

Whole Grain Connection Newsletter #19

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Potassium, a nutrient of interest

When I asked after the health of a relative recently, they replied that they were doing fine, but had just had a low blood potassium test result! All the rest of the standard values were in the normal range. "I guess I just need to eat more bananas!", they said.

Why does it matter anyway? Well potassium counterbalances sodium in the body fluids and this helps keep blood pressure within a healthy range. Too little potassium relative to the sodium, increases the risk for high blood pressure. There is more to the story of keeping blood pressure in a healthy range, but this at least explains why potassium in food is now a required declaration on the new format Nutrition Facts panels.

Meat, fish and whole plant foods supply potassium. However, most fruits and vegetables are quite watery, so the amount of potassium supplied is less per bite, than when supplied by relatively dry fruits such as banana, dates and raisins, nuts such as walnuts, seeds such as flaxseed, and whole grains. Bread ingredients are actually better suppliers of potassium than most watery fruit. Here are some examples in milligrams per 100 grams of the food: bananas (400); raisins (1,020); apples (120); walnuts (450); flaxseed (450) and whole wheat (340). It is interesting to note that the potassium is found mainly in the outer bran and germ of grains, nuts and seeds. Refinement of flour, pearling and polishing of grains and seeds, and blanching of nuts takes away considerable amounts of potassium. The amount of potassium in breads is an indication of how much of the ingredients are whole. Refined wheat flour contains only 130 mg potassium per 100 grams.

The amount of potassium needed each day from the diet is 3,500 mg. We certainly need other sources to fulfill the daily need, but 6 slices of whole wheat bread will contribute 16% of the daily requirement for an adult. With the expectation that 16% of our potassium daily, would come from whole grains as bread versus only 6% from white bread: If we are eating white bread, watery fruits and vegetables, and not many dried fruits or nuts, then we are likely not eating enough potassium in our food to keep our blood pressure nicely in balance. "Whole Wheat Raisin" bread could provide a major supply of potassium each day, especially if it is eaten at the rate of six or more slices per day, which might provide 44% of a day's potassium.

As a further aid to counteracting too much sodium in the balance with potassium, bakers could use less salt in their doughs. The common level of salt in bread means that 6 slices supplies more than 50% of the daily need for sodium. Salt reduction in bread can at least bring the sodium supplied by 6 slices, down to 40% of the daily need. Ideally, we need to be able to add salt to our salads, stews and soups without going above the recommended daily intake for sodium.

Reliable Sourdough

Gone are the days when sourdoughs were regarded as mystical and unpredictable. Given the benefits of sourdough leavening in whole grain bread making, it's time to be pragmatic and to describe and spread a truly simple method for producing and maintaining a sourdough: A sourdough that can be stored in your refrigerator so that you can make bread on a whim at home, or consistently in a bakery. The caveat is that you still need to weigh out ingredients, mix them to dough, allow dough to rise, knead, shape, rise again and finally bake.

The key is to prepare the sourdough separately and have it always available in the refrigerator, as an ingredient. To achieve this, whenever the sourdough is replenished it should be allowed to ferment to completion. In this way, it will be consistently saturated in microorganisms. In other words, the concentration of the microorganisms will be approximately constant, as will be the species of those microorganisms if the overall conditions are kept constant. The other two major factors are the choice of flour to maintain the sourdough, and the temperature at which all this happens.

For reliable production of a sourdough, the flour needs to be organic and 100% whole wheat or rye, and preferably freshly ground. During the fermentation, the flour is broken down: the starch, protein and soluble fiber, which provide dough structure are all used in some way by the enzymes from the wheat or by the microorganisms for food. The result is a distinct thinning in texture of the sourdough as the fermentation proceeds. In the case of red wheat, the thinning is so great that a watery layer separates out either by the end of the fermentation or on standing in the refrigerator. I surmise that this is due to the poly-phenol-oxidase enzyme, which causes extreme breakdown of the starch and protein, and also causes a dark coloration in the watery layer as the released polyphenols oxidize. Light colored wheat grains often do not have this enzyme. The result is a light-colored sourdough, which does not produce a separate watery layer, or at least is less pronounced.

The effect of temperature is profound; it is necessary to understand that all processes including those in living creatures happen much faster at warm temperatures than in the cold. The universal rule is that for every 18°F (10°C) rise in temperature the speed of the process will increase 2 to 3 times. Therefore, if it takes a sourdough 3 days to ferment to completion at 68°F (20°C) it will take only approximately 1 day at 86°F (30°C) to ferment to completion. The starter is refrigerated only after the fermentation is completed, so that there will be no overflowing from the container due to the gassing continuing even in the cold. In reality, the starter is at its best when used and replenished within a week. The starter is still useful after a month, but some flavor change can often be detected in the bread.

Ingredients that enhance the healthy activity of the microorganisms (compatible yeasts and lactic bacteria) are the minerals calcium and magnesium, which are normally found in drinking water, a little salt to provide sodium and chloride ions. enzyme active malt, and vitamin C.

For a recipe and more detail go to: [Simple whole wheat sourdough starter](#)

Modern wheat caution

Modern wheat can be regarded as those varieties developed since the time of Mendel and the publication of the laws of plant inheritance in the late 1800s. Since then breeding techniques have become ever more sophisticated, and it is possible now to produce new varieties in quantity very much faster than before. The problem is that novelty in anything carries the risk of mistakes. Wheat varieties with mistakes have been developed many times, and are generally taken care of by removing the seed from sale after about 5 years. The most frequently recognized mistakes are in the ability to resist fungal disease. Other mistakes have also been made such as including a gene in durum wheat that concentrated cadmium in the grain. This was a serious mistake so that the offending varieties were quickly removed from the market. Recently it has been recognized that low falling number values in some new varieties were not due to late rains on mature grain. Instead this was due to including a gene that had a similar effect to the rain. [Here's an article about this.](#) The hard white varieties Blanca Grande, Klasic and Express have been found faulty in this regard. Other faulty varieties are not so likely to have been grown in California.

New varieties may offer exciting high yield or culinary traits, but there is a risk in placing all emphasis on the new. The landrace varieties offer a counterbalance of traits that are more likely to be sustainable in the long term.