SOURDOUGH STARTER

Introduction
This document is not intended to be an exhaustive paper about sourdough. It contains a few basic facts and ideas plus my personal recipe for making a starter at home. There are hundreds of different methods out there for an initial fermented dough that is the base of your starter. These can then be kept alive for years. Every starter has a different flavour and imparts different aromas to your final breads. The combination of many parameters (water, flour, natural yeasts in your flour or ingredients, harmless bacteria harvested in your home) makes your starter unique and consequently your bread too.

You will find **many names for the same concept**:
starter, sourdough starter, leaven, levain, levain liquide, chef, pasta madre, lievito naturale, wild yeast (which is not a proper name for it actually). Sometimes other baking methods are added to the mix making things confusing: poolish, biga, pre-ferment. These are different methods and might contain a bit of sourdough starter but they are often made with commercial yeast (fresh or dehydrated).
I will use the words starter and levain interchangeably.

Let's start by **defining** the starter:
It is a symbiotic combination of non harmful bacteria and wild yeasts.

Why is it called sourdough? Why is it sour?
Well, it gets its name because of the sour taste it imparts to the bread. Professional

bakers use a pH meter to control the acidity of the starter to make sure they get consistent results especially when handling large batches or complex recipes that rely almost entirely on the starter for the flavour and shelf life (example: italian panettone).
The sourness is imparted by the bacteria, usually from the strand *lactobacillus*, producer of lactic acid. The list of possible other beneficial bacteria is long and outside of the scope of this document.
Beside the wonderful flavour bread made with sourdough starter has a longer shelf life because of its acidity.

Gas bubbles
The yeasts in the starter are the leavening agent. They consume starch, transform it into sugars, metabolize the sugars and produce gas (harmless CO_2), heat and alcohol (ethanol). The bubbles produced by the yeast must be trapped inside the bread dough, that's why it is imperative to have a dough that stretches thin without breaking (baker's window-pane test of extensibility).

Harvesting yeasts
Wild yeasts are present in most flours (wheat, rye, spelt, etc.) especially if the grains are milled whole i.e. with the husk still attached to the endosperm. Yeasts live on the outside of the grains and end up in the milled flour. If your flour is organic you have more chances of harvesting a variety of good yeasts.
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Yeasts are also found on fruit' skin. Two classic examples are:
Fresh grapes (and also dry raisins) are covered by a white powdery layer, that's yeast! Yeasts transform the sugars, present the grape juice in alcohol and you make wine.
Apple skins from untreated apples are also a source of yeasts, apple juice can ferment and become hard cider.
Did you know that in state prisons fruit is served pre-peeled? Some inmates know that by soaking fruit peels in water for several days, with the addition of some food for the yeast they can make booze. For the same reason it is illegal for prisoners to possess commercial yeast.

Personally I prefer to initiate my starter by using organic whole wheat flour but the same thing can be done by using any flour with the addition of water where fruit peels or raisins have been soaking overnight, and a little honey to help the collected yeasts thrive.

My recipe for the starter
My recipe yields a starter that is 50% flour + 50% water. It's called a liquid starter (levain liquide in french, li.co.li in italian) because of its consistency similar to a pancake batter. Depending on which flour type and brand you choose the consistency changes but it's irrelevant to the final product and its usage.

I start with small amounts of flour to avoid wasting it, in the unfortunate case the mix collects the wrong bacteria and goes bad.
Sourdough starters can also have a firm consistency, in that case they are usually 50% hydration, which means that for every 100g of flour you would use 50g of water. I find firm starters harder to maintain, especially when you go on vacation for longer periods.
My liquid starter once survived one month without being fed. When I checked there was a thick layer of alcohol on top of the dough, which I promptly discarded (I have better choices in my liquor cabinet than this weird moonshine). I also scraped the top layer of dough which was soaked in alcohol and fed with flour and water whatever was left. In a few days the levain was back to normal.

Liquid starters are easy to implement in an existing recipe, I will discuss this in detail later in this document.

Chef Pino's liquid sourdough starter

Ingredients:
100g whole wheat flour, better if organic
150g bread flour, better if organic (if you can't find it use any all purpose/plain flour)
250g room temperature water, chlorine free. If not sure, use bottled water.
VERY clean and dry container and spatula

Procedure:
Remember to work clean, you are letting a piece of food ferment at room temperature. If you add harmful bacteria to the mix you will waste time and flour.

Day 1
In a spotless container weigh 50g of whole wheat flour, mix in 50g of water. Combine very well with a clean spoon or spatula. Cover with plastic film in which you punch 4 holes with a toothpick and let sit at room temperature for 24 hours.

Day 2
Uncover the container, smell the dough. If it stinks like poo throw it away: it's a rare occurrence but it can happen, you have harvested bad bacteria. Same idea if you see mould, chuck everything.
If it has a pleasant smell proceed by adding another 50g of water and 50g of flour to the dough. Combine well, cover with new plastic film, punch 4 holes and wait another 24 hours.

Day 3
Do the smell and moulds test again. Hopefully today the dough smells a bit of fermentation, in any case (unless it stinks) proceed with adding 50g of water and 50g of

bread flour (or any all purpose flour). Cover with film or a lid, no need to punch holes, and wait 24 hours.

