Baking

BUNS AND ROLLS

BAKERguide Vol. 3–2

By

novonesis

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Table of Contents

5 **Introduction**

Market Trends and Opportunities

6 **What are Buns and Rolls?**

Definition, Types/Variations

8 **Formulation Principles**

Lean vs Rich Doughs

10 **Ingredients**

Flour, Water, Sugar, Fat, and Yeast

19 **Dough Processing**

Processing of Buns and Rolls

26 **Troubleshooting Artisan Bread**

Problems and Solutions

28 **References**

29 **Appendix: Formulas**

Discover a perfectly balanced bite with Novamyl® BestBite

Superior texture, freshkeeping benefits, recipe optimization with lower added sugar and yeast, as well as less dependence on emulsifiers — bake better with one biosolution.

Perfectly balanced bite
Delivers a soft yet resilient texture that consumers prefer

Fresher than fresh
Significantly improves texture immediately after baking

Fresher for longer
Keeps soft, moist and resilient to the end of shelf life

Recipe optimization
Offers a unique potential to reduce added sugar and lower dependence on emulsifiers

Novamyl® BestBite — a texture consumers prefer

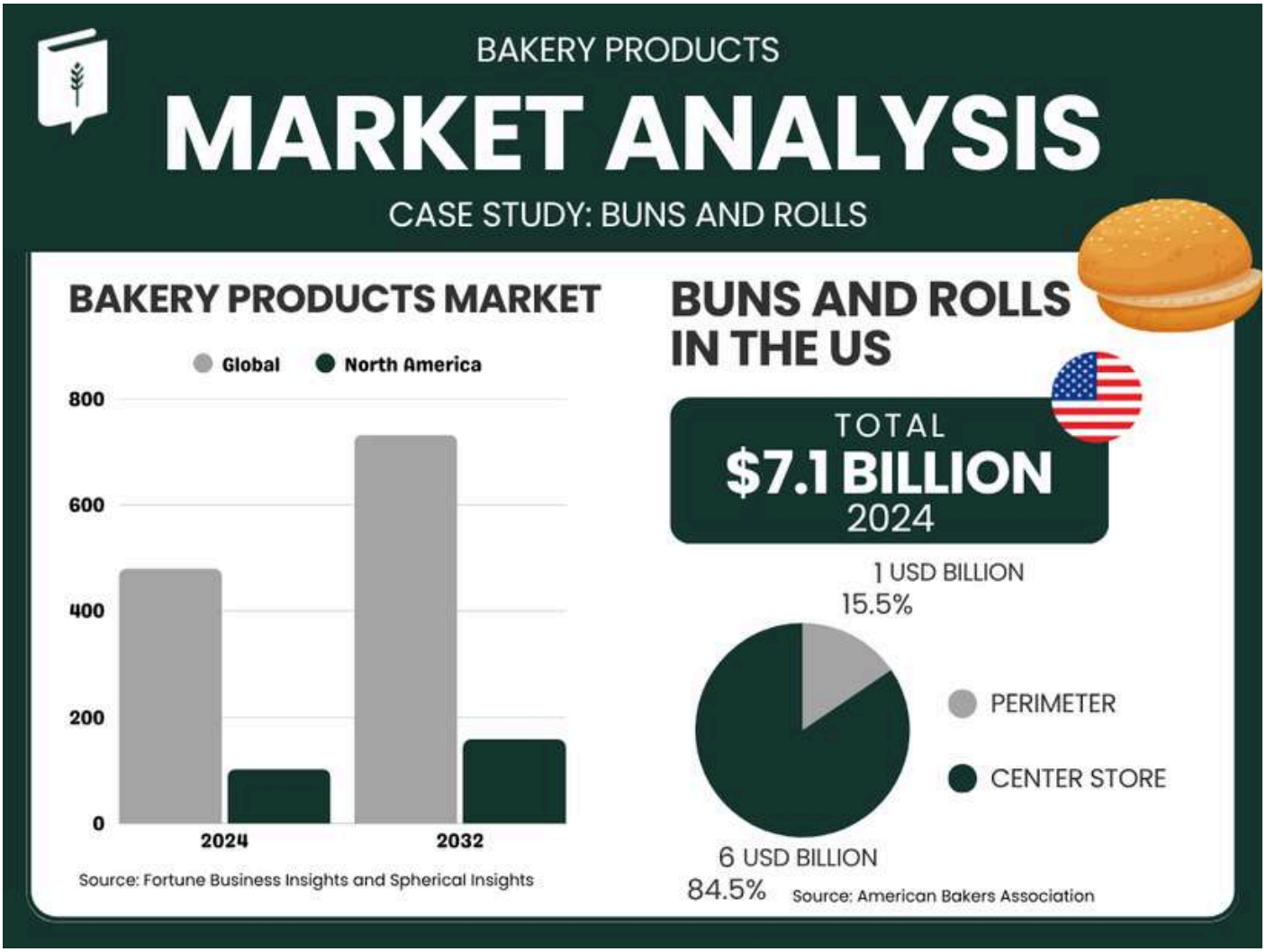
 Consumers (n=80) evaluated the bread samples in a randomized, blind trial. Comparisons on days 1 and 15. European lean white pan bread.

INTRODUCTION

Buns and rolls are no longer just a side item; they represent a dominant force in the U.S. bread market, generating over $7.1 billion in annual sales in 2024, according to the Bakery Playbook Buns and Rolls by the American Bakers Association. This category is experiencing a renaissance, driven by evolving consumer preferences and a demand for convenience and diverse flavors.[1]

They offer the perfect individual serving size, making on–the–go meals incredibly convenient. Beyond mere ease, the category is witnessing a substantial shift toward more premium and innovative offerings. The days of white bread's unchallenged reign are fading; consumers are increasingly seeking out richer, more flavorful options. This trend is evident in the growing prominence of brioche and Hawaiian–style buns. These enriched varieties, characterized by their softer texture and subtly sweet flavor, are transforming everything from everyday sandwiches to gourmet burgers.[2]

The rolls and buns category, particularly within the center store and in–store bakery segments, has been experiencing significant growth. Center store buns and rolls accounted for $6 billion with an annual growth rate of 4.4%, while perimeter buns and rolls accounted for $1.1 billion with an annual growth rate of 6.2% in 2024, according to the Bakery Playbook Buns and Rolls.[3]
[3]



WHAT ARE BUNS AND ROLLS?

Buns and rolls are types of soft, leavened bakery products often seen in food service, BBQ, and restaurants. They are typically made from wheat flour, water, yeast, salt, and fat. They can be eaten plain or with various fillings or toppings, and are often used as snack foods or as an essential part of certain meals, such as hamburgers and hot dogs.

