MILLING - GRAINS - BAKING TIPS

Freshly milled grains, made into fresh breads & foods are The Staff of Life.

Twenty-five vitamins, minerals and proteins, as well as the high fiber benefit of bran are available only in freshly milled flour from whole grain berries. Because grain is naturally preserved in it's shell, it is important to preserve the whole grain until the last moment - the way nature intended in order to get the most nutrition out of your foods. Also, naturally occurring vegetable oils are encapsulated so that they do not become rancid easily in the whole grain kernel. Once milled, flour can become rancid in a relatively short amount of time, since the vegetable oils are released. Some studies have shown that vitamin loss begins as quickly as 3 hours after milling. For the most healthful breads, mill and bake within a 3 hour period. Flours that have been left on the shelf for many months have lost portions of their B Complex and C Vitamins.

HARD WHEAT/SOFT WHEAT AND DURUM WHEAT

Hard Red Winter or Spring Wheat and Hard White Wheat have a high gluten content necessary for bread making. They have the nutty, wheat flavor that produces delicious "whole grain brown breads".

Hard White Spring Wheat (called Golden 86 or Prairie Gold) also can be used for bread making. It is a hybrid - The bitter compounds in the bran have been bred out. It is sweeter and lighter. Good for pizza - French bread - where you want lighter or whiter bread.

Soft White Winter Wheat is called pastry wheat - for pancakes, pastries, pies, biscuits, cookies, cakes and muffins - when you need flaky and delicate.

Durum Wheat is high in protein, but makes a lemon yellow mealy flour called Semolina, it is for making pastas. (Kamut can also be used for making pastas.)

High gluten grains include: Hard Wheat, Spelt and Kamut. These are high protein and make high rising breads.

Hard wheat can make yeast bread. Spelt grain and Kamut grain can also make yeasted breads. There are many other nutritional grains, but all others must be combined with wheat (for its gluten) to make yeast bread.

By varying the grains used, one can precisely tailor a flour for a specific recipe for example:

- A mix of 3:2 hard red wheat and soft white wheat makes soft yeasted rolls.
- 10 - 20 % rice flour makes for crunchier cookies. (You can make rice flour by grinding rice.)
- A 3:1 mix of soft wheat and oat flour makes a cake flour suitable for the most delicate chiffon cake.

All the other flours, whether beans or grains may be substituted for wheat flour in a bread recipe, which in turn will manifest its own unique characteristics. These flours (except Spelt and Kamut) do not contain enough gluten in them for successful high rising yeast bread making. Add or substitute 1/3 to 1/6 cup of Wheat flour to your mixture in order to get high rising breads.

Wheat flour contains the highest amount of gluten. Gluten is a protein. It is that part of the grain that develops elasticity, when it is kneaded. It is the substance that traps the carbon dioxide given off by the fermenting yeast thus expanding and stretching, giving texture and rise to your bread.

The germ and the bran are the components that cause so much difficulty in bread making with 100% whole-wheat flour. This can easily be overcome! Wheat bran, although it is very nutritious and high in dietary fibers, after milling has rough sharp edges that can damage the gluten framework (which traps the gas causing rise), as it's being kneaded and during rising. The nutrition in wheat germ is also very valuable, however it contains among other things a substance called Glutathione that breaks down the gluten in whole wheat bread dough.

Lets look at a few things that can give us help with this.

Yeast is a living plant, a microscopic fungus that as a by-product of it's existence makes the bread rise. It needs warmth, moisture and food to grow. Warmth - 100f

- 110f for best results; moisture – Water is good; and food - sugars, honey or molasses are especially good.

Yeast ferments sugars into alcohol and carbon dioxide gas. The gas is trapped in the gluten network and causes bread to rise until the oxygen is used up or you kill the yeast (by baking or over fermentation).

There is two types yeast commonly available nowadays. Regular active dry yeast and instant yeast. Both have been dried to deactivation, but the yeast cells are not killed.

Instant yeast being dried at lower temperatures; so it produces more live cells and quicker more vigorous action when added to flour and water. Unlike active dry yeast it does not need to be "proofed" (or dissolved) in warm water, but can be added along with the flour after the first of the 2 cups of flour have been incorporated.

Active dry yeast has a hard outer shell that needs to be softened in warm water with some sweetener for 5-10 minutes before adding to other ingredients. There are fans of both types of yeast.

