Pakmaya®

Issue 02 | 2026

Milling magazine

When Wheat Origin Changes

Inside Angola's Milling Industry



AFRICA'S WHEAT MAP IS SHIFTING

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editor's note

Consistency in a Changing Milling Environment

Wheat sourcing is becoming more diverse, making consistent flour performance an increasingly important challenge for millers.

Changes in wheat origin can affect gluten quality, water absorption, enzymatic activity, dough behavior and baking performance. Even when laboratory values remain within target, processing results may change. In this issue of Pakmaya Milling, we examine this challenge from different angles.

Our Milling Market Snapshot and global wheat trade feature look at changing sourcing patterns and Türkiye's role in the market. From Angola, Ali Akbar Bhatti of Happy Life Industry Lda shares his experience with wheat variability, flour consistency and bakery expectations.

From the FAGEM Lab focuses on interpreting key laboratory and rheological parameters together, while our technical articles cover baguette quality, sugar and enzyme performance, rope spoilage and Mandazi.
The Burkina Faso field case further shows how changing wheat supply may require renewed analysis, field observation and formulation adjustment.

Across these stories, one theme remains constant: raw materials may change, but expectations for consistent performance do not.

For millers, the goal is not simply to standardize individual numbers, but to understand how they translate into real processing and baking performance.

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GLOBAL WHEAT FLOUR AND PASTA TRADE: TÜRKIYE'S STRATEGIC ROLE IN A CHANGING MARKET

The global wheat flour and pasta industries are being reshaped by geopolitical tensions, climate-related disruptions, inflationary pressures and changing supply chains. Against this backdrop, Türkiye has strengthened its position as a major player in international wheat flour and pasta trade, supported by its processing capacity, geographic location and access to diversified export markets.

Wheat-based products remain among the most strategically important components of the global food trade. Consumed across almost every region of the world, wheat flour and pasta play an important role in food security, agricultural economies and international commerce.

In recent years, however, the market environment has changed considerably. Geopolitical conflicts, climate-related disruptions, inflation, supply-chain constraints and evolving consumer expectations have all influenced the way wheat and value-added wheat products move around the world.

Within this changing environment, Türkiye has established a strong position in both wheat flour and pasta exports, supported by its geographic location, industrial processing capacity and extensive international trade networks.

A Global Market Shaped by Volatility

The global wheat market has experienced significant volatility since 2020.





The COVID-19 pandemic disrupted transportation networks and altered consumption patterns, while subsequent geopolitical tensions—particularly the Russia–Ukraine conflict—created additional uncertainty around grain availability and pricing.

Russia and Ukraine have traditionally represented a significant share of global wheat exports. Disruptions originating from the Black Sea region therefore contributed to greater price volatility and heightened food-security concerns, particularly in import-dependent markets across Africa, the Middle East and Asia.

As a result, governments and private-sector companies have placed greater emphasis on diversifying sourcing strategies and strengthening supply-chain resilience.

Despite these challenges, demand for wheat flour and pasta has remained relatively robust. Population growth, urbanization and rising incomes in developing economies continue to support long-term consumption.

Wheat flour remains a fundamental ingredient for bread, bakery products, noodles and other processed foods. Pasta consumption, meanwhile, has expanded beyond its traditional markets in Europe and North America as changing lifestyles increase demand for affordable and convenient food products in emerging economies.

Flour Trade Creates Added Value

International wheat flour trade differs significantly from the trade in raw wheat.

Flour production creates additional value through milling expertise, quality control, product customization, packaging and logistics. As a result, countries with advanced milling industries can establish strong positions in international markets even when they are not among the world's largest wheat producers.

This has enabled Türkiye to establish itself as the world's leading wheat flour exporter for more than a decade.

Its sophisticated milling industry, modern production facilities and access to wheat from multiple origins allow Turkish millers to supply markets across Africa, the Middle East, Southeast Asia and Latin America.

Another important factor is Türkiye's geographical position.

Located at the intersection of Europe, Asia and the Middle East, the country connects major wheat-producing regions with many import-dependent markets. Access to the Black Sea and Mediterranean, combined with extensive port infrastructure, supports international transportation and distribution.

Turkish millers have also developed considerable experience in adapting flour specifications to the requirements of different markets and applications. This flexibility has become an important competitive advantage in serving diverse customer needs.

Türkiye's Growing Role in Global Pasta Trade

Pasta represents another important part of Türkiye's position in global agricultural trade.

Worldwide pasta production has expanded steadily over the past decade as consumers increasingly seek affordable, nutritious and convenient food products.

Although Italy has traditionally dominated the international pasta industry, competition has intensified as other producing countries have expanded manufacturing capacity and improved product quality.

Türkiye has emerged as one of the world's leading pasta exporters, supported by durum wheat availability, modern manufacturing technologies and competitive production costs.

One of the strengths of the Turkish pasta industry is its integrated value chain. The close relationship between agricultural production, milling, semolina manufacturing and pasta processing creates efficiencies across the production process.

This integration supports both cost competitiveness and product consistency. At the same time, manufacturers have invested in automation, packaging technologies and export-oriented production systems to meet the requirements of international markets.

Diversification as a Competitive Advantage

Market diversification has played an important role in Türkiye's export strategy.

Rather than relying on a limited number of destinations, Turkish flour and pasta exporters have developed commercial relationships across multiple regions. Africa represents a particularly important market because of population growth, urbanization and increasing demand for affordable staple foods.

The Middle East also remains a significant destination due to geographic proximity and established trade relationships.

At the same time, opportunities in Asia and Latin America can support further export expansion while helping exporters reduce dependence on individual markets.

Diversification is becoming increasingly important in an environment where geopolitical developments, logistics disruptions and changing trade policies can rapidly influence individual markets.

Challenges to Future Competitiveness

Maintaining a strong position in global flour and pasta trade will also require the industry to respond to a number of challenges.

Climate change creates risks for agricultural production through drought, water scarcity and extreme weather events, potentially affecting wheat yields, quality and production costs.

Competition is also increasing as more countries invest in milling and food-processing capacity and seek a greater share of value-added agricultural trade.

