Baking BREAD

BAKERguide Vol. 3-2

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Table of Contents


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WHAT IS BREAD?

Bread is one of the most commonly consumed baked goods in the world. It is an integral part of the human diet, remaining a pillar of food types for centuries. In its most basic form, bread is the baked product of a dough made from flour, water, yeast and salt. Depending on the region of the world, bread can take several forms based on varied techniques and ingredients used for its production. From sandwich bread to pita, it is versatile in its presentations and textures.

The bread market, comprising various products, is currently valued at around 228 billion USD and is expected to grow at a compound annual rate (CAGR) of 3.66% for the 2023-2030 period, according to a report by Custom Market Insights. The most significant contribution to the market growth comes from sandwich breads, with an estimated value of around 8 billion USD by 2022, followed by hamburger and hot dog buns, with an estimated value of approximately 2.5 billion USD. Other important categories include bagels, panini, ciabatta, focaccia and pita bread.

While sliced white bread has long been a market front-runner, current health trends have caused a market shift and interest in products with better nutritional profiles and alternative flours. Consumers are looking for healthier, more nutritious and tastier products. This has caused the emergence of several breadmaking trends, such as organic, whole grains, gluten-free, keto and clean label, among others.

The current bread trends have caused the emergence of several technical and formulation challenges due to the characteristics and properties of bread. Success for these trends relies on understanding bread formulation, ingredient functionality and careful dough processing. So, whether making traditional bread or trying a new approach, the fundamental aspects of dough-making remain.

Bread Market Opportunities

- The Bread market is expected to reach **533.38 billion USD** in 2025
- Bread market is expected to grow at a compound annual rate (CAGR) of **6.25%** from 2025 to 2030.
- The most significant contribution to the market is from sandwich breads, with an estimated value of around **8 billion** USD in 2022.
- Novel current trends are surging due to the consumer's interest in **healthier baked goods**.

""Bread - Worldwide: Statista Market Forecast." Statista, www.statista.com/outlook/cmo/food/bread-cereal-products/bread/worldwide. Accessed 16 Mar. 2025.

Novel Bread Trends

Current health concerns have caused the emergence of novel baking trends, with gluten-free and keto leading the pack. Gluten-free bakery products consist of reducing or eliminating gluten from the formulation while keto bakery products consist of reducing sugar and net carbohydrate content.

In recent years, there has been a shift in consumer preferences from traditional white bread to whole grain and organic bread. This trend can be attributed to several factors, including increased awareness of the health benefits of whole grains and organic ingredients, as well as a growing interest in sustainable and environmentally friendly food choices.

White bread has long been a staple of the American diet, but its popularity has decreased in recent years as consumers seek out healthier options. Whole-grain bread made from the entire grain kernel contains more fiber and nutrients than traditional white bread, leading to its increasing popularity. In addition, organic bread, made from ingredients grown without synthetic pesticides or fertilizers, has gained popularity as consumers become more concerned about the effect of chemicals on their health and the environment.

As a result of these trends, many bakeries and food manufacturers have started offering whole grain and organic breads to meet consumer demand. Some have even begun incorporating alternative grains such as spelt, quinoa, and teff into their breads to appeal to health-conscious and adventurous consumers.

Overall, the shift from traditional white bread to whole grain and organic bread will continue as consumers become more educated about these options' health and environmental benefits. While white bread will likely remain a popular choice for some, the growing demand for whole grain and organic breads suggests that these trends are here to stay.

KEY INGREDIENTS

Bread, in its most basic form, is a baked dough of essential ingredients: flour, water, yeast, fats, salt and sugar. Each ingredient provides a specific function to this bakery system.

Flour

Flour is the main ingredient in baked goods, especially in breadmaking. It is the structure builder and main contributor to a bread texture. Wheat flour proteins, specifically gluten (glutenin and gliadin), provide the dough with its viscoelastic properties and aid in trapping gasses (e.g., carbon dioxide) from yeast fermentation or other leavening agents. The largest component of flour is starch. Starch contributes to the structure of the loaf, bread texture, and yeast fermentation among other functions. Another critical role of flour is in the final product color due to its participation in the Maillard reaction.

