

The Whole Grain Connection Newsletter #22 August 2018

Summer fruit concentrates for pies and pastries

Summer fruit has simply to be eaten and enjoyed. But after the first excitement of the early season, I imagined luscious peach pies, peach slices and raspberry tarts. So, I tuned into making [whole durum wheat thin crust](#) with homemade almond butter instead of olive oil, and pie fillings with concentrated peaches; peaches sliced and gently cooked down until they had the consistency of thick jam. Cardamom is the spice of choice for pastries in Scandinavia, so I tried it here, together with Ceylon cinnamon, in the pastry or in the filling or both. With these I had absolutely no need to enhance flavor or texture by adding sugar. The secret is to choose fruit that is really sweet to begin with or mixing the sweetest fruit with a tart fruit. Prune plums, strawberries, nectarines, and later on apples are often the sweetest. One of these days I'll write out some recipes, but for now you might want to try your own hand with these combinations, or with the summer fruit that you have found locally.

Sourdough starters - a note

Many people write recipes for sourdough breads, and there are as many versions of sourdough starter to go with them. My recipes are no exception. To make my whole grain sourdough recipes work, the sourdough starter needs to be prepared as I prepare it. In particular I use a sourdough that is completely mature and fermented out, in the belief that it is then saturated with a maximum number of compatible leavening yeasts and lactic bacteria. My starter looks dormant when I add it to the dough, which it is. But it springs to life again immediately when diluted in the dough and in the presence of so many new nutrients.

Starch Damage and [Porridge Bread](#)

How awful it sounds to damage starch! But how else can we describe the break-up of starch granules to make the starch accessible to starch-degrading enzymes (amylases) during bread-making?

In plants, starch is built up in organized layers in granules around a beginning molecule. So-called starch granules are not purely starch; they also contain buried layers of proteins and phospholipid fatty material. These phospholipids are generally inaccessible during dough making processes, and it is believed that they form the block to

enzyme attack on the intact starch granule. Conversely, I assume that phospholipids are released whenever enzymes manage to attack starch. Interestingly, the surfactant or emulsifying power of these phospholipids has the potential to greatly improve crumb texture, if only they were available in the dough. Phospholipids can strengthen the formation of gas bubbles in the dough. If the starch granule could be damaged perhaps these useful emulsifying phospholipids would be released?

Damage to starch granules can happen during milling, especially if the grain is very hard and brittle in texture. In my own experience, stone milling did little starch damage, even to durum wheat; although damage should certainly be possible with fine grinding between very well-dressed stones. A roller milling system is purposely made to produce a certain amount of starch damage in a flour fraction. This explains some of the texture enhancing effects of roller milled flour. Perhaps the best way to produce a known amount of damaged starch, is to make a known amount of flour into porridge. During porridge-making, the starch granules melt, rapidly absorb water and swell; the phospholipids and starch are thus both made accessible even after cooling back to ambient temperatures. This opens up the possibility for a baker to control and optimize the amount of damaged starch in a formulation. The range for useful amounts of damaged starch seems to be up to about 15% of the flour in a formulation. However, the action of making a porridge will destroy the bread-making character of the gluten. Therefore, only a small amount of the flour for bread, can be sacrificed for making a porridge. It is also important to realize that the damaged starch will be the first to be attacked by enzymes and fermented away, so reducing that initial increase in water-holding capacity and dough stiffness during the first rise. In the end, a dough may absorb only an amount of extra water equal to the amount of starch damage. Or a baker may choose not to increase the actual dough hydration and simply appreciate the improved texture and sweetness. For example, making a porridge with 5% of the flour suggests an increase in dough water of 5% with respect to the flour. Besides generating simple sugars for the microorganisms, enzymic degradation of damaged starch produces dextrin, which has a distinct additional softening effect on crumb structure.

Thus, the effect of making a porridge with some of the flour is to produce a sweeter flavor, increase crumb softness and slow the rate of staling.

Note: For successful porridge bread, the dough flour must be supplied with the necessary starch degrading enzymes (amylases), hence the use of enzyme active malt in bread formulations.

Grain drying. Times have changed.

We are in a new era of growing grains on the California coast and we need to plan for drying those grain crops.

Grains need to be thoroughly dry so that they can be stored without becoming moldy, and to remain dormant without the development of sprouting enzyme activity. Where the harvest is managed during a prolonged dry heat wave, the grain is automatically dry enough at harvest for safe storage and is often ideally dry down to 10% moisture or less.