Currency fluctuations, energy costs, transportation expenses and changing trade regulations can further influence international competitiveness.

For exporters, the challenge is therefore not only to produce efficiently but also to remain flexible in sourcing, production and market development.

Sustainability and Digitalization

Sustainability is becoming increasingly important across the wheat flour and pasta industries.

Consumers, retailers and policymakers are placing greater emphasis on environmental performance, resource efficiency and supply-chain transparency. In response, companies are investing in energy-efficient technologies, sustainable sourcing practices and more environmentally responsible packaging solutions.

Digitalization is also transforming agricultural trade and food production.

Automation, advanced data analytics, traceability technologies and digital trading platforms are changing the way products are produced, monitored and distributed. The adoption of Industry 4.0 technologies can support greater efficiency, reduce waste and improve responsiveness to changing market conditions.

Türkiye's relatively modern processing infrastructure provides a strong foundation for further technological development across both milling and pasta production.

Looking Ahead

Several structural factors are expected to influence the future of global wheat flour and pasta trade.

Population growth will continue to support demand, particularly in developing regions. Food-security concerns are likely to encourage governments and businesses to diversify supply sources and strengthen strategic reserves.

At the same time, consumer expectations will continue to evolve around convenience, nutritional value and sustainability.

These developments create both challenges and opportunities for countries capable of supplying reliable, high-quality and competitively priced wheat-based products.

Türkiye enters this period with important advantages: an advanced milling industry, a strong pasta sector, strategic geographic access to major markets, diversified export relationships and modern processing capabilities.

Maintaining this position will depend on continued investment in **innovation, sustainability, technological development and market diversification** as global wheat flour and pasta trade becomes increasingly competitive.



Interviewee | Ali Akbar Bhatti

Quality & Lab Manager, Happy Life Industry Lda | Angola



Balancing cost, flour quality and efficiency is the key challenge.

How would you describe Angola's milling industry today, and what are the main changes you have observed in the market over the past few years?

Angola's milling industry is growing and developing steadily. Over the past few years, we have seen a stronger focus on consistent flour quality and production efficiency.

Mills are also paying more attention to the use of individual enzymes to manage cost pressures, improve flour performance and achieve more consistent results in final products.

In the past, many bakeries added enzymes themselves to improve bread quality and processing performance. Over the last three years, however, we have seen a shift in the market: more mills are adding the appropriate enzymes to the flour and supplying treated flour directly to bakeries. As a result, the need for bakeries to add enzymes themselves has decreased significantly.

What are the biggest competitive pressures facing flour millers in Angola today: raw material costs, wheat availability, energy, logistics, price competition, or changing customer expectations?

Currently, I would identify raw-material costs and price competition as the two biggest pressures. Wheat has a major impact on the overall cost of flour production. From a quality-control perspective, we need to manage wheat costs carefully while still maintaining the required flour quality and performance.

The second major challenge is price competition. Customers are highly price-sensitive, so mills need to remain competitive without compromising consistency.

From my experience, the key challenge is finding the right balance between cost, flour quality and production efficiency. We cannot reduce price at the expense of quality, so we need to continuously improve our processes and identify more efficient solutions.

Looking five years ahead, what do you believe will define the next stage of development for Angola's milling industry?

Looking five years ahead, I believe Angola's milling industry will focus on increasing production and adopting more modern technologies.

From what we observe in the market, especially among younger consumers, wheat-based ready-to-eat products such as bread and biscuits are becoming more important alongside traditional

maize-based foods.
I also expect greater use of modern processing technologies and enzyme solutions to help mills maintain more consistent flour quality.

As Angola depends significantly on imported wheat, what are the biggest challenges you encounter in maintaining consistent wheat quality from shipment to shipment?

One of the biggest challenges is that wheat quality can vary from one shipment to another. Even when the wheat meets the required specifications, we can see differences in protein content, moisture, test weight, gluten quality and Falling Number.
For example, one shipment may have around 12% protein and 28% wet gluten, while another may have around 11% protein and 25% wet gluten. To manage these differences, we rely on wheat blending and, where necessary, adjustments to the enzyme system. In our experience, Unaprim also helps us manage this type of variability.

How much variation do you see between different wheat origins, and how challenging is it for a mill to deliver the same flour specification despite that variability?

Over the last four years, we have received wheat batches from a number of different origins, as well as limited quantities from local production. These wheats have shown differences in parameters such as protein, moisture and Falling Number.
Maintaining a consistent flour specification despite this variability requires a combination of enzyme use, adjustments to milling procedures and close control of process flow. These tools help us deliver more consistent flour quality to the market.

How are wheat sourcing patterns changing in Angola, and what key differences do you see between Russian and Argentine wheat in milling and final flour performance?

We have traditionally used wheat from Poland, while Russian and Argentine origins are also present in the market. From the samples I have collected and the market experience I have observed, Argentine wheat has generally been positioned at a lower price point than Russian wheat, while its functional quality can differ depending on the shipment and blend.
In some mills using Argentine wheat, I have observed higher use of additives, oxidizing agents and enzymes to maintain consistent flour performance.

When evaluating wheat origins, how do you balance purchase price against flour yield and actual baking performance? Is the lowest-cost wheat always the most economical choice for a mill?

I would never evaluate wheat on purchase price alone. We need to consider its total economic value, including flour extraction, flour quality, processing performance, dockage percentage and consistency in the final product.
In my experience, the lowest-cost wheat is not always the most economical option. Lower extraction, weaker quality, higher dockage and greater enzyme requirements can increase the real production cost. A lower purchase price can therefore become more expensive when the full process is taken into account.



How would you describe the expectations of Angola's bakery sector today? What are bakers asking for most from their flour suppliers?

Today, Angolan bakers are looking for flour that is consistent, reliable and predictable from batch to batch.

They expect good dough handling, consistent water absorption, fermentation tolerance, and good volume and texture in the final product. At the same time, cost remains very important, so bakeries expect flour to deliver the required performance efficiently in production.

For you, what does "consistent flour quality" actually mean in measurable terms? Which indicators tell you that a flour is performing exactly as intended?