Flour type is an important parameter to consider in breadmaking to produce an ideal bread formulation. High protein flours (above 12% protein) produce a more cohesive and elastic dough. This aids in handling and shaping during the breadmaking process to produce a final product with the desired volume and crumb structure. Flours with lower protein content (below 12% protein) are commonly not desired in breadmaking due to their lower capacity to aid in gluten development. This produces dough with lower elasticity and strength, causing a final product with a lower volume and a compact crumb with a coarse or gummy texture.

Water

Water has several functions in breadmaking. A dough's optimal water absorption provides the hydration necessary for the gluten network formation and ultimately contributes to crust (exterior) and crumb (interior structure) formation during baking. Water is a medium for yeast fermentation, with the activation of yeast to carbon dioxide production. Ultimately, water influences microbial growth and product shelf life. Water availability or activity greatly impacts the ultimate product shelf life by providing the medium for microbial growth.

The amount of water used in bread formulations can vary depending on factors such as the type of flour, the desired texture of the bread, and the environmental conditions during baking. While the addition of water to flour is needed to make a dough, the exit of water in the oven is required to create bread.

Yeast

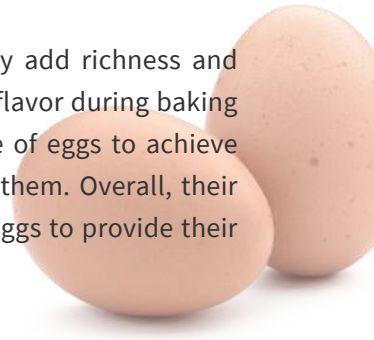
Yeast is a single-celled microorganism crucial for bread making. It provides the gasses required for leavening bread, contributing to the volume and texture of the finished product. When yeast is in the presence of water and a substrate (e.g., sugars), fermentation occurs, producing acids, aromas and carbon dioxide. This causes the dough to rise and provides the characteristic aromatic, light and airy texture. Another contribution of yeast in bread systems is in the activation of enzymes that break down wheat flour proteins, improving gluten development and final product texture and structure.

Fats and Oils

While at a low percentage, sometimes around 3%, fats and/or oils play a key role in breadmaking by helping the flavor, texture, and shelf life. Fats act as tenderizers by disrupting gluten network formation, preventing bread from becoming dry and crumbly. They can be added in various forms, such as butter, ghee, vegetable oil, or shortening. They can add softness and richness to the bread, giving it a more luxurious texture and flavor.

Additionally, fats and oils can help extend the shelf life of the bread by slowing down staling. They can affect the bread's crumb structure, giving it a softer texture. The amount and type of fats and oil used in bread-making can vary depending on the desired texture and flavor of the bread.

Eggs



Eggs are essential in brioche and bread for enhancing texture, flavor, and crust quality. They add richness and tenderness, and also contribute structure and chewiness. Egg proteins improve crust color and flavor during baking due to its reaction in Maillard browning. Classic recipes often include a significant percentage of eggs to achieve desired qualities. Eggs lead to softer, more flavorful breads compared to those made without them. Overall, their multifunctional role makes eggs a key ingredient in enriched doughs like brioche, that rely on eggs to provide their characteristic richness and flavor.

Salt

Salt has several functions in bread making. Firstly, it enhances the flavor of the bread. It also helps to strengthen the gluten structure, improving the bread's texture and volume. Salt also has an essential role in yeast fermentation by helping to regulate the rate of fermentation by slowing down the activity of yeasts, which can prevent the dough from over-rising and collapsing. Finally, it can improve the bread's shelf life by inhibiting mold growth and other deteriorating microorganisms. The amount of salt used in breadmaking can vary depending on the type of bread and desired final product characteristics. Still, it is an essential ingredient that should not be omitted.