Buns: soft, leavened bakery items, usually made from refined wheat flour. Buns are generally smaller, sweeter, and often used as sandwich bread, especially for hamburgers or hot dogs. Buns are often enriched with ingredients such as butter, milk, or eggs.[4]

Rolls: similar to buns, rolls are small, round or oval–shaped bread products. The term "rolls and buns" is often used together to refer to these soft, individual bread items. Rolls are typically larger, more versatile, and can be plain or flavored, often served as a meal accompaniment.[4]

Types of Buns and Rolls

There is a wide variety of buns and rolls commercially available; they can be classified by their use or by the type of dough they are made with.

Lean dough buns and rolls

- Hard crusted rolls: these are the leanest of all buns and rolls available; they are characterized by low fat and sugar content. Some examples of them are Kaiser rolls, Vienna rolls, Ciabatta, and other hard rolls.[1]

- Soft rolls: common examples are dinner rolls like Hawaiian and potato rolls, which are characterized by a higher percentage of sugar and fat, and may also contain eggs and milk solids. They tend to have a softer crust.[1]

Common Buns and Rolls

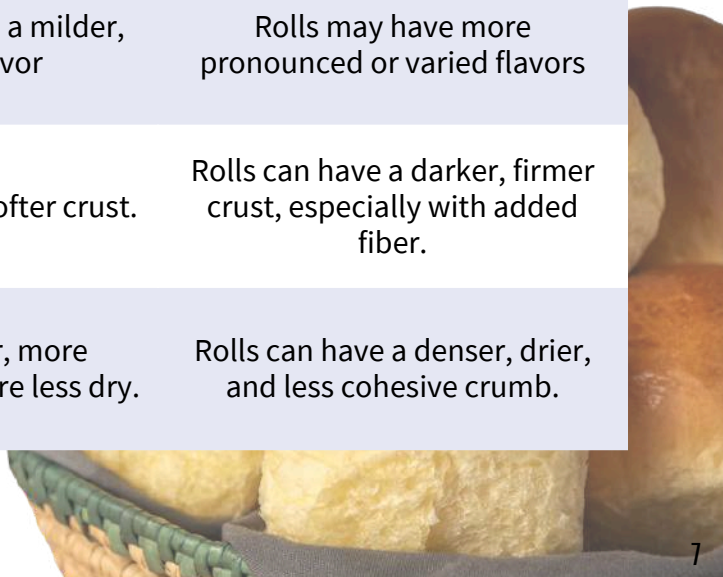
Type	Shape & Size	Texture & Crumb	Flavor Profile
Hamburger Buns	Round, 4–5 inch diameter	Extremely soft, fluffy, fine	Slightly sweet, buttery
Hot Dog Buns	Long, split–top or side	Soft, yielding, slight crust	Mildly sweet
Dinner Rolls	Round or oval, small	Soft, tender, rich, puffy	Buttery, mildly sweet
Brioche Buns	Round, slightly domed	Very soft, airy, rich crumb	Buttery, sweet
Sandwich Rolls	Oval/round, larger	Soft to chewy, sturdy	Neutral to mildly sweet
Hoagie/Sub Rolls	Long, sub–shaped	Chewy, sturdy, soft interior	Neutral
Slider Rolls	Small, round (2–3 in)	Soft, fluffy	Slightly sweet, buttery

Table 1: Common types of buns and rolls

Key Differences between Buns and Rolls

Characteristic	Buns	Rolls
Texture	Softer texture	Denser and chewier
Flavor	Soft white buns have a milder, less intense flavor	Rolls may have more pronounced or varied flavors
Crust	Buns tend to have a softer crust.	Rolls can have a darker, firmer crust, especially with added fiber.
Crumb	Buns have a softer, more cohesive crumb and are less dry.	Rolls can have a denser, drier, and less cohesive crumb.

Table 2: Key differences between buns and rolls



FORMULATION PRINCIPLES

Lean dough and enriched dough differ primarily in their ingredient composition, texture, and fermentation behavior. Lean dough contains the basic ingredients: flour, water, yeast, and salt, with little to no fat or sugar. This results in breads that are chewier, denser, and have a crustier exterior, such as baguettes or ciabatta.

In contrast, enriched dough includes added fats (butter, oil, eggs), sugars, and dairy, which tenderize the gluten by coating and shortening gluten strands. This produces a softer, more tender crumb and a lighter, billowy texture seen in brioche, challah, and cinnamon rolls. The added fats and sugars also slow yeast activity, requiring longer fermentation times and gentler mixing to maintain dough extensibility and softness. Enriched doughs tend to have a finer, more uniform crumb and often a richer flavor and longer shelf life. Additionally, enriched doughs may include other ingredients like nuts, fruits, or spices, enhancing complexity.

Overall, lean dough yields crusty, chewy breads, while enriched dough creates soft, tender, and often sweeter baked goods.[1]

A review of Lean vs. Enriched doughs:

Parameter	Lean Dough	Enriched Dough
Main Ingredients	Flour, water, yeast, salt	Flour, water, yeast, salt + fats (butter, oil), sugar, eggs, milk, sometimes nuts/fruits
Texture	Chewy, dense, crusty	Soft, tender, billowy crumb
Flavor	Mild, straightforward bread flavor	Richer, sweeter, more complex flavor
Fermentation Time	Shorter, faster yeast activity	Longer, yeast activity is slowed by fats and sugar
Mixing Method	Vigorous kneading	Gentler, longer kneading to maintain softness

Table 3: Lean dough vs enriched doughs comparasion

Parameter	Lean Dough	Enriched Dough
Dough Processing	Dough temperatures should be 20 – 27 °C (75 – 80 °F) after mixing	Regular dough temperatures should be 18 – 21 °C (65 – 70 °F) after mixing, which requires a gentle, cooler temperature to preserve its dough networks.
Crust	Thick, crispy	Softer, thinner, often golden and shiny (with egg wash)
Examples	Ciabatta, sourdough, pretzel, hamburger, and hot dog buns	Brioche, challah, cinnamon rolls, dinner rolls
Shelf Life	Shorter, stales faster	Longer due to fats and sugars

Table 3 (cont): Lean dough vs enriched doughs comparasion

INGREDIENTS

Flour

- Primary structure builder and a key determinant of texture
- Provides a gluten network crucial for trapping gases during yeast or chemical leavening, resulting in the soft and airy texture characteristic of well–made buns and rolls
- Contributes to the appealing golden–brown color of buns and rolls through its involvement in the Maillard reaction during baking [6]

Starch

- The largest component of flour
- Further supports the structure, influences crumb texture, and plays a role in yeast fermentation

Flour Quality Selection for Buns

Selecting the right flour type is vital for producing high–quality buns and rolls. High–protein flours (above 12% protein) from a mix of hard red spring and winter wheats yield doughs that are more elastic and cohesive, making them easier to handle and shape while ensuring a light, fluffy crumb and good volume. In contrast, low–protein flours (below 12% protein) lack the strength needed for optimal gluten development, often resulting in dense, compact buns and rolls with a coarse or gummy texture. Thus, flour selection directly impacts the final product's appearance, texture, and overall eating quality.[6]

Rolls would require a higher protein (12–14% protein) from a hard red spring wheat to obtain that nice height with a crispy crust.