For me, consistent flour quality means meeting the required laboratory specifications and, more importantly, delivering consistent performance in the customer's process and in baking.

For example, one batch should not have 50% water absorption and the next 55%. Variations of that scale create difficulties for bakers because they have to keep adjusting their process. Consistency means that the flour behaves predictably from batch to batch.

What were the main technical needs or challenges that led your mill to work with Pakmaya in milling solutions?

One important factor has been cost control. For example, when working with higher-protein wheat, we have been able in some cases to reduce the dosage from 30 g to 25 g per 100 kg of flour while achieving the same result in the final product.

Because wheat quality can change from shipment to shipment, we need solutions that help us maintain the required flour performance and meet bakery customers' expectations. We have also found the product quality to be consistent over the past three years of use.

Another important part of the cooperation has been technical training and support. I personally visited FAGEM and learned a great deal about flour-quality control, and we also receive virtual technical support when difficulties arise.

Can you share a specific example where a Pakmaya solution helped you address a flour-quality or baking-performance challenge?

Yes. In April, we identified a pest-related issue affecting approximately 5,000 tonnes of wheat in one of our silos, and some quality parameters, including protein quality, had been affected.

We adjusted the use of Unaprim to respond to the change in flour performance and were able to achieve the desired results in the final product. We did not receive any market complaints related to the resulting flour performance.



Beyond the products themselves, what value do Pakmaya's field and R&D teams bring to your mill's operations? Can you share a specific example of their technical support in practice?

The technical support has been valuable in both training and problem-solving.

At FAGEM, I learned how damaged starch analysis can be used as part of flour-quality evaluation. On another occasion, when we received wheat with a weak gluten index, I contacted Gürsel Uzunoğlu and received direct technical guidance on how to approach the issue.

Having access to this type of technical support is useful when raw-material quality changes and we need to understand the problem quickly.

MILLING MARKET SNAPSHOT

Africa's Wheat Map Is Shifting

Improving harvests in North Africa, sustained import dependence south of the Sahara and disruption to Black Sea trade are reshaping wheat sourcing decisions. For African millers, origin flexibility is becoming increasingly important.

September 2026 finds the global wheat market in an unusual position. Supply prospects have improved, but logistics and execution risks continue to pressure trade.

The September AMIS Market Monitor points to stronger global wheat production prospects while highlighting reduced export flows from Russia and Ukraine and disruptions to Black Sea shipments. The International Grains Council reported a 6% monthly rise in its wheat sub-index in mid-September.

One Continent, Two Import Trends

Africa's wheat outlook increasingly differs by region.

In North Africa, stronger domestic harvests are reducing import requirements. FAO estimates Morocco's 2026/27 wheat import requirement at 5 million tonnes, around 15% below its five-year average, while Tunisia is forecast at approximately 1.8 million tonnes, about 8% below average.

South of the Sahara, structural dependence on imported wheat remains high. WTO analysis shows that domestic production covers less than half of wheat consumption in every African subregion, with the ratio close to zero in Middle Africa.

Black Sea Disruption Changes the Sourcing Equation

Russia's seaborne grain exports fell 61.9% year on year in August, while shipments through the Azov and Black Sea ports declined by 73.1%.

The disruption is increasing attention on alternative wheat origins, including European, Argentine, Australian and North American supplies.

For millers, sourcing decisions increasingly involve more than FOB price. Freight availability, delivery reliability, wheat specifications and the ability to adapt blends when origins change are becoming part of the same procurement equation.

Africa Gains Weight for Türkiye's Processed Wheat Exports

Although Türkiye's overall wheat flour exports declined during the first seven months of 2026, shipments to several African markets increased strongly.

Exports to Ghana rose 46.9%, to Somalia 23.8% and to Eritrea 86.6% year on year.

Türkiye also exported 675,274 tonnes of bread-wheat pasta in January–July 2026, up 19.1%.

Somalia, Ghana, Niger, Burkina Faso and Togo were the five largest destinations, together accounting for approximately 59% of exports in this category.

For African millers, greater sourcing diversity also creates a technical challenge: maintaining consistent flour performance when wheat origins change requires closer attention to blending, analysis and process adjustment.

Market at a Glance

Indicator	Latest Figure	Market Signal
IGC Wheat Sub-Index	+6% over one month	Firmer wheat prices amid Black Sea logistics pressure
Russia – Seaborne Grain Exports	2.0 million tonnes, Aug. 2026	-61.9% YoY
Morocco – Wheat Import Requirement	5.0 million tonnes, 2026/27	Around 15% below five-year average
Tunisia – Wheat Import Requirement	1.8 million tonnes, 2026/27	Around 8% below five-year average
Türkiye – Wheat Flour Exports	1.19 million tonnes, Jan–Jul 2026	-9.5% YoY
Türkiye – Bread-Wheat Pasta Exports	675,274 tonnes, Jan–Jul 2026	+19.1% YoY

Sources: *AMIS Market Monitor No. 141, September 2026; International Grains Council GMR 580, 17 September 2026; FAO-GIEWS; WTO Data Lab; TÜİK/TUSAF; Türkiye Makarna Sanayicileri Derneği, August 2026 Sector Report. Forecast figures are subject to revision.*



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PRODUCING PREMIUM-QUALITY BAGUETTES: FROM FLOUR STRENGTH TO DOUGH STABILITY

Producing a premium-quality baguette requires much more than selecting the right flour. Flour strength, hydration, fermentation, dough temperature, scoring, steam and baking conditions must work together to deliver the desired volume, open crumb structure, crisp crust and dough stability. In warm climates, particularly across Africa, controlling these variables becomes even more critical.



The baguette is one of the world's most iconic fermented bakery products and remains a benchmark for artisan bread quality. A premium baguette is characterized by strong oven spring, an open and irregular crumb, well-developed ears after scoring, a thin and crisp crust, and a deep golden-brown color. Achieving these characteristics consistently requires both high-quality raw materials and precise control of dough development, fermentation, shaping, scoring and baking. Maintaining dough stability during long fermentation while achieving good loaf volume and crust quality can be particularly challenging. Understanding the interaction between flour characteristics and processing conditions is therefore essential.

