



Bioluence®

Bioluence Products in Bakery and Pastry Industry



**Bakery & Pastry
Industry**



**Engineering Nature for a
Brighter Future**



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& Pastry
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Engineering Nature for a Brighter Future

Bonda Faravar Company, operating under the brand name Bioluence, stands as the sole enzyme manufacturer in Iran and the largest production facility of its kind in the Middle East. Additionally, Bioluence is the leading probiotics manufacturer in the region, boasting an expansive production area of 8,000 square meters. This space is divided into two dedicated units for enzyme and probiotics production, complemented by 1,700 square meters of state-of-the-art clean rooms located in Safadasht Industrial Town.

Supported by a dedicated research and development team, strategic collaborations with experienced domestic and international consultants, and a workforce of over 300 highly skilled professionals across various disciplines, Bioluence has successfully delivered high-quality enzyme and probiotics products to meet the diverse needs of multiple industries; including but not limited to: detergents, food and dairy, meat processing, flour and bakery, feed for livestock and poultry, alcohol and starch production, as well as leather and textiles.



Enzymes in the Flour, Bakery, and Pastry Industry

The quality of flour, as the main raw material in bread production, is of great importance to bakery products' manufacturers. Due to climate changes, weather conditions, and variations in wheat quality, the produced flour differs throughout the year and across regions. This condition negatively impacts production performance and the quality of bakery products.

In the past, various additives were used in this industry to improve flour quality. Recently, enzymes have emerged as a natural alternative to chemical additives and are widely used in the flour, bakery, pastry, and chocolate industries, with positive effects on production processes and quality parameters of final products.

Enzymes offer flexible and more efficient solutions for bakery products' manufacturers, and their use in the flour, bakery, pastry, and chocolate industries is rapidly increasing. Enzyme solutions, in addition to improving the production process, can serve as a sustainable and cost-effective approach, enhancing the quality of bakery products.



Enzyme Solutions for Enhancing Production Process and Improving the Quality of Bakery Products



Modification and Improvement of Flour Quality

A consistent challenge in flour mills is maintaining steady flour quality despite variations in wheat quality. If the natural Amylase activity in flour is low, it can be improved by adding the enzyme Alpha-amylase, which produces fermentable sugars for yeast. Yeast consumes these sugars, providing enough Carbon dioxide to help the dough rise. The metabolic activity of yeast on sugars created by Alpha-amylase during the Maillard reaction produces desirable color and aroma in bread.



Increasing Bread Shelf Life

Maintaining freshness is the main concern for consumers when it comes to bread. Bread staling is caused by changes in the starch structure of the flour, which begin immediately after baking. Starch naturally starts to recrystallize right after baking, causing bread to dry out and stale. Enzymes, as natural catalysts, can delay this recrystallization process. Using Maltogenic Alpha-amylase can alter the starch structure to increase bread shelf life.

Improving Dough Handling

Xylanase or Hemicellulase enzymes play an important role in the baking process. These enzymes enhance certain dough properties, such as machinability and gas retention, leading to optimized production time, increased volume, and a better texture in the final product.



Strengthening Gluten Network

In bread production, a strong Gluten network is necessary to withstand the pressure and stretching during dough kneading, to retain the gas formed during fermentation, and to give the loaf good volume. The enzymes Glucose oxidase and Lipase help strengthen the Gluten network's strength and potential. These enzymes improve dough stability, making it easier to work with and resulting in a loaf with better volume and appearance.

Key benefits of enzymes for improving Gluten network structure include:

- Increased dough stability
- Reduced need for ascorbic acid
- Replacement of potassium bromate and other chemical oxidizers
- Reduced need to add gluten to the flour



Better Quality for Biscuits, Crackers, and Wafers

Weak flours with low protein content have low elasticity and water absorption, making them suitable for producing biscuits and crackers, as they easily take shape and allow for desired designs.

By using a suitable combination of Protease and Xylanase enzymes, these characteristics can be achieved, even eliminating sodium metabisulfite, a chemical often used to weaken the Gluten network. Sodium metabisulfite is associated with cancer risks in many scientific studies.

Key benefits of using enzymes in biscuit, cracker, and wafer production:

- Improved flavor, color, and texture of products
- Reduced breakage in final products
- Enhanced machinability and suitability for different flour types



Improved Quality for Noodles, Pasta, and Macaroni

By using enzymes, manufacturer can overcome the natural variations in the quality of raw materials used in pasta and noodle production to achieve consistent, desirable quality. A chewy texture is key to consumer enjoyment of foods like pasta and noodles. Traditionally, pasta is made from high-quality Durum wheat, which yields firm and non-sticky products. Formulations with lower-quality wheat flour can result in a softer texture and reduced cooking tolerance. With enzyme solutions, manufacturers can address these challenges.

Benefits of using enzymes in noodle, pasta, and macaroni production:

- No need to add gluten during production
- Prevention of cracking in the final product
- Prevention of dark specks
- Suitable firmness and a uniform, clear appearance in dried pasta and noodles
- Reduced stickiness in cooked noodles and pasta
- Whiter and more color-stable products



Better Quality of Cakes

Enzymes increase the softness and elasticity of cakes and are suitable for producing industrial muffins, sponge cakes, and pound cakes. Enzymes help maintain the quality of these products. A proper combination of enzymes creates a synergistic effect, increasing softness, volume, and moisture while delaying staleness.