Sugar

Sugar has a few key roles, the first being helping yeast fermentation. It is the substrate for yeast in the bread system that allows the production of carbon dioxide for leavening and thus impacts the final loaf volume and texture. Another function of sugar is enhancing the flavor, aroma, and color due to its involvement in the Maillard reaction. Finally, sugar also contributes to an improvement in product shelf life due to its moisture retention capacity and lower water activity.

Other Ingredients

Aside from the staples, other ingredients are often added to bread formulas to help with consumer appeal, high speed production, and to enhance desired characteristics. Here are a few of the most common and practical.

WHEAT PROTEINS

Vital wheat gluten is a protein from wheat flour used in breadmaking to improve bread's machinability and oven spring. It is made by wet milling wheat flour, separating the gluten, and drying it into a powder form. Vital wheat gluten can be added to the dough to increase mixing, fermentation, and overall process tolerances, which helps to strengthen the gluten structure and create a more elastic and chewy texture in the bread. It can also aid in improving final product shelf life by keeping the bread softer for longer periods due to the additional water and achieved volume. Limiting the use of vital wheat gluten is important because too much can produce a tough and chewy product.

Wheat protein isolates are protein-based dough relaxers and/or strengtheners developed with a range of elasticity and extensibility to provide precise dough functionality required for various baking applications.

DOUGH CONDITIONERS

Dough conditioners are ingredients that are used to improve dough processing and the overall quality of the bread in large scale production environments. There are many types but the most commonly used ones are: pH regulators, mineral yeast food, enzymes, reducing agents, and emulsifiers.

How they work:

- Improve the strength of dough for oven spring
- Improve crumb structure and texture
- Keep crust color consistent
- Improve appearance and symmetry
- Improve the sliceability of bread
- Delay the onset of staling and improve shelf life

MALT

Malt comes from germinated grains. There are two types of malt: diastatic and non-diastatic. The malting process for diastatic malt renders a significant level of enzyme activity, and thus a substantial amount of sugars are created in the dough when using diastatic malt. The addition of diastatic malt into bread products aids in the correction of amylase activity and the adjustment of the fermentation rate (e.g., an increase of the fermentation rate) due to the high content of fermentable sugars in malted grains. Non-diastatic malt is used in bread to give it a wonderful aroma and a crusty exterior. In bagels, it is used in boiling water to give a nice brownish sheen after baking.

SHELF LIFE EXTENSION INGREDIENTS

Shelf life extension ingredients are added to bread to preserve its freshness and food safety. The stalling process is the progressive firming and loss of moisture of bread crumbs. This occurs due to starch retrogradation. Starch retrogradation is the process in which starch molecules reassociate and crystallize, reducing their capacity to bind water molecules, and causing an increased firmness in the breadcrumb. Lower storage temperatures in the refrigerator and freezer accelerate this process.

Amylase can aid in preventing starch retrogradation due to its capacity to break down starch molecules and avoid staling. The correct application of amylase to bakery formulations depends on the type of bread, the concentration of amylase, and the usage conditions.

From the food safety aspect, mold growth is prevented through the use of calcium propionate. Calcium propionate is used as a preservative in the food industry. When in a solution, it dissociates in calcium and propionate ions. The propionate ions penetrate the cell membranes disrupting the metabolism of microorganisms, thus preventing them from reproducing and creating spoilage.

Don't like Calcium Propionate?

An alternative to calcium propionate is cultured wheat. Cultured wheat is the result of fermenting wheat flour with a specific bacterial culture for long periods of time to produce organic and natural propionic acids. Other forms of natural propionic acids can come from cultured tapioca, corn, and rice.

DOUGH PROCESSING

Dough processing consists of several steps that are required to obtain a final product with a high quality and appropriate organoleptic properties.

J&K Ingredients has led the way in the industry for naturally fermented mold inhibitors. Today, Bred-Mate™ is recognized around the world as the best Clean Label ingredient for increasing shelf life all while enhancing natural flavor and aroma. Our Clean Label line of Bred-Mate™ products will keep your bread mold-free without the need for Artificial Preservatives! Find out more.

