



Optimizing Organic Flour for Baking Trends

A need for organic flour

Flour is a long-established staple in the baking industry. From breads to sweet goods and everything in between, it is an essential ingredient. So as the demand for more natural and organic products continues to grow, so does the need for quality and reliable organic flour. The organic bakery segment is predicted to reach over \$11 billion in sales by 2023.¹ This trend is building steadily, with plenty of room for innovation and growth for bakers and food producers.

What is organic wheat?

Organic flour is milled from wheat grown in soil using only organic fertilizer. The grains must be certified by third-party organizations. For example, USDA organic seal requires the farmer to meet USDA organic standards.² One can apply for organic certification if none of the prohibited substances is added to the land in the last 36 months.

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How is grain organically grown and stored?

It is important to select the right variety of organic seed. Organic wheat farming practices suggest the use of organic seeds from the transition period to avoid any complications.³ No genetically modified bacteria can be applied. It is important to select the right variety of organic seed.

Storing

The bins should be thoroughly cleaned for any residual grains which can be potential sources of insect eggs, pupae and adults. It is important to clean grains before storage and monitor them once stored. Various physical methods such as hermetic sealing, temperature control and aeration, heating (30 minutes at 54.45°C (130°F)) and low oxygen atmosphere can be employed.

Furthermore, the National Organic Program has published a list of allowed synthetic and prohibited non-synthetic substances with specific restrictions, annotations regarding the source or use of the substance. *Bacillus thuringiensis* and Diatomaceous earth are a few of the insect control materials allowed in organically stored grains.⁴

Milling

During the milling process, the flour cannot be whitened or chemically oxidized. A detailed read on challenges and opportunities for organic wheat production in the US is available to read [in this report](#).⁵





A CASE FOR ORGANIC

The Market for Organic Products

The demand for organic flour is increasing at an unprecedented rate. In 2019, the organic product market grew by 5.9%. The pasta and bakery industries are paving the path with a growth of 10.5% and 9.1%. Fresh and frozen baked goods saw an increase of 7.8% before the pandemic.⁷ The pandemic has only pushed this trend forward.⁸

Nutritional & Health Benefits of Organic Products

The complete nutritional advantages vary according to the manufacturer. Ordinarily, there is no significant difference between organic and conventional flour. Some of the most common benefits of flour include:⁹

- High in Phosphorus: Combines with calcium to build stronger bones
- High in vitamin B1: Maintains glucose metabolism and energy conversion to ATP
- Rich in Niacin: Boosts brain functionality
- High in vitamin Folic Acid: Generates and regulates RBCs in the body and prevents DNA alteration.

CONVENTIONAL VS. ORGANIC FLOUR

1. Protein Content: Millers can blend different varieties of wheat to optimize it for the baking process, as some organic flour offered on the market may have lower protein quality.^{10,11,12} Flour with lower protein quality requires a longer mixing time for optimum dough development resulting in reduced bread volume.^{13,14}

2. Sensory Properties: There is no conclusive evidence on the difference between the sensory properties of organic flour bread and conventional bread.¹⁵ Organic flour is always bromate-free and unbleached contrary to conventional flour. The products baked from unbleached organic flour will not result in the same whiteness as conventionally bleached flour products.



Solutions for Organic Baking

Organic baking does not allow the addition of conventional chemical ingredients. Prohibited ingredients include DATEM, SSL, mono and diglycerides, azodicarbonamide (ADA), and L-cysteine. Removal of these dough conditioners reduces dough strength and makes for a firmer crumb.

Additionally, the presence of these ingredients helps improve shelf life, as well as aid in emulsification and aeration of oil-in-water emulsions like cake batters. The ingredients listed below are the closest possible substitutes for achieving the lost functionality.

- Gluten addition is one option to increase the mixing time and temperature. Using cold or ice water and jacket cooling is another. Rapid hydration technology, when used correctly, can help to control temperature as well.
- Vinegar, cultured wheat, raisin, and prune juices replaces the functionality of calcium propionate to prevent mold growth.
- Ascorbic acid aids in the process of oxidation in bread. Additionally, enzymes assist in the process of dough processing.
- In baking, the thermal profiling crumb set zone must be less than 20%. Any higher value would result in a dry final product.
- Moisture content over 38% results in slicing problems and wearing out of slicer blades.
- Packaging hot products can cause water condensation and mold formation. The product must be cooled to optimum packing temperature of 35-40°C (95-105°F).
- The sanitation of cooling conveyors and wire racks in bakeries is vital. As organic bread lacks calcium propionate, it is more difficult to control the mold problem, and organic bakeries would have to rely on a highly sanitized bakery



“ Can I cool my organic bread down quickly using refrigeration?