The reasons on day 3 we start using white flour are:

- *white flour is richer in starch, which is what yeasts need as food*
- *more whole wheat at this point would add more yeasts, risking an imbalance between yeasts and bacteria (we are looking for a symbiosys, remember?)*
- *By having a starter made with mostly white flour you have an all purpose starter that you can use in many breads. A starter made purely from whole wheat might unbalance recipes that require a high gluten content (whole wheat lacks gluten and is not suitable for some breads like focaccia, ciabatta etc.)*

Day 4

Smell and mould inspection first, then add 100g of water and 100g of white flour. Mix well and let rest 4 to 8 hours, covered, at room temperature. If all goes well your dough should be bubbling and its volume will double. If that's the case your starter is ready. You can start using it right away (according to the recipes you love).

If the dough did not ferment, don't throw it away, remember it's 50-50 flour water, you can add other ingredients and use it for pancakes, regular breads, pizza, etc.

If you don't want to start from scratch again, i.e. day 1, save 100g of the dough and start from Day 2.

Storage and a little Maintenance

My recipe yields about 500g of starter, typically in a bread recipe with a total of 500g of flour you will need 200 to 300g of levain, which means you will have some left.
Save your starter in the fridge in an airtight container. Check regularly to see if a layer of alcohol forms on top, if that's the case pour it off.

Feeding the Starter

Once a week feed your starter with flour and water. If you haven't baked in a while and you start having too much levain, use some for a recipe that calls for flour and water or, worst case scenario, discard some. I usually keep about 500g total of starter.
If you forget to feed the starter it won't die easily but its smell will be more like nail polish. That's an indication that the starter is "starving". No big deal.

To feed the starter, weigh it first and for every 100g of it, add 50g of water and 50g of white flour. Mix well, let it rest 1 hour at room temperature and then place it back in the refrigerator. It's good practice to clean the container regularly.

Example: you have 300g of starter in the fridge, you will need 150g of water and 150g of flour to feed it, resulting in 600g total of starter. If it's too much, because you don't bake

a lot then don't start with 300g, discard 100g, and you are left with 200g that are then fed with 100g of water and 100g of flour.

Activating the Starter (aka Refreshing)

The starter has been sleeping in the fridge for days, the metabolism of yeasts and bacteria has slowed down considerably. You must reactivate it fully before using it in a recipe.

These directions are generic and might change depending on your recipe. This is what I do in most cases:

Let's say I need 400g of starter for my recipe.

The night before preparing my bread dough I take 200g of sourdough out of the fridge, I mix it with 100g of room temperature water and 100g of the type of flour that my recipe calls for. I cover the mixing bowl and let it ferment overnight.

If you haven't fed your starter in a long time this overnight fermentation might not be enough to reactivate the starter to its full potential. A good indicator is the volume of the starter in the morning: it must be at least doubled.

One option is to repeat the process and wait another 8 hours, if not possible then you can add commercial yeast to the recipe (2g of fresh, or 1g of dry for every kg of flour). I know purists of sourdough breads will complain but this is actually a common practice in bakeries to control the final rise of difficult breads while preserving the sourness, complex flavour and shelf life of the baked product.

Important

Remember to always save a little piece of starter if you don't want to start from scratch every time! Even a small amount will be enough to activate the fermentation when fed with flour and water. For this very reason it's easy to share your starter with friends. You can give them a small piece to nurture and they are ready to go!

Use in your existing recipes

The overall ratio of liquids/flours is called hydration and it is a parameter that characterizes enormously the final texture of the crumb.

Rule of thumb: the more water you manage to incorporate in your dough the larger the hole in the crumb will be.

Note: If the recipe doesn't say the overall amount of flour and water you will never be able to replicate it correctly. A good recipe cannot say "300g of sourdough starter". It must specify its content in water and flour which allows the reader to calculate or substitute with his/her own starter.

Below is an example of how to use my liquid starter in an existing recipe:

FRENCH BAGUETTES - 73% hydration				
Original Recipe			Recipe with sourdough starter	
			liquid starter	**500g**
flour	**1000g**		flour	500g
water	730g		water	480g
salt	20g		salt	20g
yeast	2g		yeast (optional)	1 to 2 grams

As you can see, I half the weight of the flour and that gives me the weight of the starter to use. Since my starter is 50-50 flour and water the rest of the quantities is calculated by subtracting the amounts from the original recipe.
Depending on the acidity of your starter you might have mild or strong sourness, you can learn to adjust the amount of sourdough to use depending on the flavor of your starter. Occasionally I taste the starter and it's as sour as lemon I feed it and put it back in the fridge without room temperature resting period, this will increase the pH.
Some bakers prefer to use half of the weight of the water, I find it more random as a starting point than my method that's based on the flour.

Changing from a liquid to a firm consistency and vice versa
If you have a recipe that calls for a firm starter (usually made of ⅔ flour and ⅓ water) and you have our liquid starter handy you can easily make it firm by adding ⅓ of its weight in flour.
Example: the recipe calls for 300g of firm starter (200g flour, 100g water). The night before, when you want to activate your starter, use 200g of liquid starter (100g flour, 100g water) and add 100g of flour to it.
Similarly, if you have a firm starter and you want to transform it into a liquid one, add one third of its weight in water.

Rising Time; be patient!
Breads made with sourdough starter require longer fermentation time and a bit more experience in bread making. For beginners the results are less predictable than for those of breads made with commercial yeast but flavour and shelf life are improved.

The final rise before baking is usually longer and if you are used to commercial yeast you might worry that it'll never rise. Be patient, if your starter was properly activated overnight and you followed all the instructions it'll rise and it'll taste great!

The Organic flour we use in **all** our recipes is : www.mulinomarino.it

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