

## *Soft Sandwich Buns- 100% whole wheat with extra malt*

Using malt in bread is as ancient as using malt to make beer; the malt supplies all the vital nutrients for the leavening sourdough yeasts and lactic bacteria to flourish.

*Modern baking since 1880 with refined flour, refined sugar and purified yeast has relegated malt to being a minor baking additive intended to supply just enough enzyme activity to produce good bread texture or, as malt extract or roasted malt, to bring added flavor and color.*

The correspondingly ancient sourdough leavening for bread strongly acidifies the dough. By the time the dough enters the oven, there is enough built-up acidity to halt the starch-degrading enzymes in malt so that a spongy bread texture is maintained.

Thus, with a sourdough leavening system we have the possibility to use as much or as little enzyme active malt in bread, as we would like.

Fully enzyme active malt is sprouted grain, in the western world it is usually made from barley, wheat, or rye. The grain is sprouted for 3 days or more, and dried at a low enough temperature to preserve the enzyme activity. The starch and protein in the endosperm are modified by the increased enzyme action during sprouting. Starch is converted into simple sugars and gluten protein is degraded, while soluble fiber, minerals, antioxidant phenolics, more B-vitamins and other nutrients are released. Malted grains are thus extra nutritious compared with the original grain. The sourdough yeasts and lactic bacteria make use of simple sugars and soluble fiber. The final sourdough bread contains practically no simple sugars except a small amount of maltose<sup>1</sup>.

Modern suppliers of malt expect to be selling to brewers of beer! To the baker-newcomer, the wealth of available malt types can be overwhelming. Therefore, as bakers, we need to know exactly what kind of malt we would like to purchase for making buns or baked loaves. The whole grain baker needs *fully diastatic whole grain malt*. High temperature roasted malts have very little or no enzyme activity; they can be used in bread, but just to give color and flavor. *Wheat, rye, and barley malts provide different color, flavor, and texture to bread, due to the differences in varieties.*

One of the enzymes in malt is known as *diastase*. Hence the description of enzyme active malt as *diastatic*. The amount of enzyme activity present is known as *diastatic power* and is usually measured in *degrees Lintner (°L)*. Malt with the greatest enzyme activity has a diastatic power greater than 100°L and is often higher than 150°L.

Wheat and rye grains are free threshing, meaning that they shed their husk during harvest with a combine harvester. Thus, wheat and rye are readily made into whole grain malt that can be milled to whole grain malt flour in a single pass through a stone or impact grain mill and used directly in bread.

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<sup>1</sup> Test results from Medallion Labs on sourdough bread containing 1% or less of diastatic malt, in comparison with the ingredient whole wheat Sonora flour showed much reduced soluble fiber, no remaining simple sugars, and just 0.6% maltose.

At the moment, most barley is grown for making malt for beer. This *barley for beer* keeps its husk during harvest; it is *not* free threshing. Milling this type of barley produces a mix of barley malt flour and husk. For beer-making, this combination of malt flour and husk is mixed with warm water to dissolve all the sugars and other soluble nutrients wanted for the beer fermentation. Filtering this off as a clear solution is made easier because the husk forms a filter bed in the bottom of the perforated containing vessel. The brewer would normally use this solution extracted from malt directly to ferment into beer. However, the extract can alternatively be evaporated to a concentrated sweet syrup, known as *malt extract*. Generally, malt extract has little or no diastatic power, but it can be used by bakers to add nutrients for the yeasts and lactic bacteria, and to sweeten, color and flavor bread. If the goal of the baker is 100% whole grain bread, the use of this extract means that a significant grain ingredient is less than 100% whole grain. *Briess Malt & Ingredients Company*, mentioned below, sells barley malt for food that is *whole grain*. Presumably they have a system for removing the husk from the barley for beer, such that the bran is not removed.

When truly 100% whole grain barley grain and malt are desired, the easier starting point is free threshing barley. Free -threshing barley sheds its husk during combine harvesting in the same way as wheat and rye. Such barley is said to be *hull-less, husk-less, or naked* and is ancient, but rarely grown currently. Thus, as 100% whole grain bakers we need to ask farmers to grow free-threshing barley and ask maltsters to produce diastatic hull-less barley malt for bakers, and so create the supply chain.

Currently in 2022, in the San Francisco Bay area we have [Admiral Maltings](#), producing fully diastatic wheat and rye malts from California grown organic wheat and rye, and the possibility for naked barley malt in the near future. Large scale maltsters supply malt wholesale. One of the few, perhaps the only large-scale maltster supplying malt for use in foods including bread, is the [Briess Malt & Ingredients Company](#) in Wisconsin. For home brewers and bakers, large-scale maltsters distribute their malt through retail micro-brewing suppliers on-line, such as [More Beer!](#) and sometimes through bakery ingredient suppliers.