Yes, it is possible to cool down organic bread quickly using refrigeration. It is crucial to use proper airflow for the cooling process. A good tip would be to use a thermal logger to ensure that the internal temperature of the bread reaches 32–43°C (90–110°F) to avoid accelerated staling. A better way to quicken cooling would be to use a vacuum cooling technology.

“ How can I control the quality of my organic flour when it goes from old crop to new crop?

First, take a look at adjustments you can make to processing parameters of mix development and water addition. It is possible to control the quality fluctuations of organic flour by increasing the fermentation process, such as a sponge and dough system. Furthermore, increasing the dough conditioners or enzymes can help control the quality variations. Keep an eye on the flour absorption and MTI values on your [farinographs](#) to help you adjust from the old crop to the new crop.

“ Can you use mineral oil as a processing aid in the divider equipment for processing organic bread?

Mineral oil is a chemical substance derived from crude oil and should not be used for bread manufacturing. A solution is to reduce hydration and the temperature of the final dough to 25–28°C (76–82°F). If this still does not work, look into the type of dough conditioner that you are using. You can also dry the dough with more oxidizers like ascorbic acid and enzymes like glucose oxidase. Lastly, look into changing the dough divider belts.



References

1. “Global Organic Bakery Products Market 2020-30: COVID-19 Impact and Recovery Plans.” GlobeNewswire News Room, Research and Markets. <https://www.globenewswire.com/news-release/2020/05/18/2034801/0/en/Global-Organic-Bakery-Products-Market-2020-30-COVID-19-Impact-and-Recovery-Plans.html>
2. “Organic Regulations.” Organic Regulations | Agricultural Marketing Service, www.ams.usda.gov/rules-regulations/organic.
3. Guidebook for Organic Certification. onecert.com/wp/wp-content/uploads/2017/04/MOSES-Guidebook-for-Organic-Certification.pdf.
4. Barbercheck, Mary. “Management of Stored Grain Pests in Organic Systems.” Penn State Extension, 13 May 2021, extension.psu.edu/management-of-stored-grain-pests-in-organic-systems.
5. McBride, William D., et al. United States Department of Agriculture, 2015, The Profit Potential of Certified Organic Field Crop Production, www.ers.usda.gov/webdocs/publications/45380/53409_err188.pdf?v=0.
6. Ardent Mills: Flour Milling & Grain Innovations.” Ardent Mills | Flour Milling & Grain Innovations
7. Foodnavigator.com. “Organic Food’s Coronavirus Boost: ‘Health Crises Have a Long-Term Impact on Consumer Demand’.” <https://www.foodnavigator.com/Article/2020/05/06/Organic-food-gets-coronavirus-boost>.
8. Health Benefits of Organic Wheat Flour.” US Flour Corp, 8 Sept. 2020, usflour.com/health-benefits-of-organic-wheat-flour/.
9. Langenkamper, G., Zorb, C., Seifert, M., Mader, P., Fretzdorff, B., & Betsche, T. (2006). Nutritional quality of organic and conventional wheat. *Journal of Applied Botany and Food Quality*, 80(2), 150.
10. Krejčířová, L., Capouchova, I., Petr, J., Bicanova, E., & Faměra, O. (2007). The effect of organic and conventional growing systems on quality and storage protein composition of winter wheat. *Plant Soil Environ*, 53(11), 499-505.
11. Krejčířová, L., Capouchová, I., Petr, J., Bicanová, E., & Kvapil, R. (2006). Protein composition and quality of winter wheat from organic and conventional farming. *Žemědělství*, 93, 285-296.
12. Häglund, Å., Johansson, L., and Dahlsted, L. (1998): Sensory evaluation of wholemeal bread from ecologically and conventionally grown wheat. *J. Cereal Sci.* 27: 199-207.
13. Abecassis, J., David, C., Fontaine, L., Taupier-Létage, B., & Viaux, P. (2008). A multidisciplinary approach to improve the quality of organic wheat-bread chain.
14. Annett, L. E., Spaner, D., & Wismer, W. V. (2007). Sensory profiles of bread made from paired samples of organic and conventionally grown wheat grain. *Journal of food science*, 72(4), S254-S260.