Dough Systems

High output baking has several dough systems to choose from depending on the desired final product, equipment availability and overall production conditions available. Here are the more popular ones:

SPONGE AND DOUGH METHOD

A two stage method that consists of the pre-fermentation of a sponge mixture and a final mix.

STRAIGHT DOUGH METHOD

All ingredients, both dry and liquid, are placed in the mixer and combined to produce a homogeneous dough.

CONTINUOUS MIXING METHOD

A continuous series of equipment is used for mixing all ingredients together.

There are many advantages and disadvantages to each system. Download our dough systems handbook to learn more about them. Regardless of what dough systems you use, the type of equipment you choose would affect the output of your line.

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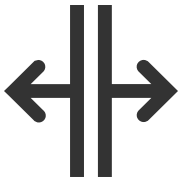
Scaling

In an industrial bakery, the ingredients are weighed and mixed using large--scale mixing equipment that can handle large batches of dough. The ingredients are measured and added to the mixer, and then subsequently the dough is mixed until it becomes smooth and elastic. Mixing times and speeds are carefully controlled to ensure the dough is properly developed and the gluten is fully formed.

Mixing

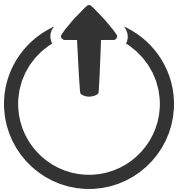
There are several types of mixers commonly used in breadmaking, including planetary mixers, spiral mixers, and horizontal mixers. Planetary mixers are often used for smaller batches of dough, while spiral and horizontal mixers are better suited for larger volumes. These mixers combine the ingredients and develop the gluten in the dough through a kneading process. Depending on the selected dough system, an appropriate type of mixer should be chosen. When choosing a dough mixer, find one that gets you to full dough development faster at a lower temperature.

Dough Dividing



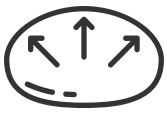
Dough dividers are an essential piece of equipment for ensuring consistency in breadmaking. They divide the dough into equal portions, which ensures that each loaf or roll is the same size and shape. This makes the dough easier to bake and guarantees consistency in the final product.

Rounding



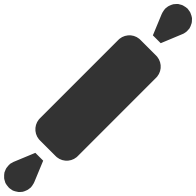
After the dividers, rounders are used to shape the dough into smooth, uniform balls. This process is essential for creating consistent baking results, ensuring that each dough ball is the same size and shape.

Intermediate Proofing



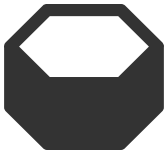
Intermediate proofers are baking equipment used to control environmental factors such as relative humidity and temperature during the dough fermentation process. They are also known as proofing cabinets or proofing chambers.

Sheeting



Sheeters are used to flatten and stretch the dough into thin, even sheets, which can be used to make various types of bread and rolls.

Molding



Molders are used to shape the dough into its final form, such as loaves, rolls, or buns. They ensure that each piece is uniform and consistent, which is essential for creating a professional-looking final product.

Panning

Panning involves placing the shaped dough onto baking pans or molds precisely at a high speed. Proper panning is essential for creating a consistent and high quality final product.

Final Proof

Proofing is the process of allowing the dough to increase its size before baking, which is necessary to develop flavor and texture. The length of the proofing process can vary depending on the type of bread and the desired final result. Proofing environmental conditions is also extremely important to guarantee the best results in shorter periods. Industrial bakeries use large proofing cabinets or rooms where the temperature and humidity are carefully controlled to promote optimal yeast activity and fermentation.

Baking

Baking involves placing the dough in the oven and baking it at a specific temperature and time to ensure it is fully cooked and has a crispy crust. Proper baking is essential for the production of loaves of bread that have the desired final product characteristics. Use the thermal profiling method to guide you through a proper bake.