DAMAGED STARCH

Falling number is a measure of damaged starch. It is a direct correlation to flour quality In some regions fungal alpha amylase, such as Fungamyl®, is often used to correct falling numbers. Damaged starch is the portion of kernel starch that has been physically broken or fragmented during wheat milling in flour. Increasing damaged starch from 6.4% to 10.6% in flour raises maltose production, especially when combined with added amylase, enhancing the anti–staling.[11]

LIPIDS IN FLOUR

Studies, such as the *Novonesis White Paper - Lipase in Flour*, have shown that Flour quality is affected by the lipids present in the endosperm of the wheat kernel. Two types can be found: starch lipids and non–starch lipids. The former does not have a significant effect before baking, while the latter is composed of Triglycerides (non–polar), phospholipids (polar), and galactolipids (polar). Polar lipids like phospholipids and galactolipids are surface–active ingredients that can act as emulsifiers and thus aid in the stabilization of air bubbles in the dough. Stabilization of gas bubbles contributes to parameters such as volume and crumb structure.

STABILIZERS

Typically, stabilizers such as emulsifiers are added to buns and rolls to improve volume and crumb structure. However, natural alternatives, which commonly contain lipases such as Lipopan® 50 or Lipopan® Fortis are used to enhance these properties without including chemical ingredients. Lipases modify polar lipids present in flour, and thus aid in stabilizing gas bubbles by improving the Hydrophilic–Lipophilic balance and enhancing emulsifying properties.

Sweeteners

SUGAR

Sugar (sucrose) is a crystalline, highly soluble, disaccharide carbohydrate with the chemical formula $C_{12}H_{22}O_{11}$, composed of two monosaccharides: glucose and fructose. Sucrose aids in yeast fermentation as a substrate for yeast in the bakery system that allows the production of carbon dioxide for leavening, flavor, and volume, enhancing the flavor, aroma, and color via the Maillard reaction. It also contributes to improving product shelf life due to its moisture retention capacity and its ability to lower water activity. [6]

Reducing the amount of formula sugar involves substituting sucrose with bulking agents and adding alternative sweeteners. Poydextrose and fibers can mimic both bulk and moisture-binding capacity. High-intensity sweeteners mimic the sweetness of sucrose without contributing calories. Additionally, fermentation techniques using specific lactic acid bacteria can produce natural sugar alcohols and exopolysaccharides that improve texture and sweetness perception in sugar–reduced baked goods.

The development of novel enzymes has been shown to enable the reduction of formula sugar by providing natural sources of fermentable sugar from starch. Premium options such as Novamyl® BestBite offer the potential of sugar reduction up to 50% with no evident difference from regular sugar levels, while also improving the overall texture of the product by enhancing the softness, extended shelf life, moistness, and resilience of buns and rolls.[7] For customers looking cost–effective formula sugar reduction without shelf life extension, Optiva® LS Prime is an effective solution. [7]

Premium solutions such as Novamyl® BestBite offer the potential of sugar reduction up to 50% with no evident difference from regular sugar levels, while also improving the overall texture of the product by enhancing the softness, extended shelf life, moistness, and resilience of buns and rolls.[7]

Sugar reduction allows bakers worldwide to mitigate fluctuations in raw material prices, supply shortages, volatile production costs, and competitive pricing pressure.[8]

Tip Box

Manufacturing high–sugar bread products often requires long mix times or even the need to delay some ingredients to get full dough development, increasing line time. Why not consider reducing the amount of formula sugar and breaking down some of the existing starch to produce the sugar with an enzyme like **Novamyl® BestBite** or **Optiva® LS Prime**, enabling shorter mix times and potentially negating the need for delayed sugar addition.

Yeast and Chemical Leavening

YEAST

- Single–celled microorganisms are crucial for bread making.
- Provides the gases required for leavening bread, contributing to the volume and texture of the finished product.
- Provides the characteristic aromatic, light, and airy texture via fermentation.

A wide variety of yeast types exist depending on the production process and the final product desired. In the following table, the most common types of yeast are discussed:

Form	Water content (%)	Solids content* (%)	Handling and application
Compressed	70	30	• Shelf–life: 2 – 3 weeks at refrigeration temperature. It can be added directly to the mixer • Application: medium–sized and high–speed bakeries • Activity: high, although lower than cream yeast
Cream	85	15	• Shelf–life: 2 – 3 weeks under refrigeration. Requires storage in agitated tanks. It can be pumped directly to the mixer by a bulk ingredient handling system • Application: high–speed bakeries, easiest and most accurate scaling • Activity: highest, less prone to variations in performance
Active dry (ADY)	5	95	• Shelf–life: 1 year under vacuum (oxygen–free) packaging. Must be activated in warm water for 5 – 10 minutes before adding to the dough • Application: retail bake shops, in–store bakeries • Activity: lowest
Instant dry (IDY)	5	95	• Shelf–life: 1 year in vacuum packaging. It can be added directly to the mixer without activation • Application: retail bake shops, medium–sized bakeries • Activity: higher than ADY but lower than compressed

Table 4: Types of yeast

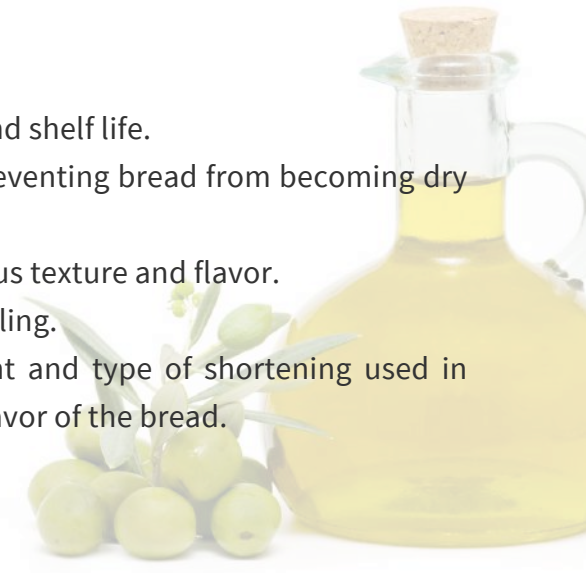
** Solids include protein, carbohydrates, cell lipids, minerals, and vitamins*

Functional Minor Ingredients

SALT

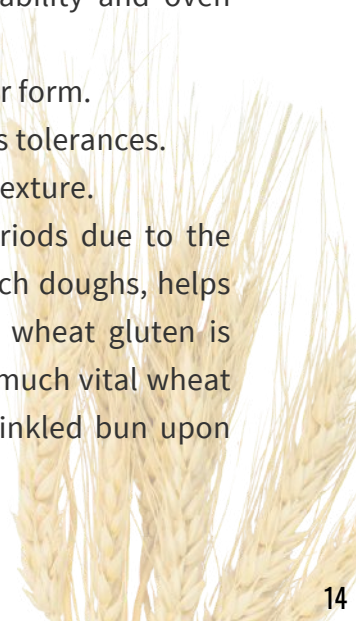
- Enhances the flavor of the bread.
- Strengthens the gluten structure, improving the bread's texture and volume.
- Helps to regulate the rate of fermentation by slowing down the activity of yeasts,
- It can improve the bread's shelf life by inhibiting mold growth and other deteriorating microorganisms.
- Varies depending on the type of bread and desired final product characteristics.