Remember the substance call Glutathione in wheat germ, which breaks down the gluten? It is also present in yeast (small amounts). It will not affect the quality of your bread as long as it stays in the yeast cell. Only under adverse conditions will it leak out. When using active dry yeast, be careful that your dissolving water is no cooler that 100f. Glutathione will leak out of the yeast cells rapidly in cool water, causing your dough strength to be weakened. With instant yeast make sure your dough "batter" or flour temperature is at least 75f when adding the yeast. If your freshly milled flour is very warm, over 120f, make sure the liquid in your recipe is a little cooler that 90f so you do not overheat the dough and kill the yeast.

Vitamin C to the Rescue! By using vitamin C, Ascorbic Acid, in your dough you will help to counteract the negative effects of Glutathione. Vitamin C will not only help prevent the gluten bonds from breaking down; but will help repair gluten bonds that have already been broken. Vitamin C helps sustain the leavening of bread loaves during baking. It also promotes yeast growth causing your yeast to work longer and faster and helps produce the acidic atmosphere in which yeast grows best.

Use 1/4 tablespoon of vitamin C crystals (powdered) or a 250mg tablet crushed in a tablespoon added to liquids per 4-loaf recipe.

LIQUIDS

Water - cheapest, easiest, fastest! The flavor of the grain will be more apparent and the texture chewy.

Milk - Bread will rise higher, toast more evenly and quickly. Bread will have a finer texture and keep longer. Scald all milk (heat to just below boiling) except canned milk. This is to kill enzymes that interfere with the activity of the yeast. Milk proteins also compliment the protein in wheat for added nutritional value.

Buttermilk - dough will be more tender and have a nice flavor. Scald like regular milk and use no more than ½ liquid requirement or it can make the bread too tender.

Potato Water - the liquid reserved after boiling potatoes not only gives greater volume, but gives a coarser texture, one that is good for holding spread butter after toasting. Also adds moistness. Use no more than ½ your liquid requirement. (We have a free recipe very old recipe, for making yeast using potatoes and hops. You are welcome to copy and paste any of our free recipes.)

Yogurt - adds tang. Substitute for ½ liquid requirement.

Vegetable juices or Broth - tomato juice, apple juice, seed sprouting soak water or whey (by-product of cheese making). Use any of these as part of your liquid requirement for added nutrition and varying tastes and textures.

Eggs - can be another liquid - adding protein, color and loft. They also add to the keeping quality of bread; due to the preserving quality in the lecithin in the egg. If eggs are added in addition to required liquid amount, then decrease liquid in the recipe by 1/4 cup for each large egg. You can use 1-2 eggs per loaf. 1 extra large egg equals about 2 ounces. 4 extra large eggs or 5 large eggs equal about 1 cup liquid.

Oils - Canola, olive oil, any good quality (cold pressed oil); even coconut or the cream off of whole fresh milk. Oils tenderize the dough, increase elasticity and produce a more tender crumb. Volume increases, bread browns more evenly and it

enhances keeping quality. Never use too much, as it will shorten the gluten strands, making it crumbly and cake like. A minimum of one tablespoon oil or fat for each 4 cups flour. I use 1/3-cup oil or melted butter for a 2-loaf recipe.

Pizza dough and French bread have hardly any oil.

First measure your oil and add it, then use same cup to measure and add sweetener to recipe. This is particularly helpful with liquid sweeteners like honey or molasses.

Sweeteners - add flavor, adds moistness, especially honey. Feeds yeast and adds to keeping quality. Preferred: Honey, molasses or barley malt syrup. Be careful of high temperatures when using honey as it tends to over brown and scorch. I use 1/3-cup honey per 2-loaf recipe.

Salt - Enhances flavors and controls the fermentation process. Bread with no salt is usually tasteless and flat. **Never** add it to the liquid in which the yeast is dissolving as it inhibits yeast growth. Use unrefined sea salt or "real Salt" if possible, (earth mineral salt). I use 1 tablespoon per 2-loaf recipe. Many recipes call for less, but this is my preference to bring out flavor in bread.

EXTRA INGREDIENTS

Lecithin - Derived from soybeans, it helps bread remain moist and soft by slowing down oxidation of its liquid components and acts as a binder. It comes in granular, liquid or powdered form. 1 ½ tsp. of liquid or granular per loaf is sufficient as a binder. If you use powdered follow directions on can.

Vital Wheat Gluten or Gluten Flour - This is extracted from high protein wheat. It is also a binder, making dough more elastic and gives it a boost. If your flour is less than 16% protein you will need to add gluten. It also helps to compensate for the damage done to the gluten in your bread dough due to the bran's jagged edges, which occur during the milling process. 1-2 tablespoons per loaf should be enough. Too much gluten flour will make bread tough and rubbery.

