**The Whole Grain Connection**

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**Seriously scary, just in time for Halloween!**

It’s that time of the year, when baking powder and baking soda raised cookies and spiced quick-breads out-do the pancakes, biscuits (aka scones), soda bread, brownies and banana breads being made throughout the year. They all answer to the spur of the moment desire for something sweet and satisfying, and they surely were made in millions of households during the pandemic. There’s a good tendency now to exchange the refined flour for a whole wheat flour, and to reduce the refined sugar content somewhat and replace it with brown sugar or raisins.

The major B-vitamin known as **thiamin**, is very well represented in the ingredient whole grain flour in quick-breads and the like. Smaller amounts of thiamin are introduced with the eggs and milk, which are often also used in baking powder recipes.

I’ve known for a long time, that baking powder and baking soda are sufficiently alkaline that thiamin is somewhat degraded in their presence. In contrast thiamin is well preserved in the acidic sourdough leavening system.

Even so, I was truly stunned recently to read the nutrition facts label for a ready mix for **whole wheat buttermilk pancakes, when made up with the suggested egg and water;** t**here was zero thiamin remaining!**

**We need a constant supply of thiamin to match our carbohydrate foods,** since water soluble thiamin does not stay in the blood for long. **This is the scare!** We need that thiamin to properly assimilate the flour carbohydrates and perhaps have enough to assimilate the added sugar as well. **If there is too little thiamin for all that carbohydrate in our system, only some of that carbohydrate is converted to energy. The rest of the carbohydrate ends up as a fat deposit! Hence the observation that many mildly overweight, obese and diabetics have consistently low thiamin levels in their blood!**

While a teenager in the 1950s in suburban London, England, my mother came home from shopping daily with a collection of neighborhood stories. On this notable day, the story was that the *overweight* lady living nearby, had just been diagnosed with beriberi! That was shocking then, as now, because I had just learned in school, that beriberi was the deadly disease resulting from thiamin deficiency! The explanation? She practically lived on homemade (baking powder raised) scones! or biscuits as they are called here in the USA.

Most of you know that truly whole grains contain a generous amount of thiamin. Many of you also know ways to use egg white to introduce loft into cakes and cookies, so that you can completely omit baking powder or baking soda. Or, you can forego the instant gratification and use a spoonful of sourdough leavening, or yeast….. and plan to wait for the rise, before baking.

﻿It’s also true that a constant worry about weight gain generally disappears, when all the basic grain foods eaten are whole grain, provided they are not baking powder or baking soda leavened! Yes. There’s no doubt more to the *weight*story, than thiamin…. The phenolics and fiber play a role as do the other B-vitamins and minerals found to their fullest extent in the whole grain……. To learn more, search the abstracts at [**www.pubmed.gov**](https://r20.rs6.net/tn.jsp?f=001vWBg8v0EP8cFTJ687lSTc3AQc8OZVKsrK5q3uzdd0DSvBR-My7XzrnweUDzUGvPX_UVFJRSUOCckoV4-ZntrrzEoVlkcNlFFbASSNbQhh8_hwFileCQR806m5fYunMr8uVeq78ZeT90=&c=wdRe3F4tYljYLKob5V_iYR9df9GsYrFHUwdDoSz-QN3pQJAFAI1wiQ==&ch=qJAMLXmX6HDxRmMzhqmdwNBIvSZ0ztEU2wHZLPG_MrYgllVGHmXROw==)

**More to scare you!**

Stone mills have been safely used for making flour from wheat and other grains for millennia. Usually, the stones have been made from hard rock from the vicinity of the mill and bakery. Also, since 1895, some very effective alternative flour millstones have been made with a composite matrix containing extraordinarily hard corundum, which is chemically equivalent to sub-gemstone quality ruby and sapphire, and almost as hard as diamond.