FATS, OILS, SHORTENING, AND BUTTER



- Plays a key role in breadmaking by helping the flavor, texture, and shelf life.
- Acts as a tenderizer by disrupting gluten network formation, preventing bread from becoming dry and crumbly.
- Adds softness and richness to the bread, giving it a more luxurious texture and flavor.
- Helps extend the shelf life of buns and rolls by slowing down staling.
- Aids in crumb structure, giving it a softer texture. The amount and type of shortening used in bread–making can vary depending on the desired texture and flavor of the bread.

VITAL WHEAT GLUTEN



- Protein from wheat flour is used in breadmaking to improve bread's machinability and oven spring.
- Made by wet milling wheat flour, separating the gluten, and drying it into a powder form.
- It can be added to the dough to increase mixing, fermentation, and overall process tolerances.
  → Helps to strengthen the gluten structure and create a more elastic and chewy texture.
- Can improve final product shelf life by keeping the bread softer for longer periods due to the additional water and achieved volume. Use of vital wheat gluten, especially in rich doughs, helps stabilize the dough and makes it more machinable. Limiting the use of vital wheat gluten is important because too much of it can produce a tough and chewy product. Too much vital wheat gluten may also result in too much oven spring, resulting in a collapsed or wrinkled bun upon cooling.

EGGS

- Essential in brioche and Hawaiian rolls for enhancing texture, flavor, and crust quality.
- Add richness and tenderness, and also contribute structure and chewiness..
- Egg proteins react with reducing sugars in the Maillard browning reaction to produce the eggy, custard aroma and the golden brown crust color.
- Classic recipes often include a significant percentage of eggs to achieve the desired qualities.

FIBERS, PULSES, AND SEEDS

- Added to allow for front–of–pack health claims
- Can make processing difficult at levels necessary for front–of–pack claims
- Can interfere with volume, dough development.
- Crumb and bread quality often requires targeted solutions to achieve the desired product quality and processability

Clean Label Ingredients

EMULSIFIER REPLACEMENT

Emulsifiers in food, especially baked goods, are increasingly being replaced with cleaner, label–friendly alternatives due to consumer demand and health concerns. Often, emulsifier replacement success is dependent on not just one lipase molecule, but instead a blend of different lipase molecules. Lipases are available as polar or non–polar molecules, and within these blends of different molecular forms can produce the desired bun characteristics.

Some examples of Lipases:

Lipopan® Fortis

- Highest tolerance towards short fatty acid chains and highest robustness towards different flour types from different regions.

Lipopan® Elite

- Performs well in intensive bread–making procedures, is very dosing tolerant, and has moderate tolerance towards short fatty acid chains.

Lipopan® 50

- Delivers better crumb structure and reduces waste of misshapen breads during slicing.

BROMATE, ADA, ASCORBIC ACID, AND L–CYSTINE ELIMINATION

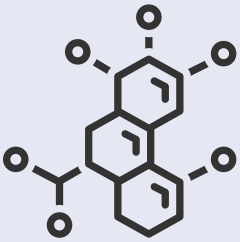
- Oxidizing agents, used in bun and roll dough, significantly strengthen the gluten network through the formation of disulfide bonds.
- Enhances elasticity and gas retention, which leads to greater dough expansion during proofing and baking
- Yields buns and rolls with increased volume and a lighter, more appealing texture characterized by a finer crumb.
- It can contribute to a whiter appearance of the baked goods.

Due to concerns about potential carcinogens, lack of social acceptability, and/or clean label initiatives, some bakers are completely eliminating or reducing these compounds.

As the baking industry moves toward eliminating or reducing these products due to health or social acceptability concerns, maintaining bread quality is a key challenge. The performance of these products is difficult to replicate, but enzymes offer effective alternatives.

- Novonesis' **Fungamyl®** amylase improves flour properties by accelerating fermentation, increasing gas production, and enhancing oven spring for optimal bread volume.
- Xylanases like **Panzea®**, **Pentopan®**, or cellulase, such as **Celluclast®** boost dough stability, mixing tolerance, and extensibility, crucial for crumb quality.
- **Gluzyme® Fortis**, a glucose oxidase, strengthens dough elasticity and reduces stickiness, improving stability and bread appearance. Additionally, phospholipase
- **Lipopan® Fortis** enhances dough consistency and fermentation tolerance, resulting in larger loaf volumes and even crumb structure.

By using blends of these enzymes from bread improver suppliers, can eliminate these ingredients while still maintaining the same quality when they are included and meet health and consumer acceptability requirements.



This enzyme-based approaches support healthier, sustainable baking without compromising dough rheology or final product quality, enabling the industry to meet regulatory bans and consumer demand for safer baked goods while preserving the sensory attributes that define great bread.

Shelf Life Extension Ingredients

The freshness of bread is primarily caused by two processes: microbial spoilage and changes in textural properties due to starch retrogradation. To counter these, formulators use a combination of antimicrobial agents and ingredients that maintain softness and moisture.

ANTIMICROBIAL SOLUTIONS

Microbial spoilage, such as mold growth, is one of the leading causes of early bread degradation. Antimicrobial agents are added to prevent this by inhibiting the growth and reproduction of spoilage microorganisms. Common ingredients available on the market are cultured wheat and calcium propionate, to name a few.

- **Calcium Propionate:** is traditionally used in the baking industry for mold inhibition, but with bakers looking to “clean up” their labels, alternative clean–label solutions have found their way on the market.
- **Cultured Wheat:** Fermentation that generates organic acid, primarily propionic acid, which delays mold growth by entering the cell and disrupting the cell membrane and metabolism. Cultured wheat is considered a clean–label ingredient.

