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The Naturally Gluten Free

Sourdough Bread

Course Handbook

Here are all the written lectures in the course, for you to print out and keep, and make notes on.

Lecture 3: A little bit of sourdough science.

Yeasts and bacteria: what do they do?

A sourdough bread is fermented. It is made with a culture of flour and water supporting a living and symbiotic colony of wild yeasts and gut-friendly lactic acid bacteria.

In its cold, dormant state, the culture is referred to as the **starter** (or, in many countries, the 'mother').

When it is warmer and active enough to be bubbling, it is known as the **leaven**, and this is what raises your dough. This principle is true for all flours, gluten free or not.

The wild yeasts are present on the plant (nuts, seeds, grains, tubers or beans), and therefore in the milled flour, especially when it is organic.

When they come into contact with water, they wake up and want to self-replicate (their mission on earth!). To feed themselves, they produce enzymes that convert the starches in the flour into sugars they can digest.

The bi-products of this digestion process are carbon dioxide bubbles, which raise the dough, and alcohol, which creates flavour.

At the same time, the lactobacillus (lactic acid bacteria) also present in the flour produce organic acids that acidify the dough, transforming its flavour, digestibility and nutritional value.

Your culture is alive and it needs nurturing. Many people treat theirs like a fridge-pet, and give it a name...

Lecture 4: What was gluten, anyway?

Understand what gluten really was, (before you ditched it).

Despite its alarming reputation in some quarters, and the very real illnesses it causes in some people, gluten is actually a combination of plant-based proteins, chiefly gliadin and glutenin.

These, when combined with water, create the elasticity and chewiness in bread dough. The chains of gluten molecules trap carbon dioxide gas like a network of little balloons, expanding and allowing the bread to get bigger and bigger.

This airy, bouncy texture is the "holey" grail for many bakers, gluten-free or not.

Industrially-produced gluten-free breads now appear to have all the bounce, airiness and softness customers expect from industrially-produced wheat loaves - your typical 'sliced white'.

This is worrying, because the quantity of artificial additives required to achieve this appearance is enormous - and will end up creating as many health problems as the gluten they replace did in the first place.

As home-bakers, we can safely get some way towards 'regular' bread, but to really take the concept of gluten-free breads forwards, we need to redefine success in other terms.

So, what makes *good* gluten-free bread?

Great gluten-free bread is not necessarily a loaf that is 'almost as good as' a wheat loaf, but one that has a decent, bouncy and chewy crumb - not too 'cakey' - and a good, crisp crust. It should make good toast and good sandwiches. It should have a good flavour, and it is interesting to note that naturally gluten-free breads nearly all have more depth of flavour than standard wheat loaves. Finally, a gluten-free bread has the potential to be considerably more nutritious than the other sort, and you will find any efforts to explore the more unusual flours will be rewarding. Check out *The Naturally Gluten Free Flours Guide* in Section 4 of the course.

Lecture 5: Your shopping list.

Ingredients you will need to complete this course. You don't need to buy them all at once; pick one recipe you like to start with, then stock up your kitchen as you build up your repertoire.

- Brown rice
- Buckwheat
- Sorghum
- White rice
- Tapioca
- Potato
- Oat
- Amaranth
- Brown teff
- White teff
- Maize
- Tigernut
- Chestnut
- Green pea
- Cornflour (cornstarch)

Binders

- Flax/linseed
- Chia seed
- Psyllium husk
- Eggs
- Chickpea water (if vegan)

Balancers

- Agave syrup
- Date syrup
- Honey
- Brown rice syrup
- Organic cider vinegar
- Sea salt

Other

- Milk or plant milk
- Butter
- Olive oil
- Apples
- Cider
- Rosemary
- Poppy seeds
- Sesame seeds

Optional

• Dried instant yeast – this is for 'turbo charging' your dough when you don't have time for the leaven to do all the work.

Lecture 7: What ingredients to use?

Choosing the best flours and water for your starter.

Organic flours

It is important to start with an organic whole flour, as freshly milled as possible. This will hopefully have preserved as many of the wild yeast strains from the plant itself as possible, without them having been drenched in sinister pesticides.

Organic brown rice, sorghum, buckwheat, teff, quinoa, or amaranth are all good options. If you use a high starch flour, like potato or tapioca or millet, the yeast may gallop into overdrive and you will have to feed it more often than is probably convenient.