Production Issues in the Flour and Bakery Industry and Enzymatic Solutions

Defects and Shortcomings of Bread and Flour Products	Possible Causes	Enzymatic Solution
Dough Resistance and Lack of Volume Increase in Final Bread Stage	<ul style="list-style-type: none"> • Strong flour • Insufficient fermentation time • Low Amylase activity in the flour 	Use of Amylase and Xylanase enzymes
Side Cracking of Bread	<ul style="list-style-type: none"> • Stiff dough • Insufficient fermentation 	Use of Amylase and Xylanase enzymes
Unsatisfactory Bread Volume	<ul style="list-style-type: none"> • Insufficient fermentation • Weak gluten network • Low gas retention in dough 	Use of Amylase, Lipase, and Glucose oxidase enzymes
Pale and Dull Bread Crust	<ul style="list-style-type: none"> • Low Amylase activity in the flour • Lack of reducing sugars for Maillard reaction 	Use of Amylase enzyme
Overly Dark Bread Crust Color	<ul style="list-style-type: none"> • High diastatic activity in the flour • Use of sprouted wheat flour • Prolonged fermentation 	Use of Lipase and Glucose oxidase enzymes
Unsatisfactory Bread Shape	<ul style="list-style-type: none"> • Poor dough extensibility • Improper shaping 	Use of Lipase and Xylanase enzymes
Collapsing Sides in Toast Bread	<ul style="list-style-type: none"> • High diastatic activity in the flour • Use of sprouted wheat flour • Weak gluten network • Prolonged fermentation 	Use of Lipase and Glucose oxidase enzymes
Dark Interior of Bread (Uneven Interior Color)	<ul style="list-style-type: none"> • Over-fermentation, souring of dough 	Use of Lipase and Glucose oxidase enzymes
Irregular and Uneven Bread Texture	<ul style="list-style-type: none"> • Poor dough extensibility • Inadequate dough mixing (insufficient dough kneading, excessive dough mixing time) • Improper dough shaping 	Use of Xylanase, Lipase, and Glucose oxidase enzymes
Dry and Brittle Bread Interior and Staleness	<ul style="list-style-type: none"> • Weak gluten network • Low water absorption in the flour (insufficient moisture in bread) 	Use of Lipase and Maltogenic amylase enzymes
Weak Taste and Flavor	<ul style="list-style-type: none"> • Low amylase activity in the flour • Insufficient fermentation • Lack of reducing sugars for Maillard reaction 	Use of Amylase enzyme
Poor Shape of Biscuits and Crackers	<ul style="list-style-type: none"> • Strong gluten network 	Use of Protease enzyme
Stickiness of Cooked Pasta and Noodles	<ul style="list-style-type: none"> • Not using Semolina flour • Low gluten content in the flour 	Use of Lipase enzyme
Cracking and Brittleness of Dried Pasta and Noodles	<ul style="list-style-type: none"> • Not using Semolina flour • Low gluten content in the flour 	Use of Lipase enzyme

Production Issues in the Flour and Bakery Industry and Enzymatic Solutions

Product Name	Application	Benefits	Dosage
Lipase	<ul style="list-style-type: none"> • Flour improvement • Various types of bread • Tortilla • Pizza 	<ul style="list-style-type: none"> • Enhances dough stability • Improves bread softness • Improves bread texture and color • Increases bread volume • Extends bread shelf life 	10 – 60 ppm
Maltogenic Alpha-Amylase	<ul style="list-style-type: none"> • Various types of bread • Pizza • Croissant • Tortilla 	<ul style="list-style-type: none"> • Extends bread shelf life • Increases moisture and softness in bread • Improves crust color 	5 – 40 ppm
Xylanase	<ul style="list-style-type: none"> • Flour improvement • Various types of bread • Biscuit • Cracker • Tortilla • Pizza 	<ul style="list-style-type: none"> • Increases bread volume • Improves bread texture structure • Increases water absorption • Enhances dough flexibility 	5 – 15 ppm
Protease	<ul style="list-style-type: none"> • Flour improvement • Cracker • Wafer • Biscuit 	<ul style="list-style-type: none"> • Reduces dough mixing time • Increases dough softness • Reduces dough viscosity • Reduces dough shrinkage • Improves dough moldability 	10 – 500 ppm
Glucose Oxidase	<ul style="list-style-type: none"> • Flour improvement • Various types of bread • Tortilla • Pizza 	<ul style="list-style-type: none"> • Enhances dough stability • Increases dough water absorption • Increases bread volume • Improves dough machinability • Reduces dough stickiness 	5 – 50 ppm
Fungal Alpha-Amylase	<ul style="list-style-type: none"> • Flour improvement • Various types of bread • Biscuit • Tortilla • Cracker • Pizza 	<ul style="list-style-type: none"> • Reduces fermentation time • Improves dough extensibility • Increases bread volume • Improves crust color • Enhances bread texture • Extends bread shelf life • Standardizes flour diastatic activity 	5 – 30 ppm
Glucoamylase	<ul style="list-style-type: none"> • Various types of bread • Frozen dough 	<ul style="list-style-type: none"> • Increases fermentation power • Improves Maillard reaction • Enhances crust color • Improves bread flavor • Increases bread softness 	5 – 30 ppm
Protease and Xylanase Mix	<ul style="list-style-type: none"> • Biscuit • Wafer • Cracker 	<ul style="list-style-type: none"> • Eliminates unauthorized additives • Reduces stickiness • Improves dough machinability and moldability • Enhances product texture 	50 – 300 ppm
Maltogenic Alpha-Amylase and Lipase Mix	<ul style="list-style-type: none"> • Industrial muffin • Sponge cake • Pound cake 	<ul style="list-style-type: none"> • Increases cake softness and improves texture • Increases volume and improves surface shape • Extends shelf life • Reduces oil usage in cake formulation • Reduces egg usage in cake formulation 	10 – 50 ppm



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