Malt, Diastatic Malt Powder or Barley Malt Syrup - These are sweet derivatives of toasted barley. They add nutrition, improve appearance, texture and keeping quality. Replace 1-tablespoon sweetener in recipe with ½ - tsp. power or 2 tablespoons syrup. Too much will make you bread gummy, dense and either too sweet or bitter.

Whey - Powdered or liquid - A dairy by-product (from making cheese), rich in protein, minerals and milk sugar. Aids in browning, adds nutrition, adds flavor and slightly sweetens. Good for promoting beneficial bacteria in colon (like yogurt). Use ½ cup powdered to any recipe. I use 1-cup liquid whey to replace water in a 4-loaf recipe.

Mashed Potatoes - A good source of yeast food and natural vitamin C (also contains Potassium, which is good for the heart). Acts as a dough enhancer and adds moistness. Makes for a lighter, better textured bread. Use up to 1/4 cup per loaf. Instant potato flakes or granules help, but not as good as the real thing.

Oats or Oatmeal - They add crunch and moistness, makes good toasting bread. 1 cup rolled oats per 2-loaf recipe. Pour 1-2 cups boiling water over rolled oats, mix and let cool before incorporating to yeast mixture; then decrease liquid requirements by 1-2 cups.

Nuts and Seeds - Chopped or ground nuts, ground or whole seeds.

Dried Fruit, Sprouts, Spices, Herbs, Cheeses, etc. - Adds nutrition, crunch, flavor, variety, fun, and adds to appearance. Once you have gotten the "feel of the dough", start experimenting and be creative. Your family will thank you! Dried fruit can be used as is, but it does help to soak in boiled hot water first.

Other Flours - Rye, Pumpernickel (This is a Rye Flour bread that contains caraway seeds or flour, which in conjunction with dill seed, ground, gives Pumpernickel it's distinctive and delicious flavor), Triticale seed (A hybrid mix of rye and wheat, which is high in protein 14% the first 12 months in storage, but then reverts to 12% after one year of storage.), Corn, Barley, Soy (except Kamut and Spelt), do not produce enough protein in themselves to make successful risen yeast bread. These flours must be used together with high protein wheat flour. Some vital wheat gluten added would not hurt either. Excellent results can still be obtained by replacing wheat flour with your choice of flours up to 1/4 - 1/3 the total amount of flour. Kamut flour and Spelt flour are exceptions. They both contain adequate gluten to make yeast breads with cohesiveness and loft. **Kamut is an alternative for many persons allergic to wheat. Persons with Celiac Disease may substitute with Lentils, Sorghum Milo and Millet for a high protein bread, that is low in gluten (will not rise, like a wheat bread, but is full of protein.)**

MORE TIPS

MORE USEFUL INFORMATION ON GRAINS AND BAKING.

- 45 Pounds of wheat berries in a 6 gallon pail yields 158 cups ground flour
- 1 pound or 3 cups berries yields approximately 4 cups ground flour
- A rough approximation - a scant 2/3 cup berries = 1 cup ground flour
- When rolling or flaking oat grains, it is ½ cup groats = 1 cup flaked grain
- The Family Grain Mill grinds 3 cups (dried or dehydrated) berries into fine flour in about 4 minutes
- A yeast bread recipe using 3 cups flour fits into a medium loaf pan 8 1/2 x 4 1/2; it will give you a nice rounded top.

- The larger loaf pan, commonly available in stores, 9x5 is really for quick bread recipes (quick breads generally use baking powder and baking soda as the leavening agents, rather than yeast), such as banana and zucchini bread. They do not work as nicely for the traditional 2-cup loaf recipe.
- For recipes using 1/4 cup or more sugar (sweetener) to 3 cups flour, increase yeast.
- The oils and milk in the recipe make chewy bread.
- Browning of crust comes from the sugars caramelizing.
- Bread made with little oils or without fats are wonderful fresh, but stale quickly such as with French or Italian type breads. Wrap in plastic wrap or zip lock after cooled to prevent drying out.
- Oil and lecithin (liquid) is the best combination for greasing pans - not straight oil. 2 parts lecithin to 1 part oil or 1 part lecithin to 2 parts oil, you experiment.
- A wire cooling rack is very helpful. Popping the bread out of pans onto the wire rack right away will avoid soggy steamed crusts.
- Refrigeration will retard mold, but accelerates staleness.
- Freezing loaves after they have completely cooled will keep loaves almost as just baked fresh for up to 3 months. Just place in a freezer zip lock bag, push out the air and freeze.