Flour Quality: The Foundation of a Premium Baguette

Flour is one of the primary determinants of baguette quality. A strong bread flour with a good balance between extensibility and elasticity is required to produce dough that can



Premium baguette quality depends on flour strength and dough stability.

withstand prolonged fermentation without collapsing.
The ideal flour should contain 11.5–13.5% protein, with high-quality gluten-forming proteins. A strong gluten network provides sufficient gas retention during fermentation while still allowing the dough to expand during baking. Excessively strong flour, however, may reduce extensibility and result in a tighter crumb structure.

The Falling Number should generally be between 250 and 320 seconds, indicating balanced alpha-amylase activity. Excessively high values may contribute to poor fermentation and pale crust color, while very low values may lead to sticky dough and weak loaf structure.

Damaged starch should remain at moderate levels because it influences water absorption and the availability of fermentable sugars. Water absorption levels of 60–65% are generally desirable for premium baguette flour. Ash content also affects crust color and flavor, and slightly higher ash levels than standard white flour can contribute to aroma and crust appearance.

Long Fermentation Requires Dough Stability

Prolonged fermentation is one of the defining characteristics of premium baguette production. Extended fermentation supports aroma development, crust color and an open crumb structure through gradual enzymatic activity.

Maintaining dough stability throughout this process requires balanced flour strength, appropriate hydration, controlled yeast dosage and accurate temperature management.
If the flour is too weak, or fermentation continues for too long, excessive proteolysis can weaken the dough structure. The result may be sticky dough with reduced tolerance and excessive spreading after shaping.
Flour strength and fermentation conditions must therefore be considered together rather than as separate parameters.

Baking Conditions: Steam, Temperature and Timing

Steam injection during the initial stage of baking plays an important role in developing a premium baguette crust.
Steam delays crust formation, giving the dough more time to expand and supporting oven spring while contributing to a glossy surface. Once the initial expansion is complete, steam should be vented to encourage the development of a crisp crust.

Typical baking temperatures range from 200°C to 230°C, depending on oven design and loaf size.
Proper baking contributes to:

- A thin, crisp crust
- A rich golden-brown color
- Well-developed ears
- An open, irregular crumb
- Good loaf volume
- A pleasant roasted aroma

Insufficient baking may result in a pale crust



High final dough temperature
Excessively warm dough ferments too quickly, reducing process tolerance and increasing variability.

Overmixing
Overmixed dough may lose aroma, develop a paler crumb and show reduced extensibility.

Incorrect hydration
Low hydration limits crumb openness, while excessive hydration combined with weak flour can result in flat baguettes.

Poor steam management
Insufficient steam limits oven spring and crust shine. Excessive steam during the later stages of baking may soften the crust.

Incorrect scoring
Dull blades, incorrect cutting angles, shallow cuts or delays between scoring and oven loading can result in poor ear formation.

Inadequate flour selection
Even well-controlled processing cannot fully compensate for flour with unbalanced gluten quality.

and gummy crumb, while excessive baking can produce an overly thick crust and bitter notes.

Common Mistakes in Commercial Bakeries

In high-output bakery operations, production speed can sometimes take priority over dough quality. Several problems are particularly common.

The Challenge of Warm African Conditions

Many African countries experience ambient temperatures above 35°C, while temperatures inside bakery production areas may reach 38–40°C or higher during the day. Under these conditions, dough temperature can rise rapidly during mixing and fermentation, creating a major challenge for consistent baguette production.

High temperatures accelerate yeast metabolism. Carbon dioxide production increases during the early stages of fermentation, causing the dough to mature too quickly and reducing its tolerance before shaping and baking. Gluten degradation may also accelerate, resulting in a weaker dough structure.
When dough temperature exceeds approximately 28°C, fermentation becomes increasingly difficult to control. At temperatures approaching 30–32°C, the risk of over-fermentation rises significantly. If dough temperature reaches 35°C or above, maintaining dough strength during prolonged fermentation becomes particularly challenging, especially when working with medium-strength flour.
Under tropical bakery conditions, achieving a final dough temperature of 18–22°C is therefore presented as an important quality objective.

Several process adjustments can help manage dough temperature:

- Using chilled or ice water during mixing
- Cooling flour before production where possible
- Reducing mixing energy and frictional heat
- Using refrigerated bulk fermentation where available
- Producing smaller dough batches

- Scheduling production during cooler nighttime or early-morning hours

Final dough temperature should be monitored continuously rather than relying on ambient temperature alone.

Adapting the Process to Tropical Bakeries

Successful baguette production in Africa requires adapting raw materials and processing conditions to the local environment rather than simply replicating methods developed for cooler climates.

Flour suppliers should consider the need for stronger baguette flours with improved fermentation tolerance, particularly for bakeries operating without climate-controlled production areas.

Higher hydration should also be introduced carefully. While increased hydration can contribute to a more open crumb, excessive hydration combined with high dough temperature increases the risk of spreading and structural collapse.

Cold fermentation can offer important advantages in tropical regions by slowing yeast activity and improving dough stability. Where refrigeration capacity is limited, partial cooling during bulk fermentation may still improve consistency.

Scoring should be carried out immediately before oven loading, as warm dough can lose surface tension rapidly. Steam application must also be carefully controlled, since excessive steam combined with weak dough may promote lateral expansion rather than vertical oven spring.

Flour, Temperature and Fermentation Must Work Together

For bakeries operating in warm African climates, flour selection, dough-temperature management and fermentation control are closely interconnected.

Improving only one of these areas will rarely compensate for weaknesses in the others. Close collaboration between flour mills and bakeries is therefore essential for producing premium baguettes with good volume, attractive ears, golden crust color and consistent dough performance—even under challenging tropical production conditions.



Flour suppliers should consider the need for stronger baguette flours with improved fermentation tolerance



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HOW SUGAR INFLUENCES FLOUR IMPROVERS **AND ENZYME PERFORMANCE IN BREAD**

Bread remains a staple food across the Middle East and Africa, yet the region is home to a remarkable variety of bread types, from Lavash and Tannour to Barbari and enriched bakery products. One factor that significantly influences dough behavior across these different formulations is sugar. Understanding how sugar interacts with yeast, gluten and enzymes is therefore essential when designing flour improver systems for different regional applications.