Filtered water

Wild yeasts and bacteria are delicate organisms who don't appreciate the 'killing cleanliness' of chlorine in tap water. At The Artisan Bakery School, we have a reverse osmosis filter on our mains supply, but you can use a jug water filter if it's more convenient. Bottled water is okay, or well water if you're lucky, but don't use distilled water.

Lecture 12: Regular feeding: maintaining your starters.

Instructions for keeping your starters alive and kicking!

Aim to feed your starter twice a week to keep it in peak condition. You can use less flour and water, to avoid building too much volume. Try 25g F + 25g W twice a week, rather than giving 50g + 50g all at once.

It will probably last 10-14 days without feeding, if you go away or forget it (!), but you will need to give it some intensive care after that to get it back to full health. That means keeping it out at room temperature for two days, doing 2 or 3 feeds per day.

If you end up with too much starter in your fridge, you can always give some away - or better still, use it to make gluten free sourdough pancakes! See the end of the course for how to do this.

Lecture 13: Important note on hydration factors.

Understanding how much water to use, and when.

When creating the starter culture from scratch, you will notice we use more water than flour. Afterwards, we feed the starter with equal weights in grams of flour and water, every time. This means that, although the hydration factor (water) is constant, each of the three starters has a different density, due to the different densities of the flours.

For this reason, we don't really advise swapping the starters in the recipes, until you have had some practice and are prepared to experiment with getting the right consistency of dough.

Lecture 14: Troubleshooting starters.

Tips on starter management.

My starter seems flat - more like liquid paint.

This could be due to exhaustion, or infection, or both. If you haven't fed her for a long time, your mother will be literally starving to death. You need to ditch most of the starter (in case it's infection/contamination) and then attempt a feed with 100g flour and 100g water. Check after 6 hours to see if any life is coming back. If not, leave it up to 12 hours and then either feed again, leaving her for another 12 hours at room temperature to consolidate the recovery, or, if there's no sign of life, throw it away and start another.

There is a layer of dark grey liquid on top of my starter.

This is known as 'hooch', or ethanol. This shows that the yeasts have exhausted every source of nutrition in the flour, and need more. Throw the hooch away, along with the top half of your starter. Feed generously, and let things develop.

There is mould (any colour!) on my starter. / The starter smells bad.

Throw it all away. Give the container a thorough wash in hot, soapy water then leave to dry. Start making another starter and cheer up – it will only take 5 days max.

I have forgotten to feed my starter.

The first question here is, since when? If you haven't fed her for 3 weeks or more, then it is doubtful that you will be able to revive her, but it is still worth the attempt (i.e. it has been done). First, discard up to 80% of the starter, then put her in a warm place, feed with 100g flour and 100g water and wait. The liquid should be thick, like a pancake batter, but if it has gone very thin, you can add more flour until the old familiar consistency is achieved. This will give her a flying start to her convalescence.

If your problem is that you urgently want to make bread now, but you forgot to feed your leaven last night, then you can try feed her now using hand-hot water and leave her for a couple of hours in a very warm place (e.g. proving oven) before mixing into the dough. You can also add 0.5% baker's yeast to turbo-charge the dough and cut the time. That way, you'll still get the sourdough flavours and texture, but without such a long wait.

I have (almost) run out of starter!

You only need 1 Tbsp to start a new one, so scrape the sides of your container down and then add in more flour and water and leave in a warm place for 12 hours before feeding again to bulk her up to your usual stock levels. If you have completely run out, you know what you have to do ... start another starter.

Prevention being better than cure...

It's a good idea to keep a back-up starter in someone else's fridge, in case something calamitous happens to yours. People freeze them for up to six months, but it can be tricky to resuscitate them. Other people dry them by spreading them on a sheet of baking paper and leaving them in the sun for a while, then reviving them with water when required. The best thing is simply to bake so regularly that you never forget and never run out!

Lecture 15: Blend, Bind, Balance, Rise.

The Four Pillars of GF Bread Making

Blend your flours for best flavour and nutrient profile

Bind your dough with natural plant material (no gums or any other weird things!)

Balance sweetness, acidity and salt – for flavour and to optimise yeast activity

Rise your dough with wild yeast leaven (sourdough). Add instant yeast if you're in a hurry, or worried about the strength of your leaven.

