Tassajara Bread Book*. Shambala, Berkeley.
- Calvel, R. 2001. *The Taste of Bread*. Aspen, Gaithersburg.
- Clayton, B. Jr. 1978. *The Breads of France*. Ten Speed Press.
- Coupe du Monde de la Boulangerie Award winning formulas*. The Bread Bakers guild of America. 1999.
- Delacretaz, P. 2000. *Construire un four a pain*. Cabedita
- Dupaigne, B. 1999. *The History of Bread*. Abrams.
- *Field, Carol. 1985. *The Italian Baker*. Harper and Row, New York.
- *Glezer, M. 2000. *Artisan Baking Across America*. Artisan. New York.
- Hamelman, J. 2004. *Bread: A Baker's Book of Techniques and Recipes*. Wiley, Hoboken.
- Jacob, H. 1944. *Six Thousand Years of Bread*. Lyons Press.
- Kaufman, T. and J. Kaufman. 1969. *The Complete Bread Cookbook*. Paperback Library.
- Katz, S. 2003. *Wild Fermentations*. Chelsea Green. White river Junction VT.
- King Arthur Flour. *The Baker's Companion*.
- *Leader, D. and L. Chattman. 2007. *Local Breads*. Norton, NY.
- Mabee, J. 1970. *Sourdough Jack's Cookery*.
- *Ortiz, J. 1993. *The Village Baker*. Ten Speed Press.
- Pylar, E.J. 2007. *Baking Science and Technology*. Siebel, Chicago. 2 Vol., 1240 pp.
- Reinhart, P. 1998. *Crust and Crumb*. Ten Speed Press.
- Reinhart, P. 2001. *The Bread Baker's Apprentice*. Ten Speed Press, Berkeley.
- Robertson, L., Flinders, C., and Godfrey, B. 1984. *The Laurel's Kitchen Bread Book*. Random House.
- Shapter, J. 1999. *The Bread Bakers' Bible*. Southwater.
- Vogel, R. and M. Gaenzle. 2009. Fourth International Symposium on Sourdough. *Food Microbiology*, 26. Entire issue devoted to sourdough. I have refs for II and III if you want them.
- *Wing, D. and A. Scott. 1999. *The Bread Builders*. Chelsea Green, White River Jct. VT
- Wood, E. 1996. *World Sourdoughs From Antiquity*. Ten Speed Press.
- Wood, E. 1995. Rediscovering Egypt's Bread Baking Technology. *National Geographic*. January, 32-35.
- Wood, E. 2001. *Classic Sourdoughs*. Ten Speed Press. Berkeley.