Bread production across the Middle East and Africa relies heavily on wheat flour, but formulations and processing methods vary considerably from one product to another. Flatbreads, for example, typically contain 0–2% sugar based on flour weight, while enriched products such as sweet rolls may contain 5–15%. These differences influence yeast fermentation, dough elasticity and the performance of enzymatic additives, ultimately affecting texture, volume and shelf life.

For flour mills and bakery producers, understanding the relationship between sugar concentration and enzyme functionality is therefore important when developing formulations for different bread types and production conditions.

Sugar's Role in Dough Structure

Sugar performs several technological functions beyond providing sweetness.

At the beginning of fermentation, sucrose provides fermentable carbohydrates that support yeast activity and carbon dioxide production. However, as sugar levels increase, osmotic pressure within the dough also rises, reducing the amount of water available to yeast cells and slowing fermentation.

Standard instant dry yeast may lose effectiveness in formulations containing more than 8% sugar, making osmotolerant yeast strains a preferred option for higher-sugar applications.

Sugar also competes for available water in the dough, reducing the hydration of gluten proteins. This can limit gluten development and produce softer, more pliable doughs with lower gas-retention capacity unless appropriate dough-strengthening systems are used.

High-sugar formulations therefore require careful coordination between yeast selection, flour characteristics and flour improver technology.

How Sugar Affects Enzyme Performance

By reducing water activity, sugar changes the dough environment and can influence enzyme functionality and substrate availability. Different enzymes therefore play specific roles depending on the formulation.

Alpha-Amylase

Alpha-amylase hydrolyzes damaged starch into fermentable sugars, helping provide yeast with a continuous carbohydrate source.

This function is particularly important in traditional Middle Eastern and African breads with little or no

added sugar. In higher-sugar doughs, where the need for additional fermentable sugars is lower, alpha-amylase can still contribute to oven spring, crust color through Maillard reactions and crumb softness.

Xylanase
Xylanase acts on arabinoxylans, helping improve water distribution within the dough and supporting gluten structure.
In high-sugar formulations, where available water is reduced and gluten development may be weaker, xylanase can contribute to improved dough machinability, gas retention and loaf volume.

Glucose Oxidase
Glucose oxidase (GOX) promotes oxidative cross-linking between gluten proteins, strengthening the gluten network.
This can improve the stability and handling characteristics of high-sugar doughs, which tend to be softer and more fragile. Dosage, however, must be carefully controlled, as excessive oxidation may reduce dough extensibility and restrict expansion during proofing.

Lipase
Lipase modifies the lipids naturally present in flour and can support gas retention and crumb structure.
In African markets where different wheat blends may result in variations in flour quality and protein characteristics, lipase can contribute to improved bread volume, more consistent texture and softness in sugar-rich formulations.

Transglutaminase
Transglutaminase strengthens the protein network through covalent cross-linking of gluten proteins.
It can help address dough instability in high-sugar formulations, although excessive use may result in dough that is too firm and lacks sufficient extensibility. Accurate dosage is therefore important.

Customizing Flour Improver Systems

Developing effective flour improver formulations becomes more challenging because of the wide variety of wheat origins used across the Middle East and Africa.
Many mills process wheat blends originating from countries such as Russia, Ukraine, Romania, France, Australia and Argentina. As a result, flour protein quality, damaged starch levels and rheological properties may vary considerably.
For standard, low-sugar bread applications, flour improver systems generally focus on supporting fermentation, controlling gas development and improving crumb characteristics. Enzyme combinations based on xylanase and alpha-amylase can often provide effective results.

Enriched doughs containing more than 5% sugar, however, may require more advanced improver systems. Maintaining dough strength while achieving the desired volume, crumb structure and shelf life can require a carefully balanced combination of glucose oxidase, lipase and xylanase, together with controlled alpha-amylase activity.
Depending on the formulation, emulsifiers may also be used to strengthen dough structure and support shelf life.

The Right Solution Depends on the Application

Sugar's role in breadmaking extends far beyond sweetness. Its concentration affects yeast metabolism, dough hydration, gluten development and the way enzymes perform within the formulation.

As sugar levels increase, ingredient interactions become more complex, making it increasingly important to optimize both the enzymatic and functional components of flour improver systems.
For bakery producers and flour mills serving the Middle Eastern and African markets, formulation strategies should therefore take into account sugar level, flour quality, production method and bread type.

Tailoring enzyme systems to specific applications can contribute to more stable production, improved volume and texture, and longer shelf life—helping flour producers and commercial bakeries respond more effectively to the diverse demands of these markets.





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ROPE SPOILAGE IN BREAD: CAUSES, WARNING SIGNS AND PREVENTION

Rope spoilage is one of the most significant bacterial spoilage defects in bread, particularly under warm and humid storage conditions. Understanding how contamination occurs, recognizing the warning signs and applying effective preventive measures are essential for protecting product quality and shelf life.



Rope spoilage is primarily caused by heat-resistant, spore-forming bacteria belonging to the Bacillus subtilis species complex, formerly classified as Bacillus mesentericus. These spores can survive baking and subsequently proliferate during storage when conditions are favorable.

Why Can Bacillus Spores Survive Baking?

Although the bread crust is exposed to temperatures well above 180°C, the internal crumb temperature rarely exceeds 98–100°C. This is not sufficient to completely inactivate bacterial spores.

Spores present in contaminated flour or other raw materials may therefore survive baking, germinate during storage and multiply within the crumb. During vegetative growth, the bacteria produce enzymes such as amylases and proteases, which degrade starch and gluten and cause the characteristic structural deterioration associated with rope spoilage.

Where Does Contamination Come From?

The primary source is wheat. Bacillus species are naturally present in soil and may adhere to the outer layers of cereal grains. Flour produced from inadequately cleaned wheat may therefore contain elevated spore loads.
Other potential sources include:

- Water
- Bakery equipment and utensils
- Processing environments
- Personnel during dough preparation and handling

For this reason, rope spoilage control depends not only on flour quality, but also on hygiene and process conditions throughout the bakery.