In regions where there are summer rains or frequent fog, and in an earlier era in Europe when whole villages of people would come to help with harvests, various techniques were available to dry out the grain. Cutting and collecting the grain into sheaves and then leaving the sheaves in stooks, or shocks, to gradually dry out in the field, was perhaps the most picturesque. Threshing and cleaning of the stored grain was managed on an as-needed basis throughout the year, so the sheaves were often saved and built into a ventilated rick. Various specially designed buildings with ventilated floors and structure that would allow a constant upward draft through the stored grain, were constructed for accessibility in the farm yard or in a village.

Here in California wheat has been grown almost exclusively in regions where it could be harvested in dry heat. Since the 1860s machinery has been available to thresh it there in the field and to send it directly for storage and final cleaning elsewhere; currently this is accomplished using a combine harvester.

The new reality is that we also want to grow wheat near the California coast and in mountainous regions, where summer rain or fog makes it almost impossible to harvest the grain when it is dry enough to store safely. We want to grow it there because we have appreciated that wheat can be used as a cash cover crop in the organic rotations that build soil. And yes, we are working on choosing varieties that can withstand the foggy summer weather.

We need therefore to plan for the drying of the grain, in addition to the post-harvest cleaning and storage. As yet i have no experience to offer, other than using a food dehydrator with a low temperature setting, to dry down some coast grown emmer that took 2 days to dry down. I've also spread grain to dry out on a tarp in the sun. Now I own a moisture analyzer, a MINI-GAC from [Calibration Plus](#), which is useful to recognize too moist grain. This is important because moist grain might look and crunch about the same as really dry grain! I am reading about various grain drying methods designed for small scale in Third World Countries. It is shocking to realize just how strapped we are in aiming to process and store local whole grains, against a huge centralized commodity system that aims primarily to supply refined grains. Whole grains instead should be the normal healthy base to the diet, supported by everyone!

What is Thiamine?

Thiamine is Vitamin-B1 and it was so-named because it was the first of the B-vitamins to be identified during the early 1900s. Thiamine is present in generous amounts in the germ and bran of grains, but is almost absent in the grain endosperm, which is made into refined flour. So, what does it do? Well, it acts mostly as a catalyst inside the body's cells, so that sugars can be converted to energy. When thiamine is in short supply, only some of the steps in the process are fully accomplished. Basing the diet on refined flour without compensating thiamine, and refined sugar that is devoid of thiamine, sets people up for problems with their carbohydrate metabolism. Recent research shows that thiamine intake is much too low in people suffering from [obesity](#), [type 2 diabetes](#) and [Alzheimer's disease](#). Adding thiamine back to the diet improves these conditions.

Thiamine, like all the other B-vitamins in whole grains, is far too valuable for our good health to be removed by sifting or refinement from our most basic grain foods.

Since about 1990, organic refined flour millers and bakers have been allowed to omit the enrichment with thiamine and other nutrients normally found in the whole grain. Such flour is dangerously deficient.

The least that can be done to reduce the danger of B-vitamin deficiency from basing the diet on refined flours, and polished grains, is enrichment with these vitamins. Refined flour millers, and bakers using un-enriched flours, can no longer hide behind a facade of *artisan or organic* to explain their continued use of un-enriched refined flours for everyday foods. The science is conclusive.

By far the healthiest choice is to use 100% whole grain flours, with their full quota of thiamine naturally present.

Ingredient dividing line

Facing up to the need to provide healthful bakery products is really difficult for most bakers. For the last 200 years they have requested and been supplied an ingredient palette based on sifted or refined flour and refined sugar. In general, they have not been concerned with the healthfulness of their products, and instead have focused on eye appeal and sweetness. But today bakers need to produce a full range of everyday healthy whole grain-based foods to please their health-conscious customers. As an aid to consumers and to bakers wanting to provide healthy choices, how about developing two distinct categories of bakery products: *Healthy Every Day* products and *Confectionery* products. A separate case could be used to sell confectionery and all the rest of the bakery products could then be safely recognizable as *Healthy Every Day* products.

Confectionery products would be those based on refined flours, refined sugars, refined oils and fats, and sugars in large amounts to create texture as well as sweetness.

Healthy Every Day ingredients would be based on 100% whole grain flours, with zero refined sugars added. Variations in flour type that would be needed to cover a wide range of products can be managed by making use of the many types and varieties of wheat and other grains, especially the landrace varieties. Other qualifying ingredients would be unrefined oils and fats, nuts and seeds (un-blanching), eggs, dried fruits, fruit pastes, fruit concentrates, milk, cheese, spices, herbs and other truly wholesome ingredients, and only flavoring amounts of unrefined sugar sources.