TEXTURAL STABILITY– MAINTAINING SOFTNESS OVER TIME

Maintaining bread’s softness, elasticity, and moisture is equally critical for consumer satisfaction. Bread becomes firm and dry over time due to a process called starch retrogradation. This occurs when gelatinized starch molecules reassociate and crystallize, leading to reduced water retention and a firmer crumb structure. Lower storage temperatures, such as in refrigeration or freezing, can accelerate this staling process.

- Amylases, particularly maltogenic alpha–amylases, are enzymes that modify starch molecules and slow down retrogradation.
- The effectiveness of amylases depends on the bread type, dosage, and baking conditions.

Tip Box

The **Novamyl®** family of maltogenic alpha-amylases modifies the starch in wheat flour to delay firming during storage. It can be added during mixing—either to the flour, the dough improver, or the water—and works well in a wide range of applications, including breads, buns, rolls, and sweet baked goods. **Novamyl®** improves crumb elasticity and maintains a fresh texture over time.

A premium solution such as Novamyl® BestBite is a new, novel molecule from Novonesis which differs from traditional softening solutions in that it is an AMG, producing glucose while maintaining the internal structure of amylose to produce superior softening, resilience, while enabling up to 50% bowl sugar reduction without negatively affecting sweetness.

DOUGH PROCESSING

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

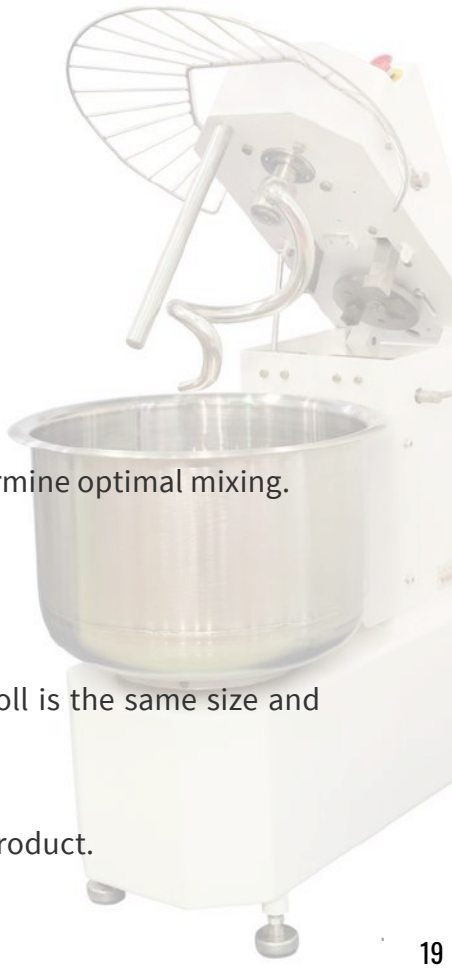
Dough Systems

High output baking has several dough systems to choose from, depending on the desired final product, equipment availability, and overall production conditions. 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:** all ingredients, both dry and liquid, are placed in the mixer and combined to produce a homogeneous dough.
- **Continuous mixing:** a continuous series of equipment is used for mixing all ingredients together.

Preparation

- Scaling
- Flour, water, oil, and sugar are usually scaled directly into the mixer.
- Minor ingredients are weighed out separately.



Mixing

- Planetary, spiral, and horizontal
- Mix and hydrate
- Full development of dough or the “window pane” test is required to determine optimal mixing.

Dough Dividing

- Divide the dough into equal portions, which ensures that each loaf or roll is the same size and shape.
- Can be done through a chunker or extrusion divider
- Makes the dough easier to bake and guarantees consistency in the final product.