Recognizing the Warning Signs

One of the earliest signs is a sweet, fruity odor, sometimes described as resembling overripe melon or pineapple. As spoilage progresses, the smell becomes stronger and increasingly unpleasant.
The crumb gradually becomes soft, moist and sticky. In advanced stages, it develops a gummy consistency and forms characteristic viscous, rope-like strands when pulled apart.
Brownish or dark, sticky discoloration may also appear.
From an industrial perspective, rope spoilage can shorten shelf life and lead to product returns, consumer complaints and financial losses.

Preventing Rope Spoilage

Effective prevention requires minimizing the introduction of Bacillus spores and creating conditions that inhibit their germination and growth.

Raw material storage:
Flour should be stored in clean, dry and well-ventilated areas. Bags should be kept away from walls and positioned to allow sufficient air circulation.

Dough preparation:
Only potable water should be used. Dough temperature should preferably remain below 27°C, as higher temperatures favor bacterial growth and spore germination.

Product segregation:
Returned or stale bread should be kept separate from freshly baked products to reduce cross-contamination.

Hygiene:
Processing equipment, baking pans, utensils, conveyors and food-contact surfaces should be cleaned and sanitized according to validated procedures. Particular attention should be paid to areas where flour dust accumulates. Personnel should also follow strict hygiene practices.

Temperature and humidity:
Production and storage areas should be kept as cool and dry as practical, since warm and humid environments favor bacterial proliferation.

What to Do When Rope Spoilage Is Detected

When rope spoilage is identified, corrective action should be taken immediately.

Comprehensive sanitation:
All equipment, utensils, baking pans, cooling racks and food-contact surfaces should be thoroughly cleaned and disinfected with suitable food-grade disinfectants and hot water.

Dough acidification:
Increasing dough acidity can help suppress rope-forming Bacillus species. Food-grade vinegar may be added to the dough water at approximately 0.5–1.0 L per 100 kg of flour, depending on the formulation and desired product characteristics.

Antimicrobial preservatives:
Calcium propionate (E282) may be used at approximately 400–500 g per 100 kg of flour. Calcium acetate or sodium diacetate may alternatively be used at approximately 400 g per 100 kg of flour, provided that their use complies with applicable food regulations and product specifications.

Process control:
Dough should be mixed at the lowest practical temperature, while fermentation should be carefully managed. Where the formulation permits, yeast dosage may also be adjusted to support acid development.

Rapid cooling:
Immediately after baking, loaves should be removed from their pans and transferred to a cool, well-ventilated area.

Act Quickly When Symptoms Appear

Any bread showing symptoms of rope spoilage should be regarded as unsuitable for consumption and removed from production immediately.
Effective control depends on a combination of raw-material quality, hygiene, temperature management, correct processing and rapid corrective action.
Preventing contamination before visible spoilage develops remains the most effective way to protect product quality and reduce production losses.



Prevention remains the most effective way to protect product quality.



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MANDAZI: THE CULTURAL HERITAGE OF EAST AFRICA'S BELOVED FRIED BREAD

With its light, airy crumb, golden-brown crust, mild sweetness and distinctive aroma, Mandazi is one of East Africa's most recognizable bakery products. More than a popular fried bread, it reflects centuries of cultural exchange along the Swahili Coast and remains an important part of everyday food culture across the region.

Among the diverse traditional bakery products found around the world, Mandazi holds a unique place in East African cuisine. It is widely consumed in Kenya, Tanzania, Uganda, Rwanda, Burundi and neighboring countries, where it is enjoyed throughout the day.

Although Mandazi is sometimes compared with doughnuts because both are fried dough products, it has its own distinct composition, processing characteristics and sensory profile. Its relatively mild sweetness, soft interior, slightly chewy texture and thin, crisp outer crust distinguish it from many conventional doughnuts.

Traditionally, Mandazi is made from wheat flour, water or coconut milk, sugar, yeast or baking powder, salt and aromatic spices. Cardamom is particularly characteristic, although other ingredients may vary according to regional and household preferences.

Eggs, fresh milk, coconut milk, butter or vegetable oil may also be incorporated to modify flavor and texture. Despite these variations, Mandazi generally retains the characteristics that define the product: a light interior, golden crust and balanced sweetness.

More Than a Sweet Snack

Unlike many fried bakery products associated primarily with desserts, Mandazi plays a much broader role in East African food culture.

It can be eaten at breakfast, served with tea, enjoyed as street food or consumed alongside savory dishes. Its moderate sweetness allows it to work in both sweet and savory settings, contributing to its popularity among different age groups and communities.

Mandazi is particularly associated with spiced tea, or chai, and is commonly eaten as a mid-morning snack by schoolchildren and workers. It is also prepared for weddings, religious celebrations and community gatherings.

In many households, recipes are passed down through generations. Families may have their own preferences for spice combinations, sweetness, dough consistency and fermentation time, giving Mandazi both a shared regional identity and strong local variations.

A Product Shaped by the Swahili Coast

The history of Mandazi is closely connected with the cultural exchanges that shaped the East African coast over several centuries.

The Swahili Coast developed through sustained interaction among African communities and Arab, Persian and later Indian traders. Maritime trade across the Indian Ocean facilitated the exchange not only of goods, but also of ingredients, culinary

traditions and food-processing techniques. Fried dough preparations were among the techniques that became part of this evolving food culture. Local communities adapted them using ingredients available in East Africa.

Coconut, which is abundant along the coasts of Kenya and Tanzania, became an important ingredient in many traditional Mandazi recipes. Spices such as cardamom—and occasionally cinnamon or nutmeg—also contributed to the product's distinctive aroma and flavor.
The name Mandazi is associated with the Swahili language and remains widely recognized across Kenya, Tanzania and Uganda, although formulations and shapes can differ from one region to another.

Coastal versions often contain coconut milk, giving the product a richer flavor and softer crumb, while inland formulations may rely more commonly on fresh milk or water.

From Household Tradition to Commercial Production

Mandazi remains deeply rooted in household and small-scale production, but its role has gradually expanded.