Cooling

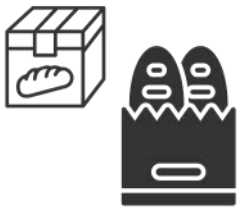
After baking, the bread must be cooled to the proper internal temperature to fully set so that slicing can happen. This process also prevents the crust from becoming soggy and helps to maintain the bread's overall quality.

Slicing

Slicing is the process of cutting the bread into pieces, typically done with a bread knife or slicer. Proper slicing at the right temperature is essential for creating a consistent and professional-looking final product.

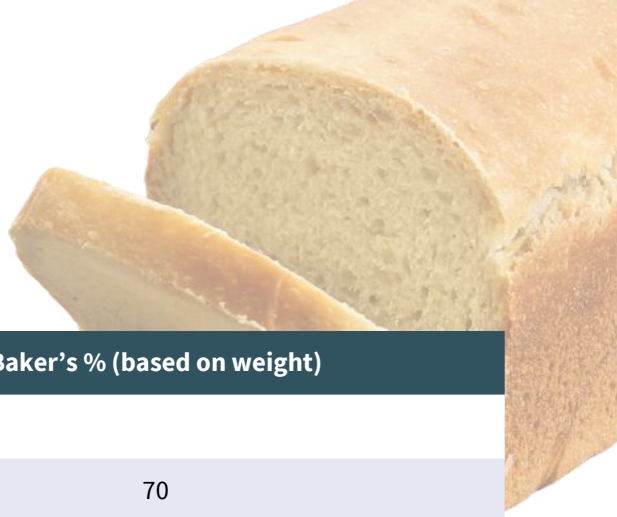
Bagging

Bagging or wrapping is the process of packaging the bread for storage and transport, which helps to maintain its freshness and flavor. This is particularly important for bread that will be sold in retail settings, as it ensures that the bread remains fresh and appealing to customers.



FORMULATIONS

White Pan Bread



Ingredient	Baker's % (based on weight)
Sponge (70% pre-fermentation of flour)	
Bread flour	70
Water	43.4 (62)*
Yeast (compressed)	1.5**
Mineral yeast food	0.5
Protease	0.25
Total	**115.65**
Dough (62% total flour hydration)	
Bread flour	30
Water	18.6
Yeast (compressed)	2.5
Salt	2.0
Granulated sugar	7.0
Butter (melted)/Oil/Shortening	3.5
Nonfat dry milk (heat - treated)	3.0
Clean label dough conditioner mix* **	3.0
Vital wheat gluten	1.0
Cultured Wheat	0.1
Vinegar (100 - grain)	0.5
Sponge	115.65
Total	**186.85**

Table 2. White pan bread formulation.
**Hydration level, based on the weight of flour used in the sponge*
***Yeast amount for an 8-hour sponge fermentation*
****Crumb softeners, dough strengtheners, enzymes, redox agents*

Baguette

Ingredient	Baker's % (based on weight)
Bread Flour	100
Water	65-75
Instant Yeast	0.8-1.0
Salt	2
Malt Syrup	0.5
Poolish (optional)	Varies
Total	**168.3-178.5 + Poolish**

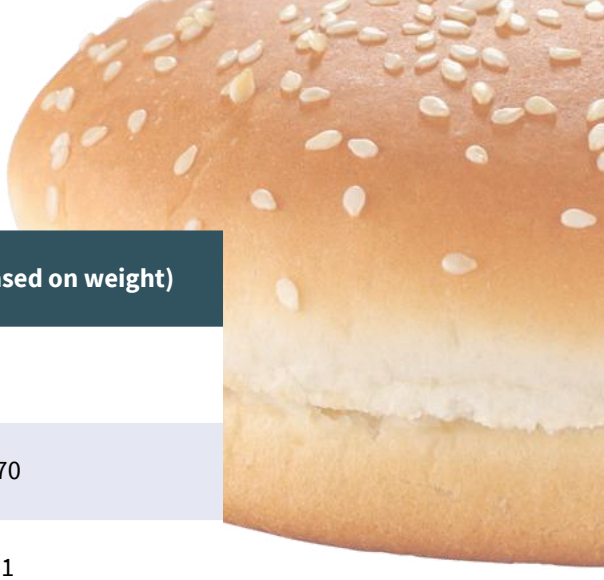
Table 3. Baguette formulation.