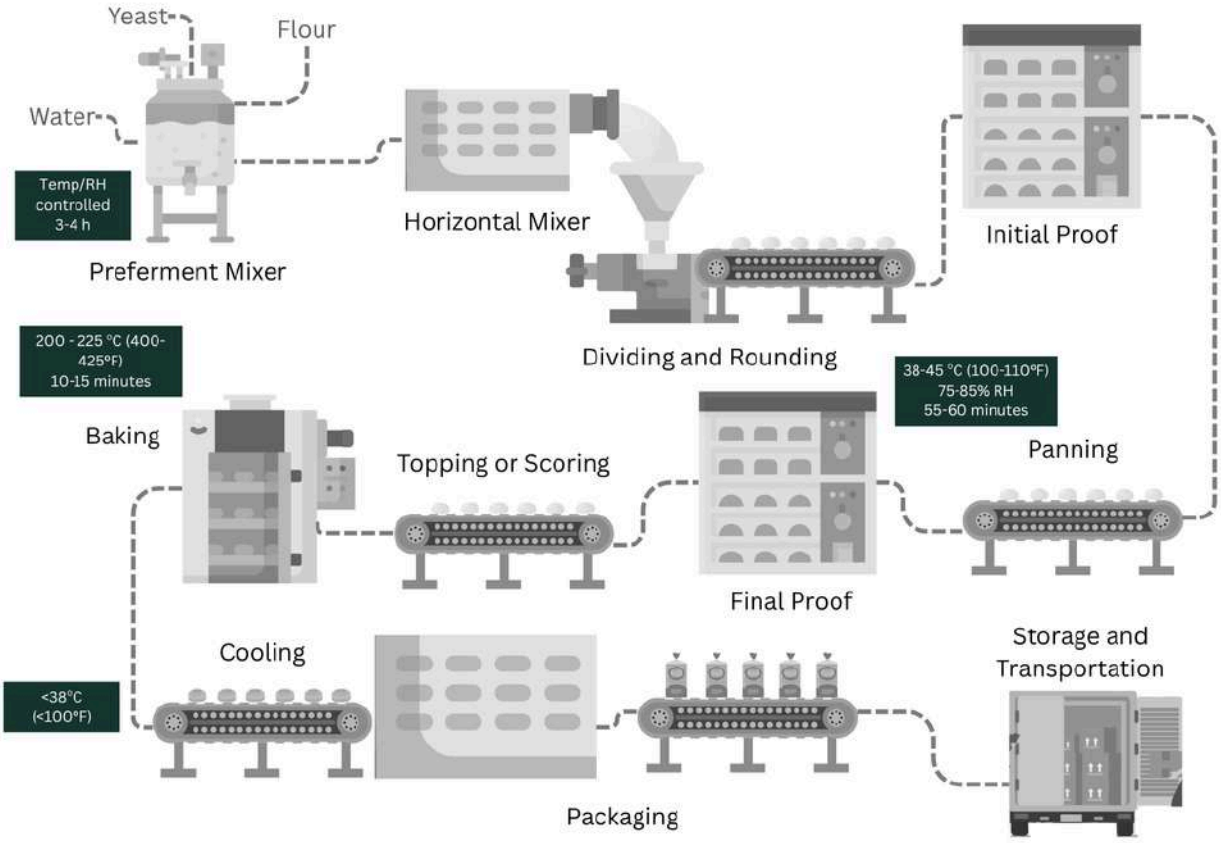


Figure 1. Buns and Rolls Productions Process Diagram with Preferment

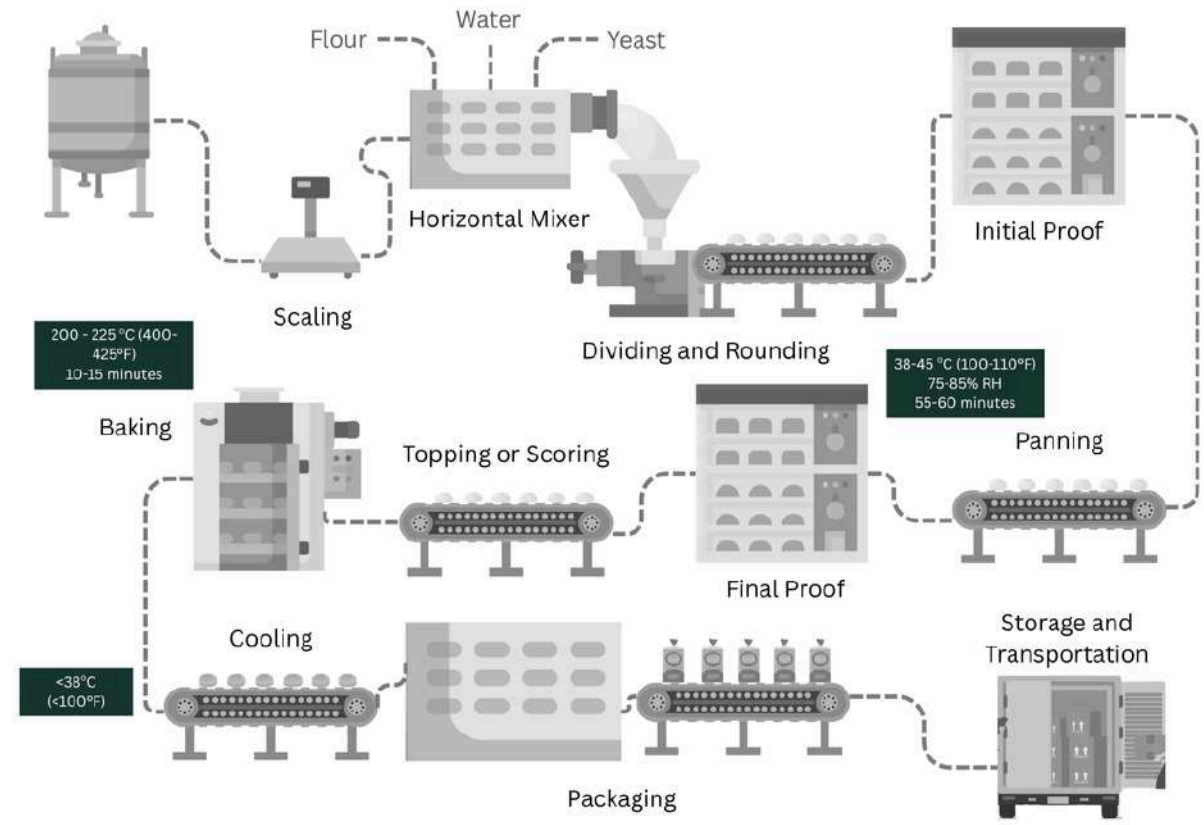
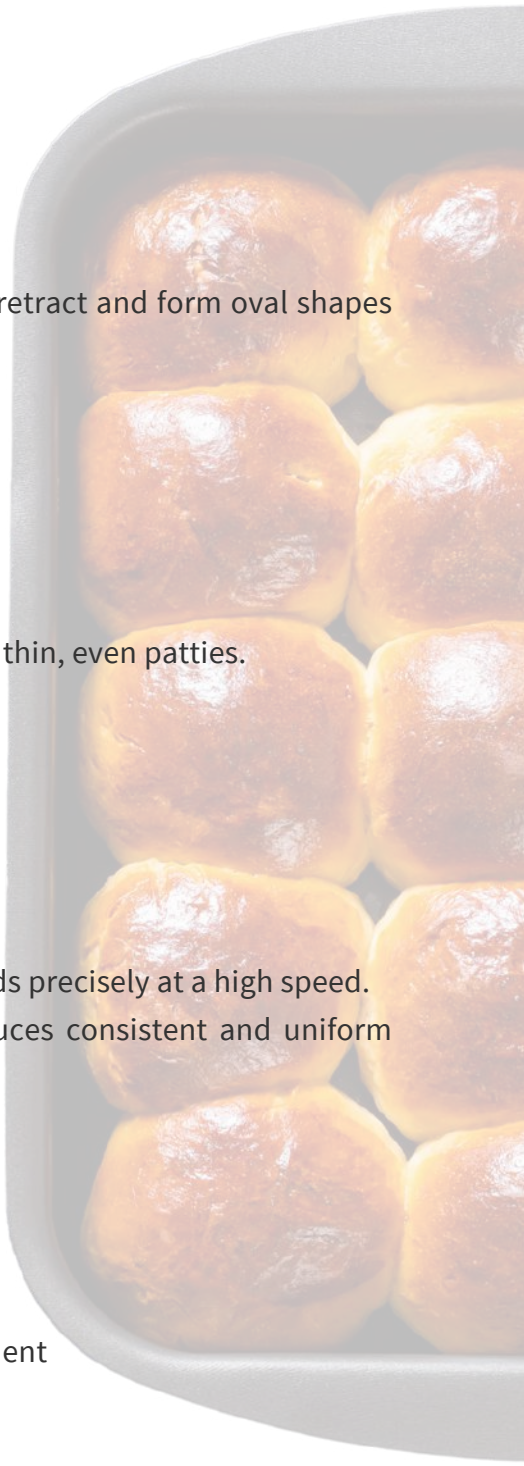


Figure 2. Buns and Rolls Productions Process Diagram with Direct Mixing

Rounding

- Shape the dough into smooth, uniform balls.
- Essential for creating uniform cell structure and consistent baking results, ensuring that each dough ball is the same size and shape.



Initial Proofing

- To let the dough balls rest before sheeting.
- Allows the dough ball to equilibrate and relax, so that they do not retract and form oval shapes after the sheeting process.
- Also known as proofing cabinets or proofing chambers.

Sheeting

- Some bakers may use sheeters to flatten and stretch the dough into thin, even patties.
- This step dictates the height and diameter of the product.

Panning

- Panning involves placing the shaped patty onto baking pans or molds precisely at a high speed.
- Pan shakers center the dough patties in the pans, and this produces consistent and uniform crowns on the buns.