As East African communities have grown around the world, Mandazi has also become more visible outside the region. It can now be found in African restaurants, bakeries and cultural events in Europe, North America and the Middle East, serving both diaspora communities and consumers discovering East African food traditions.
At the same time, commercial bakeries have increasingly adopted more standardized production methods in response to the need for greater product consistency and longer shelf life. This transition has also brought greater attention to the technical aspects of Mandazi production, including flour quality, dough rheology, fermentation, frying conditions, oil absorption and texture.
In this sense, Mandazi sits at an interesting intersection between tradition and modern bakery production. Its identity remains strongly connected to East African culture, while commercial production creates new demands for consistency, process control and quality.



Preserving Identity While Improving Consistency

The enduring popularity of Mandazi comes from more than its simple formulation. Its cultural importance, versatility and distinctive sensory characteristics have made it an integral part of everyday life across East Africa.

As production moves from household kitchens into increasingly standardized commercial environments, the challenge is to maintain these familiar characteristics while achieving greater consistency. Mandazi therefore represents not only a valued part of East Africa's culinary heritage, but also a bakery product whose traditional identity continues to evolve alongside modern production practices.

When Wheat Origin Changes:
How to Read the Lab Results Together

For a professional miller, the challenge is to interpret laboratory values together and decide whether the response should come from blending, milling settings, flour standardization or improver formulation.



A change in wheat origin can alter flour performance even when basic specifications appear similar. Protein and Falling Number may remain within target, yet behavior during mixing, fermentation or baking may change. What matters is the performance profile these parameters create together.

1. Similar Protein Does Not Mean Similar Flour

Two wheat lots with similar protein levels may differ in gluten strength, extensibility, mixing tolerance, gas retention and water absorption. When protein remains stable but bakery performance changes, examine protein quality through wet gluten, gluten index, sedimentation and rheological measurements.

2. Read Falling Number with Dough Behavior

Falling Number should not be interpreted alone.
Lower Falling Number + increasing stickiness may indicate higher enzymatic activity.
Higher Falling Number + weaker fermentation response may point toward insufficient amylolytic activity for the target application.
Compare the laboratory result with processing and baking behavior.

3. Water Absorption Can Signal a Broader Change

If water absorption changes while protein remains similar, review damaged starch, wheat hardness, milling intensity, protein functionality or arabinoxylan behavior.

4. Read Resistance and Extensibility as a Balance

Higher resistance + lower extensibility may lead to tighter dough and reduced machinability.
The reverse may indicate weaker structure and lower process tolerance.
The response may involve wheat blending, milling adjustment or improver formulation.

5. When the Same Improver Gives a Different Result

If the same improver dosage produces different bakery performance, the functional characteristics of the flour may have changed.

Compare the flour profile and application results before changing dosage.

From Data to Decision

The goal is not to reproduce the same laboratory numbers from one wheat origin to another, but to maintain the same functional flour performance despite changes in raw material.

Analytical: What changed?
Rheological: How did dough behavior change?
Application: Did final performance change?

FAGEM LAB PRINCIPLE

Do not standardize the number.
Standardize the performance.

A Practical Interpretation Matrix

Lab Finding	What to Check Next
Protein similar, gluten performance weaker	Gluten index, sedimentation, rheology
Falling Number decreases	Stickiness, fermentation behavior
Water absorption increases	Damaged starch, hardness, milling conditions
Resistance increases / extensibility falls	Blend balance and end-use requirements
Same improver dosage, weaker bakery result	Full flour profile + application validation



ONE QUESTION, ONE EXPERT

Why can the same improver perform differently when wheat origin changes?

The short answer: because the improver is not working in isolation. It interacts with the functional properties of the flour, and those properties can change significantly from one wheat origin to another.

Two wheat lots may show similar protein levels and still behave very differently in processing. Differences in gluten quality, enzymatic activity, damaged starch, water absorption, dough stability and extensibility can all influence how an improver performs.

For example, a formulation that delivers the required dough strength and tolerance with one wheat blend may produce a tighter or weaker dough when the wheat origin changes. The improver dosage may be the same, but the flour matrix it is acting on is no longer the same.

This is why a change in wheat source should trigger more than a routine specification check. The flour should be evaluated analytically, rheologically and in application.

The key question is not:
"Is the improver still working?"
but:
"Has the flour changed in a way that requires the improver system to be rebalanced?"

In practice, the mill should compare parameters such as:

- Protein and gluten quality
- Falling Number
- Water absorption and mixing stability
- Resistance and extensibility
- Damaged starch
- Final bakery performance

Only after these results are reviewed together should dosage or formulation changes be considered.

Expert Takeaway

The same improver can give a different result because the raw material has changed. Consistent flour performance therefore depends on matching the improver system to the functional profile of the current wheat blend.

Burkina Faso: From Technical Expertise to Market Partnership



As wheat sourcing becomes more variable, maintaining consistent flour performance requires close coordination between the mill, bakery, field teams and R&D. Pakmaya's work in Burkina Faso provides a practical example of how technical support, formulation development and market communication can come together in response to local needs.

Burkina Faso is a market where competition is still emerging and business opportunities are rapidly diversifying. Government incentives aimed at strengthening local production are supporting market development and contributing to its long-term potential.

The country's milling ecosystem is shaped by a relatively small number of influential players. Within this integrated structure, mills often go beyond flour production, also serving as important supply hubs for bakeries by providing yeast, bread improvers and other baking solutions.

Together with its strategic partner in Burkina Faso, Pakmaya is active across three key areas: milling, yeast and bread improvers.

A Market-Specific Approach
Following an analysis of the specific needs of the Burkina Faso market, Pakmaya and its milling partner developed a market-specific hybrid flour improver designed to address both nutritional fortification requirements and consistent dough performance. Bringing bakers' practical needs together with the nutritional fortification requirements of the government and the market within a single solution helps simplify the mill's operations.

At the same time, changing wheat-sourcing patterns are creating a new challenge. As the market increasingly turns to lower-cost wheat sources, mills must manage greater variability in wheat blends while continuing to maintain consistent flour performance.

This requires ongoing monitoring and, when necessary, technical adjustment.

