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Understanding and Selecting Sourdough for Health Benefits

Fact Sheet 9.392 Food and Nutrition Series | Food Safety

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The popularity of sourdough bread has risen in recent years, with both a significant increase in bakery sales and more home bakers making sourdough bread because of its unique flavor, texture, and potential health benefits. Though sourdough bread may be perceived as a healthier choice, not all recipes or breads titled or labeled as 'sourdough' are fermented and leavened solely using wild cultures. Having an understanding of the processes involved in making traditional sourdough bread can help consumers make and/or purchase sourdough products with these potential health benefits.

Sourdough Bread Starters

Traditional sourdough bread is made using a 'starter,' which may be obtained from fellow bakers, purchased from food fermentation retailers, or made from 'scratch' by mixing flour and water. A starter contains wild yeasts and bacteria from the surrounding environment. The fermenting microorganisms in a sourdough starter need to be fed fresh flour and water regularly to survive and grow.

For making sourdough bread at home, starters are often shared or they can be created following best practices to cultivate a healthy and safe starter.

When using wild yeast and bacteria in bread making, the required time for fermenting bread dough (proofing and rising) is less predictable and generally takes longer, sometimes even being intentionally slowed down using refrigeration of the dough to create desired flavors, texture, and nutritional benefits.

In contrast, using a packaged commercial baker's yeast enables the baker to create a bread product in a much shorter amount of time and with more consistent results, but without the potential fermentation benefits and complex flavor.

Sourdough Organisms

The wild yeast in a sourdough starter are present naturally on flour and in the environment. Wild yeast does not need to be intentionally captured from the air, nor does commercial yeast need to be added when making a sourdough starter. The wild yeast consumes the carbohydrates in the flour and produces alcohol and carbon dioxide gas (CO_2) as the primary by-products. The release of CO_2 in the dough helps create bread's airy structure.

Quick Facts

- Sourdough bread was essential to early human societies, and continues to be a staple food in cultures worldwide.
- Sourdough bread is fermented with wild microbes. Both yeast and bacteria participate in the fermentation and leavening of sourdough.
- Not all bread labeled "sourdough" is made using traditional sourdough methods.
- Reading and understanding a bread label can be beneficial for buying sourdough bread for its potential health benefits.

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One common type of yeast present in sourdough starters is wild-type Saccharomyces cerevisiae. Different strains of this wild yeast are found naturally in many environments, and each creates distinctly different bread flavors. In contrast, standard bread is made with a single strain of Saccharomyces cerevisiae known colloquially as “baker’s yeast.” This strain has extremely high CO2 output, but it delivers very few flavorful byproducts. The result is a rapid rise but a limited flavor profile.

- The **naturally occurring bacteria** in a sourdough starter are species of Lactobacillus. They turn sugars from flour into lactic acid and convert the yeast-produced alcohol into acetic acid. These organic acids give sourdough bread its trademark sour flavor and enhanced preservative qualities.

- The **wild yeast and bacteria** in a sourdough starter are in a symbiotic relationship. Together, they survive better than either organism would survive alone. The bacteria depend on the yeast to break down proteins into peptides (Gänzle, 2014). In return, the bacteria release excess glucose, which is food for yeast fermentation. The bacteria also lower the pH to a point that is optimal for numerous yeast enzymes (Siepmann et al., 2018). There are many different yeasts and bacteria that can be involved in sourdough fermentations. Together, they create countless combinations, each of which gives unique properties to the bread. Some of these combinations are geographically-specific. For example, San Francisco sourdough is famous for the flavor resulting from the combination of wild yeast and bacteria native to that geographic location.

Digestibility

Traditional sourdough bread made with wild yeast and bacteria has several benefits over bread made with commercial baker’s yeast. Because of the organic acids produced by the Lactobacillus bacteria, sourdough has a lower pH than standard bread. This not only gives it a desirable “sour” flavor and longer shelf-life, but also makes the bread kinder to your gut (Marti, et al., 2015; Siepmann, et al., 2018).

- The low pH of sourdough bread, combined with its long fermentation time, allows nutrients, like carbohydrates and proteins with a more complex structure, to get a “head start” on digestion by partially breaking down into smaller units. For these reasons, sourdough has been shown to be more digestible than standard bread fermented with baker’s yeast (Rizello et al., 2019).

- Sourdough fermentation also reduces levels of certain FODMAPs, which are a type of carbohydrate that cause bowel irritation in some people. The low levels of this type of carbohydrate in sourdough makes it much more digestible for certain consumers (Menezes et al., 2019). Sourdough has also been shown to produce less gas and bloating overall, and this may also be due to its low-FODMAP profile (Rizello et al., 2019).

- Research has shown that some minerals may be present in a more available form in sourdough bread. Flour is a source of minerals such as calcium, sodium, zinc, and magnesium. However, these minerals can be sequestered in a molecule known as the phytate complex, which must be broken down in order for humans to absorb the minerals. While baker’s yeast is unable to break down the phytate complex, sourdough organisms can break down the complex very effectively. This could increase the amount of minerals available for absorption in the human gut (Leenhardt et al., 2005; Nionelli & Rizzello, 2016).

What About Gluten?

Gluten, composed of two types of proteins named gliadin and glutenin, is produced by wheat, barley, and rye plants and can contribute to the structure and texture of bread products. For individuals with celiac disease, gluten causes damage to the intestinal tract because of an immune system reaction. The only way to manage the symptoms of celiac disease is strict avoidance of gluten in the diet, so any gluten-containing bread (including sourdough bread) would not be tolerated or safe to consume.