Whole Wheat Bread

Ingredient	Baker's % (based on weight)
Wheat Flour	85
Whole Wheat Flour	10
Rye Flour	5
Water	43.5
Milk (pasteurized),cold	21
Compressed yeast	7
Honey	6.0
Salt	2
Vegetable Oil	2
Clean label dough conditioner mix*	0.1 to 0.2
Ascorbic acid	0.01
Vinegar (11% acetic acid)	2
Total	**176.5**

Table 4. Clean label bread formulation.

Hamburger Bun



Ingredient	Baker's % (based on weight)
Sponge (70% pre-fermentation of flour	
Whole wheat bread flour	70
Vital Wheat gluten	1
Water	42 (60% flour absorption)*
Yeast (compressed)	3**
Total	116
Dough (65% total flour hydration)	
Whole wheat bread flour	30
Milk (refrigerated)	15
Yeast (compressed)	2
Salt	2
Granulated sugar	8
Butter (melted)	12
Liquid whole eggs	10
Sponge	116
Total	**195**

Table 5. Hamburger bun formulation.
** Hydration level, based on the weight of flour and grains used in the sponge*
*** Yeast amount for a 4 hour sponge fermentation*

Keto Bread

Ingredient	Baker's % (based on weight)
Arise (R) wheat protein isolate	36
Fibersym (R) RW resistant (wheat) starch	64
Water	70
Inulin	6
Oil	3
Instant dry yeast	2.2
Salt	1
Stevia	1
Dough enzymes	1
Total	**183.2**

Table 6. Keto bread formulation.

Substituting Traditional Ingredients with Keto-friendly Options

Keto baked goods present an alternative to traditional baked goods for consumers looking for healthier options and following a low-carb, high-protein diet. The production of keto bread presents a challenging opportunity for bakers due to the huge impact of wheat flour's gluten in bread's overall characteristic properties. However, successful wheat flour substitution can be made with alternative flours or a mixture of resistant wheat starch and a blend of wheat protein isolates.

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BREAD TROUBLESHOOTING

What is a good flour quality for hamburger buns?

Hard Red Winter or Hard Red Spring wheat are great for bun and rolls production. They have both a high quantity and quality of gluten-forming proteins, gliadin and glutenin. Lower protein quantity aged flours can be used, but a longer fermentation time in a sponge would be required for it to fully hydrate and function on the high output line. Often, bakers mix these two kinds of wheat at 50/50 to get the performance of the spring wheat at a more affordable price.

Which dough conditioners or enzymes should I use to get soft, fluffy bread with a high volume?

DATEM works best for getting a homogenous crumb grain with a fluffy interior. If you want a clean label, a combination of alpha-amylase and xylanase (both fungal and bacterial) does magic. Check your flour specs, especially the % dry gluten and W - P/L values of the alveograph rheological test. If using stronger flours, a higher solids hydration is required for extensible and soft dough. A good flour for high quality buns usually has a dry gluten content of 11 to 12%, alveograph W values of about 300 to 350 and P/L values of 0.6 to 0.9.

Why are there bigger holes near the top of my clean label bread? How can I help crumb uniformity?

When converting to clean label bread, bakers should understand that they have a more delicate dough. Here are two major things to address. Firstly, cooler dough temperatures should be addressed. Target a final dough mixing temperature of 25-28°C (76-82°F). This can be obtained by reducing the mixing times. A sponge and dough can significantly reduce mixing times by 40%. If this is not an option, use reducing agents like inactivated yeast to reduce the mixing times.

