

## *The Galliard loaf*

Galliard is the name of a formal Court Dance that was popular in the Renaissance, and characterized by wonderful accompanying tunes and Lords a-Leaping. Usually preceding the lively Galliard, was the stately and slow Pavanne dance.

This Galliard loaf follows in the footsteps of the simple whole wheat sourdough loaf, the Pavanne. The Galliard loaf has more than the usual oven-spring expected from 100% whole wheat loaves, so this alone would make the name appropriate. However, the name was chosen in honor of Professor Terry Galliard (d.1994) whose work in England in the 1980s provides the basis for the formula below.

From all the chemical oxidants introduced for making white bread whiter and lighter, only ascorbic acid, otherwise known as Vitamin C, remained as an approved oxidizing additive for bread in the 1980s in England. Ascorbic acid in solution, functions as an oxidizing agent by first being oxidized by the air. Hence the instruction below, to begin the bread-making process by dissolving the ascorbic acid in water, and stirring it vigorously to incorporate plenty of air. One theory for the action of oxidizing agents on bread dough is that they strengthen the gluten structure. However, there must be more to the story of the effect of vitamin C in the whole wheat bread dough. By now it is well known that vitamin C behaves as a protective antioxidant, and that this antioxidant effect is enhanced by polyphenolic compounds found in whole plant foods, including the whole wheat grain. So it is reasonable to speculate that another bread-improving effect of vitamin C is due to its protection against the action of lipoxygenase, which would otherwise oxidize the unsaturated essential oils in the germ of wheat, and spoil the emulsion of oils and water, as described below.

The addition of a small amount of fat to bread is generally known to improve the softness and volume of bread. The bread system already has the gluten-starch-water system to hold gases in the dough, but this does not seem to have the same strength in the whole grain dough as in white flour bread. Terry Galliard made the important observation that there is another gas holding system in bread, working synchronously with the gluten-starch-water system; this is the phospholipid-oil-water system. A number of synthetic emulsifying agents were available in England in the 1980s, but only lecithin remained as an approved emulsifier to add to bread. Naturally occurring phospholipids are strong emulsifying agents, and are commonly known as lecithin. There are phospholipids in wheat flour, but they are for the most part deeply protected inside the amylose starch granules. There are also phospholipids in the germ oils. While the natural phospholipid-oil-water emulsion system can hold wheat germ oils in suspension, the system is easily broken by the action of natural enzymes breaking down or oxidizing those germ oils. Therefore the addition of lecithin, and enough oil or fat to compensate for any effects of degraded germ oils in whole wheat flour, keeps this emulsion strong. The result is that the bread rises strongly and continues to rise for a longer time in the oven, i.e. it has greater oven-spring, and consequently produces a more voluminous and softer loaf.

There are plenty of natural sources of vitamin C and lecithin in whole plant foods that can be the source of delightful variation in 100% whole wheat breads, and will simultaneously boost oven-spring. Citrus and many other fruits

are rich in vitamin C. Seeds in general, including nuts, contain oils that are more or less rich in lecithin, which are released when they are ground to a paste. In some cases, such as sunflower seed, the virgin extracted oil is especially rich in lecithin. Ground flax seed is already used as an ingredient in whole wheat and rye breads.

Enzyme active malt is intended to supply a boost to the starch degrading enzymes naturally present. This ensures a good supply of sugars for the leavening microorganisms. Excessive starch degradation is held in check by the sourdough, since these enzymes cease to act when the acidity of the dough is sufficient, which occurs before baking the dough.

Terry Galliard's description of the bread scene in Britain during the 1970s and 1980s provides evidence that the whole grain bread movement was gathering strength rapidly. The impetus was due to the particular realization at that time, that dietary fiber protects us from the so-called Western diseases. Similarly there was plenty of whole grain bread action here in the USA, illustrated by the publication of Laurel Robertson's *Laurels Kitchen Bread Book*, Thom Leonard's *Seed to loaf approach to Real Bread* and the cooperative Uprisings recipe collection called *The Whole Grain Bakers Book*. All of these books were about whole grain baking.

The tragedy for baking in the USA was that this movement towards whole grain baking was hijacked in the 1990s by powerful refined flour milling and baking interests and turned into the white flour Artisan Bread movement. Indeed, many of the whole grain bakers defected, including Thom Leonard. Only very recently has there been a return of such bakers to the realization of the need to produce 100% whole wheat breads. Perhaps the main reason for such a high rate of defection of bakers, back to refined flour baking, was that the methods for making expanded whole grain breads had not been given enough attention. It is high time to see how far we had come with our knowledge of the whole grain bread system in the 1980s, and to renew this research effort so that we never again find that 100% whole wheat breads are so rare as at present in 2014.

*When adapting this recipe to your own whole wheat flour, it is best to begin with a stiffer dough, and if necessary, to add more dough water at the kneading stage. In this way no flour will be added to the dough after the first mixing, and all the flour will be well hydrated and fermented. Ideally the amounts of flour and water to give an optimal dough will be known, so that neither flour nor water needs to be added after the first mixing.*

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*Amounts for one loaf made with 500 grams or 16 ounces whole wheat flour*

<i>Ingredients</i>	<i>Bakers per Cent</i>	<i>Grams</i>	<i>Ounces</i>	<i>Cups &amp; spoons</i>
Salt	1.5	7.5	0.25	1 ½ teaspoons
Ascorbic acid	0.016	0.080	0.003	Tip of teaspoon
Water	70	350	11.20	1½ cups
Stone ground whole spelt wheat flour	100	500	16.00	3 cups
Enzyme active wheat malt	1	5	0.16	1 teaspoon
Ghee (or butter, olive oil, etc.)	2	10	0.32	1 tablespoon
Liquid lecithin	0.4	2	0.06	½ teaspoon
Mature sourdough	10	50	1.60	2 tablespoons
Water, extra	5 - 10	25 - 50	0.80 – 1.60	1 – 3 tablespoons

[] Measure salt, ascorbic acid and water into a jug. Stir vigorously to dissolve the salt and aerate the water.

[] Separately, measure whole wheat flour and enzyme active malt into mixing bowl. Mix to evenly distribute the malt.

[] Measure ghee and lecithin, and add to flour in mixing bowl. Rub the ghee and lecithin into the flour using a food processor fitted with a metal blade, or a stand mixer fitted with a flat beater.

[] Measure the sourdough into the jug containing salt, ascorbic acid and water. Mix well and add to the flour in mixing bowl.

[] Mix until flour is completely incorporated. Punch dough down in a bowl, cover it, and leave to rise until doubled in volume; for example this may take 6 hours at 77°F (25°C) or 12 hours at 68°F (20°C).

[] Punch dough down. If dough is too stiff, add more water, perhaps 5-10% more. Knead until smooth. Form a dough ball and allow it to rest for 15 - 30 minutes.

[] Re-shape into dough ball. Gently coat dough ball in whole spelt wheat flour, and set to rise upside down in a cloth lined oval basket, covered with a cloth.

Allow the loaf to rise until doubled in volume, approximately 2 hours.

[] Preheat oven at 475°F, with baking tiles or pizza stone in place, approximately one hour ahead of bake time.

[] Sprinkle a small amount of flour on the risen loaf and invert it out of the basket onto an oven peel. Make a single lengthwise cut about half an inch deep, along the center of the loaf.

[] Reset oven to 400°F. Bake the loaf at 400°F for 40-45 minutes.

[] Allow loaf to cool to room temperature before slicing. Store in a covered container at ambient temperature.