

Re-defining BREAD

BREAD is a naturally fermented and cooked grain product with all grain ingredients in the whole grain form and without any extracted carbohydrate ingredient or artificial additive.

Supposing we define BREAD this way? How can this definition be used for baguettes, pizza, tortillas, focaccia, croissants and so on? Well, these are simply BREAD formats. If these formats are made and labelled as BREAD then we, the customers, would know that they were made with all the grain ingredients whole, and without added sugars, or refined flour, or artificial additives. We would also know that a natural fermentation has been used, which enhances the nutritional value of the whole grains. BREAD distributed to the disadvantaged would be recognizable as a healthy base to the diet. Anyone looking to defeat health problems such as constipation, diverticulitis, obesity, type-2 diabetes, cardiovascular disease, would know to ask for a plain BREAD. It would be up to the baker to provide interesting shapes and flavors for their BREAD offerings.

Rotis, wheat tortillas and pasta; all of these can be made with whole grain ingredients. In general, they require a long rest for the dough, which allows at least some fermentation (enzyme activity and microorganism growth) to happen before being finally shaped and cooked. Thus, these too can qualify as BREAD, when made with whole grain ingredients.

Natural fermentation here means changes in a BREAD dough due to enzyme activity originating in the grain, and a naturally mixed culture of microorganisms including compatible lactic bacteria and yeasts.

Extracted carbohydrates that would not be appropriate in BREAD, would be sugars or flours that are extracted from their original whole source. For example, sugar extracted from sugar cane or sugar beets, refined flour extracted from whole grains, honey extracted from honeycomb, maple syrup extracted from trees, corn starch extracted from corn, corn syrup extracted from corn, malt extract from barley malt, rice syrup extracted from rice, blanched almonds extracted from whole almonds, and so on. In practice all of these would instead be appropriate in confections such as cakes, cookies, and sweet pastries, or as confections perhaps to serve on BREAD.

There are many very popular baked products that contain natural foods together with the grain ingredient, to make BREAD into a meal, or a meal elaboration. Milk, butter, cheese, tomato, egg, spices, dried fruit, nuts, olive oil, are frequently found in or on such specialties. Examples that can be BREAD in the sense that they can be made without extracted carbohydrate are brioche, pain de mie, Danish pastries (without icing), croissants, pan loaves and pizza. These can be BREAD as defined here, with the qualification on the label that the BREAD is made with egg, butter, milk, nuts, raisins, or whatever natural food (other than an extracted carbohydrate) has been added.

The microorganisms in a sourdough are voracious consumers of easily digested sugars, so attempting to sweeten bread with any added sugar, such as honey, beet or cane sugar or maple syrup is a lost cause. Most, if not all, of the sweetening sugars will be used up by the microorganisms before the loaf goes into the oven. Sweetening

reduction due to fermentative sugar loss, can be minimized by making the addition just before the final rise. If an excess of sugar is added with the goal of changing the texture and tasting sweet, this would possibly bring about an imbalance in the species of microorganism present in the fermentation system (sourdough). The flavors from honey or maple syrup, but likely not the sweetness, may be retained in the bread. Truly the better way to appreciate precious sweeteners such as honey or maple syrup would be *on* BREAD rather than *in* BREAD.

However, sweet tasting bread can be produced without adding sugars! Some of the flour can be treated and so used to make sugars within the BREAD-making process. These sugars, in excess of the amount needed by the microorganisms, can be produced in quantity when enzyme active malt is mixed with a cooled flour porridge, as a source of gelatinized starch. This gelatinized starch is very easily attacked by the malt enzymes to produce sugars; much more so than raw flour, which has only a small amount of naturally gelatinized (damaged) starch produced during milling. By using this method distinct sweetness can be tasted in the BREAD, approximately proportional to the amount of porridge. In a suggested recipe, with plenty of enzyme active malt present, up to 10% of flour can be made into porridge.

The acidity produced during sourdough fermentation is necessary as a means of controlling the breakdown of gelatinized starch by the (amylase) enzymes in malt. During BREAD dough fermentation the acidity gradually increases as more and more lactic bacteria are produced. When the dough acidity is sufficiently increased (to pH4) before the BREAD is baked, the starch degrading enzymes can no longer breakdown starch. In contrast, if there is not enough acidity by the time the BREAD is baked, a collapsed texture results.

Dried whole fruit can be added to BREAD for healthful and interesting sweetness.

Thus, the advice to omit extracted carbohydrates as ingredients in BREAD is after all an easy decision that is both economical and health promoting especially to those avoiding quickly digested sugars.

Artificial additives in grain-based foods are generally preservatives, texturizing agents, and nutritional supplements. BREAD does not need any of these additives because they are inherent in the whole grains and fermentation method. For example, the slow fermentation produces acidic preservatives against molds, and releases humectant soluble fiber. The bran and germ of whole grains are naturally rich in vitamins, minerals, antioxidants, and dietary fiber.

For the baker who uses the *baker's yeast plus sugar* system for fast leavening, this definition of BREAD raises a problem. Sugar is essential in this fast-leavening system that is very widely used, so these products would not qualify as BREAD. Bakers using this system, are also tempted to use sugar in excess, because it acts as a humectant and produces pleasing texture. If instead baker's yeast alone is used in a preferment, in a French style Poolish or Italian biga, with the whole grain flour, then added sugar will not be needed. This is because, with time, the natural whole grain flour enzymes become active in the wet dough and produce enough sugars from the flour to feed the yeast and the associated microorganisms that enter the preferment with the flour and

from the air. However, the sourdough system generally produces more acidity in the dough than a baker's yeast Poolish or Biga.

Leavening with baking powder and baking soda would appear to be an option for making BREAD. However, naturally alkaline baking soda tends to deplete the whole grain flour of its vitamin thiamin. Thiamin is stabilized in acidic sourdough bread. Since thiamin is essential for the healthy assimilation of carbohydrate foods, alkaline chemical leavening is thus, less than ideal for a healthy product. So, the definition for BREAD excludes fast chemical leavening with baking powders and baking soda.

Obtaining enough fresh whole grain flour for BREAD is currently a difficulty for many bakers. Commodity refined flour mills produce only 6% of their output as whole grain flour. Also, commodity whole grain flours have generally been heat-stabilized for adequate shelf life and they lack fresh flavor. Bakers who have whole grain mills in their bakeries have a great advantage, provided they can source and store good clean grain. However, the localized grain infrastructure to support the farmer's production and storage of clean grain barely exists in many regions. In some cases where this problem has been solved, the baker can reach out directly to a grain farmer for their grain supplies. There are advantages to this direct purchase line between baker and farmer. The baker can ask for grains to be grown that would be suited to their various BREAD selections. In turn the farmer is assured of a market for their grain crop. The caveat is that the grain variety or type should be well suited to the farmer's climate and soil conditions. In just a few cases, grain farmers have access to good grain cleaning and storage and have also installed mills on their farms. In this case, farmers can supply local bakers who do not own mills, with fresh whole grain flours. Here again the baker needs to establish their own direct trade relationship with the farmer.

To be regarded as fresh, whole wheat flour is ideally baked into bread within 24 hours of being milled; note that this is an ideal, and not a necessity. The bran of wheat naturally contains the very powerful antioxidant ferulic acid and under cool and dry conditions, whole wheat flour keeps its fresh flavor for at least a month and possibly much longer. However, the grain can be safely stored cool and dry for years, so there is no sense to milling grain into flour and storing it so far ahead of planned use in BREAD.