Secondly, slow the proofer down to obtain a proofing temperature of 33°C (90°F). Many times, when proofers are the bottlenecks, operators increase proofer temperatures to increase output. While this can be tolerated with oxidizing agents like potassium bromate and ADA, clean label dough conditioners were not designed for these conditions. Clean label dough conditioners produce a more delicate dough that cannot prevent dough cells from coalescing. Therefore, the hotter it gets on the top of the dough, the more cells coalesce and the bigger the cells become on the top of the bread compared to the heel. The real solution is to reduce the proofer temperature or slow down the proofer. If this is not feasible, you must change the dough conditioning blend.

Which protein is the best for making keto bakery products?

There are a variety of proteins available, although only some will allow you to make a keto baked product with the most similar eating quality as the original bakery product. Wheat protein isolates perform the best especially because they are made from wheat flour. There are wheat protein isolates that help with extensibility and others that help with elasticity. ***For more information on this topic, download our Baking Keto pocket guide!***

Why are there blotches of white spots on the top of my buns?

The blotches are from over oxidation and dry proofing of the dough. Here are four ways to deal with it:

1. A reduction in oxidizing agents will help immediately.
2. . Decrease your dough temperature by 2°C (5°F).
3. Increase the relative humidity of your proofer.
4. Change the clean label dough conditioning blend.
5. Take a look at your flour COA, and you may see a spike in protein quality.
6. Have a discussion with your miller on keeping the flour quality consistent.

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QUALITY PARAMETERS

Typical Bread Quality Parameters

While similar quality parameters apply to most baked goods, bread has specific markers. Key items to track include:

- **pH:** influences the rate of fermentation. Yeast activity peaks in acidic environments of pH levels around 4-6. Texture and gluten behavior are also influenced by dough pH. A higher pH tends to favor the browning of the Maillard reaction, while lower pH values favor the production of flavor and aroma compounds that contribute to a more complex aroma profile. Final pH affects the microbial stability of the product (e.g., mold growth). The typical pH of baker's yeast bread lies between 5.3-5.8, and around 3.8-4.6 for sourdough bread.

- **Moisture content:** the product's water content affects the shelf life and sensorial acceptability of finished products. Moisture content is commonly measured by a direct method of evaporation (e.g., convection oven, vacuum, microwave ovens) or by indirect methods (e.g., spectroscopy or thermogravimetry).

- **Texture:** a wide variety of sub-parameters define bread texture. Among the most relevant are hardness, cohesiveness, springiness, and resilience. Texture can be measured with a trained sensory panel or by instrumental methods like Texture Profile Analysis (TPA).

- **Loaf volume:** associated with the lightness and fluffiness of the loaf. It can be measured through instrumental methods like C-Cell, laser, or rapeseed displacement, among others.

- **Cell structure:** considering the number of cells, cell diameters, cell volume, cell elongations, among others. It can be measured through instrumental methods like C-Cell.

- **Color:** produced during the baking process due to the browning reactions affects the acceptability of the product. It can be measured through instrumental methods or by trained sensory panels.

- **Dimensions:** multiple measurements of the basic dimensional characteristics of the bread, such as slice area, height, width and length. It aids in the understanding of the final product's physical and visual properties.

Measuring Bread Quality

Bread quality parameters can be measured by instrumental methods and/or sensory evaluation methods. Instrumental methods are quick and are relatively low cost in the long run with an initial high investment in equipment. They also cannot replicate the conditions during human mastication. The best approximation to this process is the Texture Profile Analysis (TPA) which intends to repeat the mastication process with a mechanical instrument.

Sensory evaluation methods provide more accurate results in approximating the actual sensations of the textural properties during mastication. However, they have several drawbacks, such as high costs, lengthy test times, and difficulty gathering consistent, repeatable data.

The following table shows instrumental techniques for the evaluation of bread quality:

Parameter	Evaluation technique	Parameter
pH	• pH meters	• pH
Moisture content	• Direct methods: evaporation (e.g., convection oven and microwave oven)Indirect methods: spectroscopy or thermogravimetry	• Moisture content
Water activity	• Resistive Electrolytic Hygrometers (REH)Capacitance HygrometersDew Point Hygrometers	• Water activity
Texture	• Texture Analyzer	• Texture
Loaf volume and cell structure	• C – Cell analyzer or Sightline	• Loaf volume and cell structure

Table 7. Evaluation techniques of quality parameters.