Lecture 18: House White & House Brown Blends

How to make your own.

House White

(*Makes a little over 1 kilo - 8 cups)*

White rice flour: 500g - 50% - 4 cups

Oat flour: 250g - 25% - 2 cups

Tapioca flour: 125g - 12.5% - 1 cup

Potato starch: 125g - 12.5% - 1 cup

Psyllium husk 20g - 2Tbsp - 2% of total flour weight*

House Brown

(*Makes a little over 1 kilo - 8 cups*)

Brown rice flour: 250g - 25% - 2 cups

Brown teff flour: 250g - 25% - 2cups

Sorghum / amaranth flour: 250g - 25% - 2cups

Oat flour: 250g - 25% - 2 cups

Psyllium husk 20g - 2 Tbsp - 2% of total flour weight*

*Psyllium husk is our preferred natural binder.

Lecture 19: A note on flour substitutions

Answers to a frequently asked question!

Some ingredients used on this course may seem 'exotic' or hard to find in some countries, but be commonplace in others. This course is intended to open up a world of inspiration for GF bakers everywhere, which is why I try not to limit my thinking when creating recipes. What we need to do is be brave and creative in finding solutions / substitutions.

As a <u>general</u> rule, you should substitute like for like, so swap nut flour with another nut flour, starch with a different starch, beans with other beans and grains/seeds with a different member of the absolutely huge family they belong to!

The question we get asked most often about flour is in relation to the oat flour used in our House Blends. Sweet white sorghum flour is a good replacement for oat, as is white teff, if you can get it.

Here are a few other suggestions:

In the Teff & Tigernut loaf, teff is hard to replace from the nutritional point of view, but I would suggest trying sorghum flour (which will produce a lighter result in colour and texture) or millet.

Tigernut is a tuber with a caramel-like flavour; you could use something like cassava, or sweet potato flour, which should have similar levels of fibre. Some might say coconut flour, if you like the flavour, but watch how much extra water you might need. Try using a bit of maple syrup too, if you have it, for the smokier flavour.

Chestnut flour for the buckwheat boule could be replaced by cashew, almond or hazelnut flour. Enrich the texture by adding pecan or walnut pieces.

Millet can be swapped for white teff in the pizza dough.

The pea flour is really hard to substitute, but you may find broad bean/fava bean flour is light enough, and perhaps switch the rosemary for thyme. Or you could mill your own split green peas, if you have a table mill.

Maize flour is the more finely ground polenta/cornmeal. It is NOT masa harina, which is specially treated corn (nixtamalized). Students have reported poor results when using it as a substitute in the recipes on this course.

Cornflour = cornstarch in USA

Lecture 21: A note on egg and vegan substitutions

Eggs can have a wonderfully enriching effect in dough, and will improve the texture and lightness. We only use free range, organic eggs.

If you are vegan, you can make the following substitutions:

1 egg = 1 Tbsp ground flax seed + 3 Tbsp water

OR
1 egg = 1 Tbsp chia seed + 3 Tbsp water

OR
1 egg = 2 Tbsps aquafaba (chickpea water)

OR

1 egg = 1Tbsp camelina seed + 3 Tbsp water

Lecture 22: More on natural binders

Natural binding and gelling agents

The main problem with gluten-free breads is that they tend to be crumbly and dense. The elasticity and chewiness associated with gluten is missing. The addition of eggs can improve dough texture, as can the use of xanthan gum, or guar guar gum, but many people have reservations about a gum made in a laboratory, and not everyone can eat eggs. Modified cassava or tapioca starch is used in certain recipes, but again, the modification process is not something everyone welcomes. Whey protein isolate, as used by body-builders, can contribute to a bread-like texture, but is not enough on its own and, if you're buying the organic variety, it is very expensive.

Fortunately, the most successful compensation for gluten is through the use of natural mucilage. Mucilage is hydrophilic plant material, which means a material that attracts water and binds it on a molecular level. Mucilage therefore swells with the addition of water, resulting in a high-volume, clear and colourless gel. This does amazing things to the texture of gluten-free breads.

The three most useful forms of mucilage are psyllium husk, linseed or flaxseed, and chia seed. Psyllium absorbs the most water, then chia seed, then linseed. Psyllium can be used alone, while the others are better used in combination. Their different properties and functions are described below.