Small pieces of corundum are embedded in a matrix of somewhat softer, but still very hard and abrasive materials. **In any case, if during the milling the stones are brought together, a fine or possibly chunky powder of same can arrive in the flour! This will be true of any stone mill, whether of local stone or corundum.**The softest wheat and grains, like spelt, rye, soft red and white wheat, mill so nicely fine with all millstones without bringing them close enough to touch, that the idea of the miller contaminating the flour with millstone debris, rarely crosses the mind. Harder wheat grain does not mill to the same velvety texture; harder grains mill to a sandy textured flour. The temptation to bring the mill stones really very close, and even actually touching is almost irresistible especially after becoming familiar with the working of these mills! But the hope to produce a velvety fine flour from hard wheat is impossible with this kind of mill. Durum wheat is the hardest of wheat types and the Italians long ago decided not to attempt stone milling it beyond coarse *semolina*, which roughly translates to half-milled. The original *semolina* must have been a coarsely ground whole grain product. Similarly in India they produce *atta,*which is also coarsely ground whole durum flour, and use it to make their daily bread in the form of rotis, chapatis and the like.

**We are warned by Mock Mill (producers of kitchen mills with corundum stones) not to attempt the milling of popcorn (flint corn) or parboiled rice to flour, because they are too hard! Now I realize that durum wheat and closely related Kamut ® should also be on that list. All of these are hard enough to clean the stones, that is, clean out any loosened material on the surface of the millstones, and into the flour!**

Durum wheat is a newly and increasingly available grain for home baking and pasta making; it is indeed desperately hard. Kamut® (khorasan), also very hard, is increasingly available to home chefs and bakers. But we know it can be made into wonderful whole grain pasta and whole grain bread, if the flour is made really fine.

Hence the temptation, which is to use the small kitchen mill with the corundum stones to make very fine durum flour! Think about this carefully and do not attempt to produce fine durum flour by bringing corundum stones close enough to touch, or you will find yourself eating fine corundum powder, which stays in your mouth to make it very sore! What’s more the soreness is not an immediate development, so you could have a sore mouth and not realize the cause. You might not only inadvertently eat abrasive corundum powder, but it can arrive through the air on your skin and near your eyes to itch like crazy! Looking on-line you will find that **very fine corundum powder, which is completely non-toxic, is the ingredient in Halloween itching powder!**

Coarsely ground **hard wheat**in bread and pasta dough, requires a second kneading step after the dough is fully hydrated. In this way the chunks of endosperm are pulled and stretched into the expected gluten-starch dough structure.

Alternatively to milling hard wheat with corundum stones, I’d suggest milling durum wheat at home using a micronizing mill such as a Nutri-Mill. The original BlendTec Kitchen mill micronizer was highly effective, but its recent redesign is clumsy, but still workable with care. In a commercial bakery or mill the air-swept impact mills, especially those including an air-classifier, will produce the gorgeously fine whole durum flour of your baking dreams with none of **the scare! That is, except for the price of these mills!**

           Even so, the realization that my own trauma over many months was caused by too finely milling durum and other very hard wheat varieties on my Mock Mill, has finally awakened me! How did the ancients mill rock hard parboiled rice, flint corn and durum wheat? To be brief, they wet-milled these very hard grains! But in this there are stories for another time........

This revelation has helped me to further understand how the roller milling process for refined flour from hard red wheat came about and remains so popular. Hard red wheat is not quite so rock hard as durum wheat. The method does indeed produce the very fine flour that bakers see makes beautifully textured bread. In this case however, they removed the bran and germ and so we have the consequences of obesity and diabetes. How hard it is to get this right!

Perhaps at last we do have the solution to the production of fine whole hard wheat flours, in the air-swept impact mills. You can try working with whole hard wheat flours produced by air sweptimpact mills. [**Azure Standard**](https://r20.rs6.net/tn.jsp?f=001vWBg8v0EP8cFTJ687lSTc3AQc8OZVKsrK5q3uzdd0DSvBR-My7Xzrpb1Nr74lHlkiqSRRtU9ll9-itgvifAYgXmhqoHFW04ecSpFyCs98gN--hHAruLfvFYuRMDydlyjNxtg8_9QYiTlF3IQ4JXXYw==&c=wdRe3F4tYljYLKob5V_iYR9df9GsYrFHUwdDoSz-QN3pQJAFAI1wiQ==&ch=qJAMLXmX6HDxRmMzhqmdwNBIvSZ0ztEU2wHZLPG_MrYgllVGHmXROw==)has a Unifine mill to produce fine whole durum flour…………. [**Sunrise Mill**](https://r20.rs6.net/tn.jsp?f=001vWBg8v0EP8cFTJ687lSTc3AQc8OZVKsrK5q3uzdd0DSvBR-My7Xzrpb1Nr74lHlkQhgQaW4SJYPahHtJGIZ8h6gsivLloT1ouLcnw4V6Lz5wNHkmPHqbHjBHvaiPY3K-lj1_r0_McwCCYOw08oqjfg==&c=wdRe3F4tYljYLKob5V_iYR9df9GsYrFHUwdDoSz-QN3pQJAFAI1wiQ==&ch=qJAMLXmX6HDxRmMzhqmdwNBIvSZ0ztEU2wHZLPG_MrYgllVGHmXROw==) also uses a Unifine mill to make very fine hard red wheat flour; they both sell on line to home bakers.