Tips to Solve Quality Issues

There are many steps during the bread making process where challenges to the final product may occur. So, it is important to take several considerations into account to both prevent and solve issues that arise during production.

In the following table the most commonly found problems during bread making are shown with their potential causes and recommended solution:

Problem	Cause	Solution
Overproofed bread	• Higher yeast content than necessary • Higher content of fermentable sugars than required • Warmer proofing environmentLong rising times	• Decrease yeast content • Decrease sugar content • Use cooler water or check environmental temperature • Proof dough in cooler temperature environments
Underproofed bread	• Low yeast content • Low fermentable sugar content • Colder doughInsufficient rising time	• Increase yeast contentIncrease sugar content • Use warmer water or check environmental temperature • Proof dough in warmer temperature environments
Dense or heavy bread	• Insufficient rising time • Low gluten development • Higher flour content	• Increase rising time • Knead dough for longer • Use higher-protein flour or adjust dough hydration
Crumbly or dry bread	• Higher flour content • Not enough hydration • Overbaking	• Decrease flour amount • Adjust dough hydration • Shorten baking time

Table 8. Common bread making problems, causes and solutions.

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Problem	Cause	Solution
Pale or underbaked bread	• Insufficient baking time or temperature	• Increase baking time and temperature
Burnt or overbaked bread	• Excessive baking time or temperature	• Shorten baking time • Lower baking temperature • Cover bread with foil to prevent burning
Unevenly shaped bread	• Improper shaping or uneven dough distribution	• Ensure even shaping and consistent dough distribution in baking pan
Poor crust formation	• Insufficient moisture during baking • Too much steam • Not enough steam	• Adjust moisture during baking • Adjust steam injection accordingly
Off-flavors or odors	• Poor ingredient quality • Improper storage or handling • Bacterial contamination	• Use high-quality ingredients • Properly store and handle ingredients • Sanitize equipment and work surfaces

Table 8 (Continuation). Common bread making problems, causes and solutions.

SUMMARY

Demand for healthier bread alternatives is on the rise globally. Producing keto-friendly, clean label and other novel bread products that are flavorful and pleasing—as well as nutritious—presents unique functional challenges. Bakers can master these challenges with knowledge of key ingredients, processing technologies, and specific techniques required to work with higher levels of protein and fiber. The result? Healthy breads that consumers can enjoy and feel good about eating.

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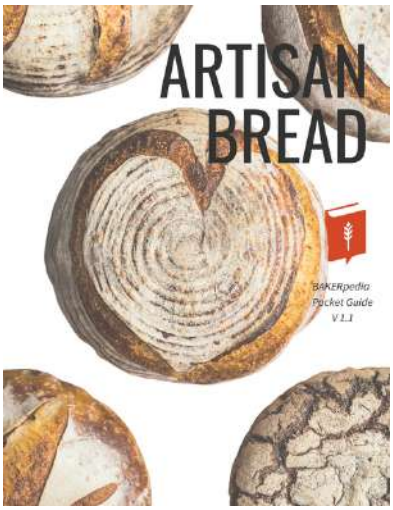

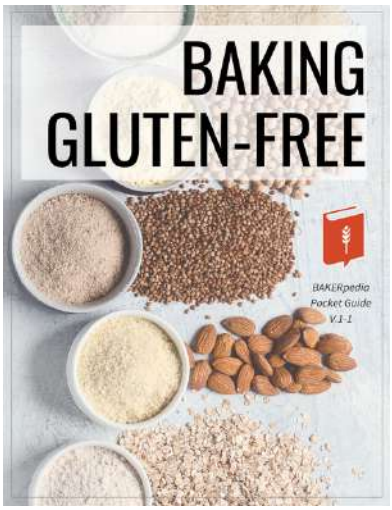

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