For individuals experiencing non-celiac gluten sensitivity, gluten intolerance, or chronic intestinal issues, gluten-containing products are frequently cut from daily diets. Research is ongoing to determine if the natural fermentation processes of sourdough bread made using a wild yeast and bacteria starter may help alleviate some symptoms for those with gluten intolerance. (See the Reference section for more information, and always consult a medical professional if you have gluten sensitivities before eliminating or introducing gluten-containing foods into your diet.)

Impact on Blood Glucose

Some research suggests that the acids produced during the sourdough fermentation process inhibit the enzymes that metabolize starches, causing the starches to be more slowly digested when consumed. This prevents blood glucose and insulin levels from rising quickly. More research is needed to understand these impacts on humans when consuming sourdough bread. The carbohydrate content should still be factored in when considering impacts on blood glucose levels, especially for those with diabetes.

Buying Sourdough Bread for the Potential Health Benefits

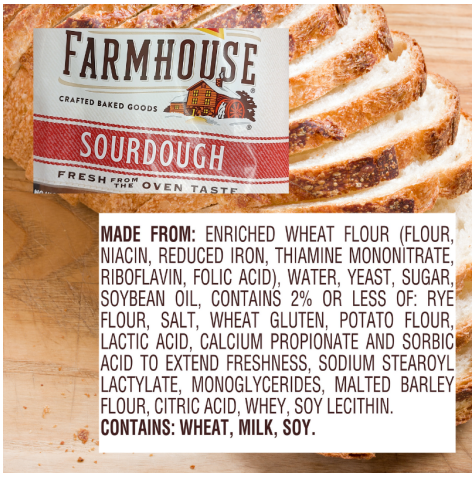
Many food products have Standards of Identity (SI) set by the U.S. Food and Drug Administration which outline necessary requirements for that food to be marketed and labeled for sale under a particular name. The SI may include how the food must be produced, what it contains, and the proportions of ingredients. This system of standards provides information for consumers to help make informed decisions regarding the nutrition and safety of their food.

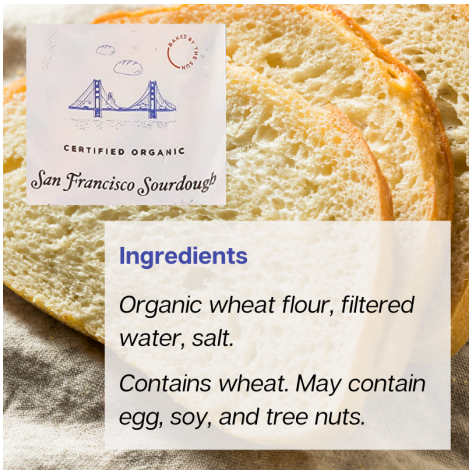
- There is currently **no standard of identity** for sourdough bread in the U.S. Therefore, checking the ingredient list on the label can help consumers make a more informed sourdough purchase.

Read the Label!

When buying sourdough bread from a bakery, market, or store, knowing how to read the label (or asking the right questions) is important for understanding what you are buying.

- The source of fermenting microorganisms is the key determinant in what distinguishes a naturally-leavened sourdough bread from a bread labeled 'sourdough' that may actually be made using commercial baker's yeast.





Trade or brand names mentioned are used only for the purpose of information with the understanding that no discrimination is intended and no endorsement by Extension is implied.

Naturally-Leavened Sourdough:

Traditional sourdough bread is created through spontaneous fermentation by wild yeast and lactic acid bacteria using flour, salt, and water. (Other ingredients can be baked into the sourdough for a more unique flavor or texture profile, for example whole grains, nuts, seeds, herbs, spices, olives, or dried fruits.) In addition to potential health benefits, lactic acid bacteria in sourdough help limit the growth of harmful microorganisms—including mold—to naturally delay staleness and extend shelf life. The following simple ingredients are what you would expect to find in a naturally-leavened bread:

- **Flour**
- **Water**
- **Salt**
- **Culture or Starter** (fermented leaven made using flour and water) may or may not be listed separately on the label but is necessary for making the bread rise.

Sourdough Made Using Commercial Yeast:

Some sourdough breads that are labeled as 'San Francisco,' 'Seattle,' 'Artisan,' 'Extra Sourdough,' or 'Sprouted Sourdough' may have increased consumer appeal but reading the ingredient list could reveal that the product was not produced using traditional sourdough methods and/or ingredients. If a sourdough bread label has any of the following ingredients, the bread may not confer the same health benefits of a naturally-leavened sourdough bread:

- Leavening agents: baker's yeast, baking soda, etc.
- Ingredients that are added to mimic 'sour' flavor: vinegar, acetic acid, yogurt, or cultured wheat/flour
- Added ingredients that can speed up and/or interfere with the longer wild yeast fermentation process: vegetable oils and sugars or sweeteners, including honey
- Preservatives to extend shelf life: for example, benzoic acid or cultured wheat

So Many Choices!

Bread was essential to early human societies and continues to be a staple food in cultures worldwide. The most common source of leavening in antiquity was to retain a piece of dough from the previous day as a form of a 'starter' to be used in subsequent days. With industrialization, the availability of commercial baker's yeast and chemical additives has made baking more predictable, easier, faster, and cheaper but some sensory and nutritional qualities are reduced. For people seeking to make and/or buy breads with enhanced health benefits, as well as those with digestive challenges, exploring sourdough bread may be a great option.

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