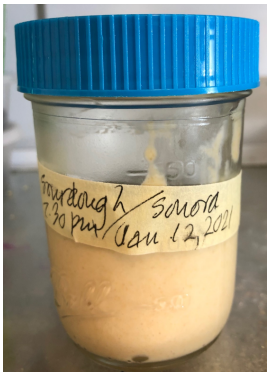
Simple Whole Wheat Malt Sourdough Starter



This simple whole wheat malt sourdough is a mixture of stone ground, or impact milled, organic whole wheat flour with wheat malt flour and water, that has been allowed to ferment using only those microorganisms that are naturally present on the grain, and in the air.

Sourdough has the power to leaven and flavor all kinds of whole grain bread, and to preserve and flavor such products as whole grain pasta and Indian rotis, which are generally un-leavened. At the same time sourdough will make bread more nutritious, and more storage stable, than when made with baker's yeast, or baking powder. For example, the acidity allows the action of naturally occurring phytase in whole wheat, to break down phytic acid and release valuable minerals. Acidity will discourage the growth of contaminating fungi and so preserves the bread longer, from turning moldy. Vitamin B1 (thiamine) in the whole grain flour (which aids the healthy assimilation of carbohydrate) is preserved in the bread as a result of the acidic dough.

The sourdough yeasts and bacteria are fed with sugars released from the starch and soluble fiber in the whole wheat flour, by the action of the naturally occurring enzymes in whole wheat and those of the yeast and bacteria. Malt is used to supplement these enzymes. A valuable advantage to sourdough leavening of bread is that these simple sugars are removed by the fermenting micro-organisms. As a result, the amount of easily digested carbohydrate is reduced in comparison with unleavened breads, or breads produced with baker's yeast with added sugar, or baking powder. This makes sourdough fermented whole grain breads also useful for people who are in a pre-diabetic or diabetic state, who need to reduce their intake of the most easily digestible carbohydrates.

In order to produce a sourdough for the first time, microorganisms naturally present in the air and in organic whole wheat flour, are allowed to grow in a mixture of whole wheat flour and malt with water. Initially there is competition between many types of microorganism, some of which are harmful. Eventually the lactic bacteria will reproduce sufficiently to make the mixture very acidic or *sour*, with a pH 3.5 or less, which kills and excludes any harmful bacteria. Only some specialized yeasts remain, which are compatible with the lactic bacteria and can withstand the acidity. The sourdough microorganisms are primarily acid tolerant yeasts and lactic bacteria.

If the whole wheat flour, malt, and water mixture is left at room temperature for several days, the growth will eventually be sufficient for the yeasts and lactic bacteria to be so crowded that they can no longer compete for the remaining food supply. ***At this point the gassing in the sourdough will cease, and the mixture can be regarded as saturated with sourdough microorganisms. This saturated sourdough is effectively a mature starter with a consistent potency,*** because approximately the same number of microorganisms will always be able to exist in this saturated system. Once saturated in this way the ***mature sourdough*** can be refrigerated to preserve the microorganisms.

In order to replenish the supply of starter, a small amount of *mature sourdough* is added to a new mixture of stone ground organic whole wheat flour, malt, and water.

Stirring the sourdough brings air to the yeasts that need it for aerobic growth. The rest time between stirring, when the oxygen supply is low, favors anaerobic growth of the lactic bacteria. Portions of this *mature sourdough* can be used to make breads and pancakes for up to 4 weeks. **Ideally, for the best leavening action and bread flavor, only a one week supply is regularly made with each replenishment.** The freshly mature starter will be the most strongly leavening.

Fermentation is highly sensitive to temperature so that sourdough refreshment to a mature sourdough, may take just one day in the heat of summer and yet it will take three days in winter. The general rule is that the sourdough fermentation will be 2 to 3 times faster if the temperature rises by 18°F (10°C). This temperature connection to speed of fermentation, applies both to sourdough starter and to sourdough bread dough. The favorable temperature range to encourage the appropriate microorganisms is 68 – 86 °F (20 – 30 °C).

Making sourdough for the first time

Amounts make a half-cup of starter (115 grams), enough to leaven 2 bread loaves and replenish the starter supply.

Although it should be possible to make bread with a newly made mature starter; mature starter should improve in quality after several replenishments.

Ingredients	*Grams*	*Bakers per cent*
Stone ground organic whole wheat* flour	50	100
Enzyme active (diastatic) malted wheat flour	2.5	5
Water**	62.5	125

**It is recommended that durum or white wheat is chosen since these do not separate out appreciably when made into a mature starter in the way that red wheat does.*

***Water should be carbon filtered if antibacterial substances such as chlorine are present.*

[] Mix whole wheat flour, malt, and water in a bowl large enough to allow for expansion of the sourdough as it gasses. Cover with a plate and leave at room temperature preferably 68 – 86 ºF (20 – 30 ºC). *Initial pH is greater than 5.*

[] Stir the fermenting sourdough at least twice daily, e.g. morning and evening.

After 2 – 3 days the aroma should mellow, and the initial bubbliness should subside. If you are testing the pH (with acidity test paper by removing a dab of the mixture onto the test paper or with a pH meter) the pH should eventually be 3.5 or less.

On approximately day 4 the mixture thins and there is a tendency for the solids to settle out and leave a watery upper layer, but only if red wheat is used. A thin layer overgrowth of yeast may form on top of the watery layer, especially if the mixture is left undisturbed for 12 -24 hours. This can be stirred back into the mixture.

[] On approximately day 5 - 7, provided all the previous stages have been achieved, the sourdough can be used as a mature sourdough starter to make bread and to replenish your supply. *Stir any separated water back into the sourdough; stir and mix well before using. Store in a covered narrow jar, at 40ºF (4ºC). Replenish the sourdough starter when the supply is running low, or after no more than 2-4 weeks refrigerated storage.*

Replenishing sourdough

Amounts make one cup of mature starter (240 grams), enough to leaven 4 bread loaves (500 gram flour basis) and replenish the starter supply.

Use the previous batch as the source of mature sourdough for replenishment. Prepare only enough mature starter for the following few days of baking and to replenish your supply. Frequent replenishment is best to maintain the leavening strength and good flavor of the starter.

Ingredients	*Grams*	*Bakers per cent*
Stone ground organic whole wheat flour	100	100
Enzyme active malt flour	5	5
Water (carbon filtered)	125	125
Mature sourdough	10	10

[] Use a large enough bowl to allow for sourdough gassing. Add stone ground whole wheat flour and malt.

[] Separately measure water. Add the mature sourdough and disperse evenly in the water.

[] Add the water mixture to the flour. Mix well until evenly incorporated. Cover with a plate. Leave to ferment at room temperature preferably 68 – 86ºF (20 – 30 ºC). Stir the fermenting sourdough at least twice daily.

Notice that the mixture is at first quite thick and that the aroma and degree of bubbliness, is usually greatest after 8 -12 hours. Allow the fermentation to continue until after stirring and waiting another 12 hours, very few new bubbles appear, the aroma has

mellowed and the texture has thinned; this usually takes 1-4 days, according to the temperature and is the sign of a mature sourdough. If testing the pH, it should be 3.5 or less at maturity.

[] Generally, maturity is reached by 24-36 hours at 86ºF(30ºC) or in 2-4 days at lower temperatures. Store mature sourdough, covered, at 40 ºF (4 ºC).
The sourdough is best stored such that it fills a narrow jar and is covered with a loosely fitting screw cap lid. Stir well before measuring out for a recipe. Keep the sides of the jar well scraped down.