Psyllium – or 'Horse Flower'

Psyllium husk is the outer part of the seed of *Plantago ovata*, also known as Indian plantago or Isabgol. Isabgol is an Indian word which comes from the Persian roots *asp* and *gul*, meaning horse and flower, owing to the shape of the seed. A member of the prolific *Plantago* family, it looks quite like plantain grass. Most psyllium husk comes from India, although some is now being grown in Europe. It is readily available online or in health food stores.

Psyllium is prized as a true dietary fibre. It is helpful in restoring and maintaining healthy bowel function, in lowering cholesterol and in regulating blood sugar levels in diabetics. (*Please note* that it must always be mixed with water before ingesting, as otherwise it can swell up in the throat.)

Adding psyllium and water to gluten-free flours produces a dough that you can actually knead, if you wish, and shape like a conventional wheat loaf. If you are missing the therapeutic aspects of making bread by hand at home, psyllium will be a revelation. It also makes fabulous pizza bases that the whole family will enjoy.

We're often asked whether to use psyllium powder or psyllium husk. Both work, BUT it is important to follow the weights, not the cups & spoons, because a cup of psyllium powder will be far stronger than a cup of husk, and will make your dough much too stiff.

Flaxseed or linseed

Flax is a plant with a pretty blue flower that was first grown for its fibrous stalks which were turned into linen. Its Latin name is *Linum usitatissimum*, meaning 'the most useful kind of linseed.' The brown or golden seeds are highly nutritious, being sources of both omega-3 essential fatty acids and lignans, which have both phytoestrogen and antioxidant qualities. Flaxseed also contains both soluble and insoluble fibre.

Flaxseed mixed with warm water becomes a gel. This gives strength, flexibility and texture to your dough, helping it to maintain its rise. If you're baking a loaf in a tin, you can use flaxseed alone, but you would need to combine it with chia or psyllium husk if you wanted to bake a freestanding bread. You can also mix the seeds into the flour if you prefer; they will still attract and absorb the water in the dough. Grinding the seeds just before you add them to the dough will help make the nutrients more available to your body – whole seeds can sometimes pass through your intestine undigested.

Chia seed

The Aztecs provided the first recorded use of *Salvia Hispanica* seeds as a form of nutrition, while the natives of North America used the seeds from *Salvia Colombiana* (golden chia) in very similar ways, for food and for medicine. Both plants have purple-blue flowers, rather like flax. Chia is even richer in omega-3 than linseeds. It is so rich in antioxidants that the seeds can be stored for months without going rancid. Every 25 grams of chia seeds gives you 6.9 grams of dietary fibre, as well as calcium, phosphorus, magnesium, manganese, copper, iron, molybdenum, niacin, and zinc.

In terms of gluten-replacement, chia seed gives a great deal of flexibility to dough and can add softness, but it isn't strong enough to hold bread up on its own. It will help the final loaf retain moisture and therefore freshness for longer.

Camelina seed

This seed was forgotten for centuries but is being revived in Britain. Known as 'false flax' or 'gold of pleasure', it is part of the brassica family and cultivated for its oil (it used to be used as lamp oil), as well its use in bread and baking. It is related to wild mustard and to rapeseed (canola).

Lecture 24: A playfully sour note.

A word about vinegar.

Not all the recipes include vinegar, which proves that, providing your sourdough leaven is strong enough, the yeast will do the job quite happily, and the lactobaccilus will create a great flavour by itself. If you like cider vinegar, though, feel free to add a dash or two to your dough, even if the recipe doesn't say so. (Not the Apple Cider Sourdough, though!)

Lecture 25. RISE Sourdough Leaven

Understand what sourdough starters and leavens are, and what they do.

Sourdough is one of the most ancient ways of making bread, yet still the most exciting! It is also the healthiest, especially in the gluten free version, since the ratio of leaven to raw flour is so high (around 100%).

The leaven used to raise sourdough is flour and water in fermented form, full of gut-friendly lacto-acid bacteria and the wild yeasts (*saccharomyces exiguuae*) which are much gentler than the instant bakers yeast (*saccharomyces cerevisiae*).

1. First you create a starter culture, using organic flour and filtered water and time (3 to 5 days, but you can keep it going for years after that!).
2. Then you use your starter to prepare your leaven - allowing 3 to 5 or even 8 hours.
3. Then you use your leaven to make the naturally gluten free sourdough bread.