The next question is how much diastatic malt to use in bread? Is there a limit? I'd suggest that there is no limit, except to realize the nature of malted grain flour. The starch has been mostly converted to sugars and the gluten protein has been degraded so that it cannot hold the dough structure as before malting. The sourdough microorganisms likely use all the simple sugars present and a portion of the soluble fiber from the malt. The amount of residual sweetness increases as more malt is added.

The following recipe is an example showing replacement of 10% spelt wheat flour with diastatic rye malt. A 10% replacement of wheat flour in bread is generally accepted as an amount that keeps the bread texture and volume little changed from the corresponding all-wheat flour formulation. At 25 and 33% replacement of wheat flour with diastatic rye malt the flavor is heartily sweet-sour. At 100% replacement of the wheat flour with wheat malt, the buns are sweet and still open-textured but with much reduced reduced volume. The variations are infinite!

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Ingredients for 12 round 3 inch buns, based on 500 grams mixed whole spelt wheat and whole rye malt flours.

Ingredients	Grams	Bakers per cent
100% whole spelt wheat flour	450	90
Diastatic rye malt flour*	50	10
Salt	7.5	1.5
Water at 86°F (30°C)	300 - 350	60 - 70
Mature whole wheat barm sourdough starter**	50	10

\*Base wheat or rye malt grain with diastatic power greater than 100 (degrees Lintner/ pound of grain) is available from micro-brewing supply houses. Grind to whole malt flour using home grain mill.

\*\* See whole wheat barm and sourdough recipes at [www.wholegrainconnection.org](http://www.wholegrainconnection.org)

#### Method

[] In mixing bowl, mix flour and malt.

[] In a separate container add water and dissolve salt. Add mature barm sourdough. Mix well and add the water-mixture to flour-mixture in mixing bowl. Use smaller amount of water for first attempt. Note the amount of water used, for future reference. The goal is a medium stiff, smooth, and workable dough.

[] Mix well until ingredients are completely and smoothly incorporated. Leave to ferment in a covered container, at 86°F (30°C) for 4 hours.

[] Punch dough down and knead briefly, to finish dough development. Divide into 12 equal-weight pieces. Round dough pieces and cover them with a moist cloth. Rest at 86°F (30°C) for 15-30 minutes.

[] Preparation for final rise depends on the planned use of either a stove top steamer or steam-baking in a combi-oven:

- **For stove top steaming in bamboo steamer**, place rounded dough pieces on individual 3 to 4-inch squares of baking parchment paper. Gently press into a disk with fingertips, keeping thickness of a half inch. Cover with a moist cloth and leave for final rise at 86°F (30°C) for 2 hours.

- **For combi-oven steaming on perforated or plain sheet pans**, place 12 rounded dough pieces on a half-size sheet-pan (18 x 13 inches) lined with baking parchment paper. Gently press dough pieces into a disk with fingertips, keeping thickness of a half inch. Cover with a sheet of baking parchment and a moist cloth. Leave for final rise at 86°F (30°C) for 2 hours. Note: the cover of parchment paper maintains a continuous shiny crust on top of buns and is kept in place during the oven steaming.

[] Steam cooking either in stove top steamer or in combi-oven:

- **For stove top steaming in bamboo steamer**, bring water to a boil below a Chinese bamboo steamer. Check water level frequently and replenish water when needed throughout cooking time.

Remove steamer tray and arrange buns on parchment paper on the steamer trays, with enough space to allow steam circulation. Replace steamer tray or basket on steamer, plus lid.

Steam vigorously for 30 - 60 minutes. *Buns are done when they no longer retain an indentation and are springy to the touch. If buns are pasty in texture rather than simply soft, the cooking time was not long enough.*

Remove steamer tray or basket from steamer before removing the buns to a cooling rack.

- **For combi-oven steaming on sheet pans**, set combi-oven to 100% steam at 350°F; usually there is no need to preheat oven. Set timer for 30 minutes to start when oven reaches 350°F.

Remove wet cloth from risen buns but leave the parchment paper cover in place. Place baking sheet on rack in center of oven. Steam-bake for 30 minutes after temperature of 350 °F is reached. *Buns are cooked when they no longer retain an indentation and are springy on touching. If buns are pasty in texture rather than simply soft, the cooking time was not long enough.*

[] Cool buns on a rack after removing parchment paper.

[] Serve fresh buns after cooling for at least 45 minutes.

Or allow buns to cool completely. Store in a closed container at normal room temperature, between paper towels. Slice in half and lightly toast before serving.