Final Proof

- Allows dough to triple its size in a temperature–controlled environment
- Develops flavor and texture.
- The dough ferments for 55 – 60 min at 24 – 28 °C (75.2 – 82.4 °F)
- They are then proofed with moisture in the air (90 – 95% Relative Humidity) to prevent a skin from forming.

Topping or scoring

- Seeds or toppings can be dispensed on top of the buns following proofing. At this point in the process, eggwash, water, starch, or a protein–based solution can be sprayed on the buns to adhere seeds or produce a glossy sheen.
- Water scorers can also be placed on the line. Water scorers use high–intensity nozzles to shear through the top of the buns, creating designs on top of the dough.

Baking

- Bake at 204 – 218 °C (400 – 425 °F)
- 10 – 15 minutes for buns and 20–25 minutes for cluster dinner rolls.
- Proper baking is essential for the production of buns that have the desired final product characteristics.

Tip Box

You may be able to reduce your bake time or produce quality par–baked products by adding products such as Goldcrust®(an AMG) and or Xylanases.

Cooling

- Buns and rolls should be allowed to cool to an internal temperature of <37 °C (100 °F) to fully set so that slicing can happen.
- This prevents the crust from becoming soggy and helps to maintain the bread's overall quality.

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.

Measuring Buns and Rolls Quality

Buns and rolls quality parameters can be measured by instrumental methods 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 replicate 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 buns and rolls quality:

Parameter	Evaluation technique
pH	pH meters
Moisture content	**Direct methods:** evaporation (e.g., convection oven and microwave oven) **Indirect methods:** spectroscopy or thermogravimetry
Water activity	Resistive Electrolytic Hygrometers (REH) Capacitance Hygrometers Dew Point Hygrometers
Texture	Texture Analyzer
Loaf volume and cell structure	C-Cell analyzer or Sightline
Color	C-Cell analyzer or Sightline
Dimensions	Vision Analysis can detect the following: • 2D/Shape&Size – diameter, roundness, length, width (accuracy: 0.2mm) • 3D/Height – peak height, complete 3D profile, slope, surface texture (accuracy: 0.3mm) • Top & Bottom Color – bake color, topping color (Lab and BCU coordinates, accuracy: 0.2 ΔE) • Topping/Seeding – coverage, distribution, voids (accuracy: 0.5% of product surface) • Scoring/Split/Imprint conformity check

Table 5: Evaluation techniques of bread quality parameters

Tips to Solve Quality Issues

There are many steps during the buns and rolls production 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 solutions:

Problem	Cause	Solution
Overproofed	• Higher yeast content than necessary • Higher content of fermentable sugars than required • Warmer proofing environment • Long rising times	• Decrease yeast content • Decrease sugar content • Use cooler water or check the environmental temperature • Proof dough in cooler temperature environments
Underproofed	• Low yeast content • Low fermentable sugar content • Colder dough • Insufficient rising time	• Increase yeast contentIncrease sugar content • Use warmer water or check the environmental temperature • Proof dough in warmer temperature environments
Dense or heavy	• Insufficient rising time • Low gluten development • Higher flour content	• Increase the rising time • Knead the dough for longer • Use higher–protein flour or adjust dough hydration
Crumbly or dry	• Higher flour content • Not enough hydration • Overbaking	• Decrease the flour amount • Adjust dough hydration • Shorten baking time
Pale or underbaked	• Insufficient baking time or temperature	• Increase baking time and temperature
Burnt or overbaked	• Excessive baking time or temperature	• Shorten baking time • Lower baking temperature • Cover the bread with foil to prevent burning
Unevenly shaped	• Improper shaping or uneven dough distribution	• Ensure even shaping and consistent dough distribution in the baking pan

Table 6: Tips to solve quality issues

Problem	Cause	Solution
Poor crust formation	• Insufficient moisture during baking Too much steam • Not enough steam	• Adjust the moisture during baking • Adjust the 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 6 (cont): Tips to solve quality issues

TROUBLESHOOTING BUNS AND ROLLS

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

While DATEM and potassium bromate are usually the go–to dough conditioners for a fluffy hamburger bun, many bakers these days prefer to avoid them. Emulsifier replacement solutions consisting of lipases, such as Lipopan®50 and Lipopan® Fortis, can be used to help replace/reduce DATEM and potassium bromate. Don't forget, a good quality flour with a strong protein network to hold in the gas is also crucial to creating a bun with a high volume.

What are the causes of blisters, white spots, or wrinkling on hamburger buns?

Wrinkling of the bun's crust is usually a consequence of either insufficient baking (crumb–setting) or excessive volume (over–stretching), which causes the internal structure to collapse upon cooling after the product has compressed slightly in volume. If using a deck oven, open dampers at the beginning of baking to let water vapor escape. This way, the surface will dry and set faster, preventing wrinkling. Use a thermal profiler to make sure your yeast kill is less than 50% to prevent over–expansion. Targeting an arrival of over 20% will also help set the structure properly and prevent wrinkling. Blisters are caused by many factors, such as formulation and process. White spots are usually seen at the end of the dough or the tail end of the product. This indicates an over–fermented or over–oxidized dough. You can cut the dough size down, adjust your dough conditioners appropriately to your flour strength, or adjust water absorption to reduce overoxidation.

What is a good flour quality for hamburger buns?

Bread flour from either hard red winter or hard red spring wheat is perfect for buns. It has both a high quantity and quality of gluten–forming proteins, gliadin and glutenin. Lower protein quantity aged flours can also 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. A 50/50 blend of winter and spring wheat may be required to meet protein quality requirements, together with a protein level of 12% and an ash level of 0.5%.

The use of enzymes can improve flour quality by enhancing certain dough properties, increasing volume, softening crumb texture, and aiding in shelf–life extension. Both individual use and enzymatic blends can significantly improve the quality of buns, especially when working with lower–quality flour or fiber–enriched formulations.

Enzyme	Effective Dosage Range	Key Effects on Buns
α–Amylase (Fungamyl®)	6 – 10 mg/kg flour	Increases volume, softens crumb
Xylanase (Panzea®,Pentopan®Mono, and Celluclast®)	70 – 120 mg/kg flour	Improves volume, crumb structure
Cellulase	35 – 60 mg/kg flour	Softens crumb, increases volume
Protease	20 – 60 mg/kg flour	Improves gluten, prevents stickiness
Hemicellulase	40 mg/kg flour	Softens dough, increases volume

Table 7: Enzymes to improve buns and rolls flour

Enzyme blends are often more effective than single enzymes, providing synergistic improvements in softness, volume, and crumb structure.