Lecture 26: How to prepare a leaven

How a starter becomes a leaven.

Each recipe in this course starts with specific instructions for preparing the required amount of leaven.

In general, you:

1. take required amount of starter from the fridge

2. feed the starter with specified quantities of flour & water to make leaven, allowing 3 to 5 hours for it to ripen in a warm place

3. replace the quantity of starter you removed, using equal weights of water and flour, then put the starter back in the fridge

4. use the ripe leaven to make your dough

Lecture 27: Optional bakers yeast

Turbo-charging your slo-mo dough.

If you wish to 'turbo charge' your dough for a stronger, faster rise, you may like to add instant bakers yeast to the mix (assuming you are not allergic to it). We have given the measurements in grams only as they are very small and must be very accurate.

If you don't add the bakers yeast, the wild yeast in your sourdough culture will do the same job, but more slowly - giving your dough a longer time to ferment, and producing a richer, more flavour.

Lecture 48: Back to basics.

Make your own flour blends

This is:

- cheaper

- more convenient
- more nutritious
- more personalised to you
- and more exciting.

Try to include at least one powerful nutrient flour along with the starches you need for bulk.

Remember you can make your own 'mixes' in zip-loc bags, including salt and psyllium husk (and optional instant yeast), so you only need to add the liquids when you're ready to bake. Do remember to label the bags clearly, including the date

Use natural binders

Linseed, chia, camelina or psyllium husk - will all give healthier results than xanthan or guar gums, or modified cassava starch. Linseed and chia work well in very wet doughs, where the proving is done in a loaf tin. Psyllium is best for dough you want to shape, and bake on a tray.

Don't forget the holy trio

Sweetness: honey, date syrup, agave nectar, molasses and sugar all give the yeast more energy.

Acidity: organic cider vinegar fosters the healthiest environment for yeasts to live in.

Salt: this is crucial for regulating yeast activity - it prevents over-rapid development and loaf collapse.

Hydration, hydration

Water or milk (dairy or other) constitute the hydration in your dough. Wetter dough makes a more moist and open crumb structure, but if it is really wet, it will need to be proved in a tin - otherwise it will just sprawl all over your baking sheet.

Oils and fats

Adding fat or oil makes the crumb more tender, and the colour of the crust a little deeper. Olive oil is a good choice, as is butter. Another benefit is that oil/fat helps the loaf stay moist for longer.

Leavens

Make your own starters using organic flours. Have patience in the first few days, as there may not appear to be that much going on. You will be rewarded in the end! Use the starters to make your leaven, and use the leaven to mix in the dough. If you put the starter straight into the dough, it will take much, much longer to rise.

A warm place to rise

If your kitchen is chilly and/or draughty, you can use your oven to create a little proving box. Pre-heat the oven to its lowest setting (50 C / 122 F) and then switch it OFF. You now have the perfect, cosy spot for the dough to rise in, or for proving loaves.

And a cold one

Refrigerating dough slows down the fermentation process, and firms up sloppy dough mixes. All dough can be refrigerated for 24 hours. If you leave it for longer, it will start to develop a 'sour' tang, as the lactic and acetic acids get to work. Some GF bakers mix enough dough to last all week. Experiment to see what suits your preference.

The relationship between time and temperature is fundamental to all baking. The lower the temperature, the slower the rise. The higher the temperature, the faster the rise. Learn to master this relationship, and you will transform your gluten free lifestyle!

Tips for recipe development:

Start by mastering the recipes in this course. Note the dough consistency at each stage:

1. after mixing
2. after first rise
3. after proving.

Then vary our recipes by substituting one flour for another. It is a good idea to replace grain flours with other grain flours, nut flours with other nut flours, and so on.

Pay careful attention to the hydration (the quantity of water/milk), as some flours will be more absorbent than others. For example, coconut flour will absorb its own weight in water, so if you are using it as a substitute for almond flour, you will need to add more water to the recipe.

Remember that you can replace eggs with linseed or chia seed gel. Be creative with additions of fruit, nuts, seeds and vegetables.

Experiment with different loaf shapes and different finishes: egg wash / milk wash / rice flour/ stencils / seeds ....

WRITE IT ALL DOWN. And, if possible, take pictures. You will learn as much or more from your flops as you do from your hits.

Good luck!

Penny & Dragan