**A new normal for dry farmed wheat**

**in the California Mediterranean climate**

By now, we have seen spring type landrace wheat varieties planted in the early fall variously, overgrow and lodge, produce disappointingly low yields and low protein grain, become diseased with rust or smut and in some years drown in the winter rains. The practice echoes the conventional irrigated wheat growers’ system to plant in November, in order to use all available rainfall to enhance yield, and to make for an easy planting before the fields become muddy. To do this, conventional wheat varieties have been specially bred with short stature to cope in this system that also requires herbicidal weed control.

Instead, **the new normal for dry-farming the spring type drought tolerant selected landrace white wheat and durum, seems to be to plant into a warming season as early in the New Year as is possible with consideration of the location and use of a mechanical planter after a dry spell.** Generally, this is in February or March, but can be in January. The trick is to be savvy or lucky enough to realize that after planting there will be enough moisture around for at least 4 weeks to allow for germination and the robust establishment of the new plants. Durum and Sonora have the reputation to give a crop with only this minimal moisture in the driest of years. Hopefully though, there will be enough later precipitation to grow the plants to 3-4 feet and provide a reasonable yield of good quality grain. The possibility for these large plants to grow too tall and lodge, or become diseased is much reduced. Instead, there is height to lose in the event of drought! Another advantage is that the winter weeds are controlled with the fall field preparation and crop.

The field that will be planted with wheat in spring, needs a crop that can be dry planted by November and which can make good use of the major winter rains, as well as being competitive with the winter weeds. In keeping with the concept of a series of annual rotations in an organic system with wheat, **this fall planted crop needs to be a cool season annual.**Ideally the crop can come to fruition and be harvested and mowed down, before planting the wheat. Other requirements for this crop are that it is compatible with all the other crops or grazing, that are planned in following rotations over 3 or more years. Thus, if stray plants from the fall crop appear in the wheat the seed needs to be greatly different in size to the wheat, either very much smaller or very much larger, so that it can be easily cleaned from the wheat crop. Similarly, if this fall planted crop appears among the wheat it should not cause a major interference as it might if it has strong climbing tendrils or grows to a large plant in warmer drier weather. Certainly, other grain crops should not be grown as the fall crop or they will appear with the wheat. Suggestions and caveats follow:

An ideal choice for the fall crop, seems to be a legume such as clover, but I’d absolutely avoid perennial white clover since it can become invasive and is toxic to some animals. Annual red clover might be an option, but the plants can be quite large and bushy. I avoid sweet clover anywhere near wheat because it grows in all seasons and its strong smell of sub-grade cinnamon, is taken up by the wheat grain during the harvest. Beyond bell beans, peas have tendrils that can climb up the wheat and bring it down, unless they conveniently die back as the season warms and the planting time for wheat arrives. Chick peas or garbanzos would be my favorite to choose, especially the large type, but I’d need to research further to find a compatible variety that is also one that I'd like to eat. Another idea is to **choose some weeds** i.e. carefully choose a mix of native annual legumes, low growing annual grass (*e.g.Festuca microstachys)* and poppies; however, seed for these is expensive even though it should be possible to propagate it without a further purchase. Realistically, a three to five year rotation needs to be very carefully planned to include the wheat of your choice. Research is needed to make sensible choices to keep the soil covered and building during the entire time, under your unique farm conditions.