REFERENCES

1. Hui, Yiu H., et al., eds. Bakery products: science and technology. John Wiley & Sons, 2008.
2. "Bakery Products Market Size, Share & Trends: Analysis [2032]." Bakery Products Market Size, Share & Trends | Analysis [2032],. Accessed 09 May 2025.
3. Kuhn, Liz Parker. "State of the Industry 2024: Buns and Rolls Capture Consumer Interest." Snack Food Wholesale Bakery RSS, Snack Food & Wholesale Bakery, 4 June 2024,. Accessed 09 May 2025.
4. Vijayendra, S., & Sreedhar, R. (2023). Production of buns, the bakery–based snack food, with reduced refined wheat flour content: Recent developments. Journal of Food Science and Technology, 60, 2907 – 2915. https://doi.org/10.1007/s13197–023–05696–1.
5. Novonesis. A closer look at lipases and flour quality.
6. BAKERpedia. Bread Pocket Guide., 2025.
7. Novonesis. "Novamyl® BestBite – Discover a Perfectly Balanced Bite." Novonesis,. Accessed 09 May 2025.
8. Baking Company, King Arthur. The King Arthur Baking Company Big Book of Bread: 125+ Recipes for Every Baker (A Cookbook). United States, S&S/Simon Element, 2024.
9. Cuni–Mertz, Lucas. "Instore Bakery Buns, Rolls in Demand." Supermarket Perimeter, 5 June 2024,. Accessed 15 May 2025.
10. Liu, P., , L., Duan, W., Gao, W., Fang, Y., Guo, L., Yuan, C., Wu, Z., & Cui, B. (2023). Maltogenic amylase: Its structure, molecular modification, and effects on starch and starch–based products.. Carbohydrate polymers, 319, 121183 . https://doi.org/10.1016/j.carbpol.2023.121183.
11. Liu, W., Brennan, M., Brennan, C., You, L., & Wu, L. (2023). Individual and combined effects of α–amylase, xylanase, and cellulase on the breadmaking and nutritional properties of steamed bun enriched in wheat bran.. Journal of food science. https://doi.org/10.1111/1750–3841.16665.
12. Zhygunov, D., Chumachenko, Y., Kovalov, M., & Kovalova, V. (2023). WHEAT FLOUR QUALITY CORRECTION BY USING ENZYME PREPARATIONS. Grain Products and Mixed Fodder's. https://doi.org/10.15673/gpmf.v23i4.2811.
13. Tian, B., Zhou, C., Li, D., Pei, J., Guo, A., Liu, S., & Li, H. (2021). Monitoring the Effects of Hemicellulase on the Different Proofing Stages of Wheat Aleurone–Rich Bread Dough and Bread Quality. Foods, 10. https://doi.org/10.3390/foods10102427.
14. Edwards, William P. The science of bakery products. Royal Society of chemistry, 2007.
15. "North America Bakery Product Market Size, Forecast –2032." Spherical Insights, Accessed 31 May 2025.

Formulas

HOT DOG BUNS

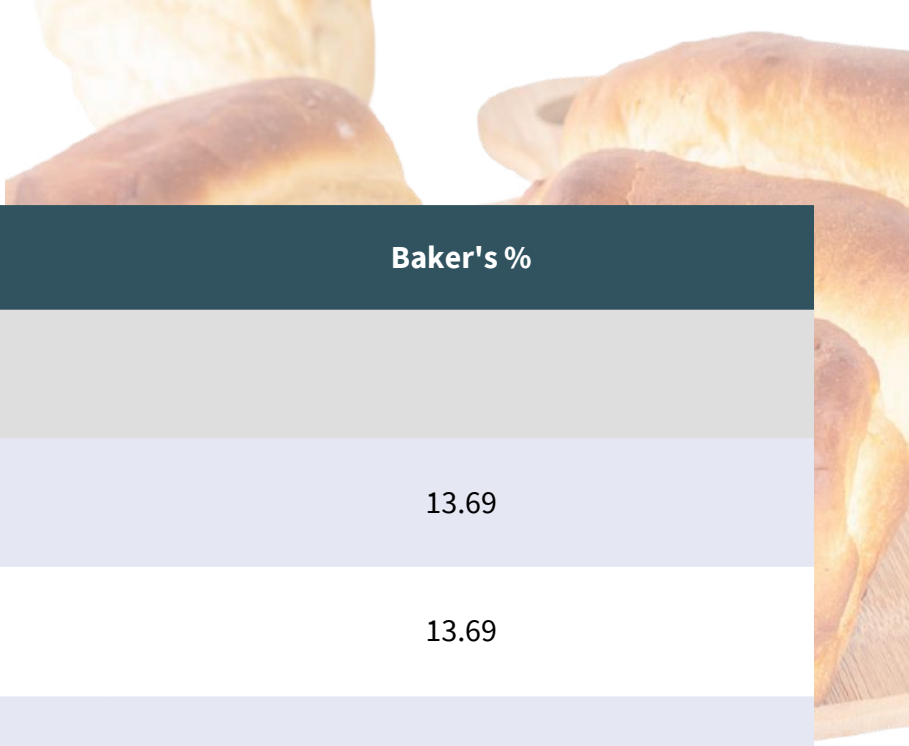
Ingredients	Baker's %
Flour	100
Milk	63.1
Water	15.7
Vegetable oil	3.8
Sugar	3.5
Instant yeast	1.9
Salt	1.7
Sesame Seeds	For topping

Table 8: Hot Dog Bun Formulation

BRIOCHE BURGER BUNS

Ingredients	Baker's %
Water Brew	
Water	6.25
Cream yeast	3.13
Sugar	0.63
Dough	
Bread Flour	100
Butter	40
Eggs	38
Water Brew	10
Sugar	8
Milk	5
Salt	2
Vanilla	0.1
Dough conditioners	0.5
Calcium propionate	0.3
Shelf life extension enzymes	0.1

Table 9: Brioche Burger Bun Formulation



JAPANESE MILK BREAD ROLLS

Ingredients	Baker's %
Tangzhong	
Water	13.69
Milk	13.69
Bread Flour	4.46
Dough	
Flour	95.54
Milk	35.99
Unsalted Butter	18.15
Sugar	15.92
Eggs	15.92
Non–fat dry milk	4.46
Instant yeast	2.87
Salt	1.91

Table 10: Japanese Milk Bread Rolls Formulation

POTATO ROLLS

Ingredients	Baker's %
Flour	100
Milk	47.5
Water	31.7
Potato flakes	30.2
Fresh eggs	13.0
Unsalted butter	11.0
Sugar	8.0
Salt	2.4
Instant yeast	1.3

Table 11: Brioche Burger Bun Formulation

HAWAIIAN DINNER ROLLS

Ingredients	Baker's %
Sponge	
Flour	8.3
Water	7.8
Instant yeast	2.6
Dough	
Flour	91.7
Pineapple juice	31.4
Fresh eggs	25.7
Granulated sugar	18
Unsalted butter	15.8
Salt	2.2
Vanilla	1.2

Table 12: Hawaiian Dinner Rolls Formulation

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