When a Change in Wheat Affected Flour Performance

A recent visit to Burkina Faso provided a practical example. After the mill changed its wheat supplier, fluctuations were observed in the flour's intrinsic properties and processing characteristics. Although the standard dosage of the improver remained unchanged, the characteristics of the new wheat resulted in minor deviations from the flour's target values and affected its processing behavior at bakery level.
Pakmaya's field team identified the issue during visits to both the mill and the bakeries.





The response involved three stages:

Field Analysis
The team assessed the yield achieved by bakers using the flour and reviewed the mill's latest wheat data directly on site.

Real-Time Data Transfer to R&D
The latest field data were immediately shared with Pakmaya's central R&D team, allowing the technical findings from the market to be evaluated without delay.

Dynamic Formulation
The market-specific dual-product system was adjusted according to the characteristics of the new wheat. Following this adjustment, both the flour's nutritional fortification values and its baking performance returned to the required level of consistency.

Beyond Technical Support

Pakmaya's work with its partner in Burkina Faso also extends beyond laboratory analysis and product supply.

To support the long-term sustainability of the partnership, the cooperation includes marketing and field communication activities alongside technical support. These activities include in-market branding and visual materials that highlight the partner's brand, product-use guidance for professional bakers, launch materials and commercial communication activities aimed at strengthening baker loyalty and product preference.

The objective is to connect product performance with the way the flour is understood and used in the market—supporting not only the production of high-quality flour, but also its recognition and acceptance among professional bakers.

Consistency from Mill to Bakery

As mills adapt to lower-cost and more variable wheat sources, maintaining consistency becomes increasingly important for both millers and bakers.

The Burkina Faso experience shows the role that continuous field monitoring can play when changes in wheat characteristics begin to affect flour performance. Pakmaya's approach in the market combines market-specific formulation, field monitoring from the mill to the bakery, R&D support and marketing communication within the same partnership.

From wheat to flour, and from flour to bakery performance, the work is structured around responding to changing market conditions while supporting consistency and long-term cooperation.





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DAVID KIOKO: PAKMAYA'S TECHNICAL LINK TO KENYA'S MILLING INDUSTRY

At Pakmaya, being close to the market means more than supplying products. It means listening to customers on the ground, understanding their technical needs and working alongside them to develop practical solutions.



In Kenya, David Kioko, Pakmaya's local field specialist, plays a key role in bringing this approach to life. By visiting flour mills across the country, David works directly with customers, providing technical support on enzymatic solutions and helping them address the challenges they encounter in their daily milling operations.

His close contact with millers allows Pakmaya to better understand local needs and respond with relevant technical solutions. At the same time, David serves as a direct link between Kenya's flour mills and Pakmaya's broader technical expertise, helping ensure that feedback from the field is continuously reflected in customer support.

Kenya is one of the markets where Pakmaya's global-to-local strategy is put into practice. Through its local field presence and technical know-how, Pakmaya is able to stay close to the milling industry and provide technical support to flour mills across the country.

For David, being in the field is ultimately about building relationships through understanding, responsiveness and practical support—creating a strong and active bridge between Pakmaya and Kenya's milling industry.



Pakmaya®

UNAPRIM 2in1

Fortified Strength. Superior Performance.

The Hybrid Solution Combining Essential Vitamins & Minerals with Professional Flour Improvement.



Why Unaprim 2in1?

Vitamin & Mineral Enriched Formula

A high-performance improver fortified with essential vitamins & minerals to add nutritional value to your flour.

Structural Stability

Significantly increases dough stability and strengthens the gluten network for easier processing.

Volume & Color Excellence

Specifically engineered to provide superior bread volume and a vibrant, appealing crust color.

Tailored for Africa

Customizable enzyme and vitamin content, precisely adjusted to meet the specific requirements of each African country.

Dough Weakness Correction

Effectively eliminates inherent flour weaknesses to ensure consistent baking results.

Local Expertise, Global Quality

Dosage: Varies by country / local requirements.

Produced in Türkiye by Pakmaya

CMA Annual Technical Conference & Expo 2026

Pakmaya Milling Meets the Industry in Nairobi



Pakmaya took part in the CMA Annual Technical Conference & Expo 2026, held in Nairobi, Kenya, on 14–15 April, bringing together its milling expertise, regional team and Pakmaya Milling magazine with industry professionals.

Organized by the Cereal Millers Association, the conference brought together representatives of the milling industry in Nairobi for technical discussions, sector networking and knowledge sharing.

Pakmaya participated in the event with its milling product group and was also among the event sponsors. The company was represented by Cem Perdar, Africa Regional Sales Manager; Yiğit Can Demirel, Africa Export Sales & Marketing Executive; Tarık Tarı, R&D Specialist; and David Kioko, Africa Regional Technical Executive.

During the conference, the team introduced Pakmaya's milling solutions and shared information on its local activities in Kenya with industry professionals.

As part of the technical program, Cem Perdar delivered a presentation titled "The Past, Present and Future of Different Bread Types and Production Processes in Africa." The presentation focused on Africa's diverse bread culture and the evolution of production processes across the region.

The event also marked the first field launch of Pakmaya Milling magazine. The inaugural issue was introduced to milling professionals during the conference, providing an opportunity to bring the publication directly to its target audience for the first time.

Throughout the two-day event, the Pakmaya team met with sector representatives, exchanged technical insights and developed new industry contacts in the region.







Pakmaya®

UNAPRIM SBF PLUS

Master the Perfect Loaf: Strength, Volume, Consistency.



Why Unaprim SBF Plus?

Superior Dough Tolerance

High gluten strength for effortless processing.

Excellent Bread Volume

Get bigger, bolder loaves with an appealing golden crust color.

Perfect for Toast Bread

Provides a uniform crumb structure and consistent performance in industrial applications.

Local Expertise, Global Quality

Dosage: 20 – 24 g per 100 kg flour

Produced in Türkiye by Pakmaya



trade fair calendar

DATE	FAIRS and CONGRESS	LOCATION
November 3–5, 2026	Gulfood Manufacturing 2026 (GFM)	Dubai, UAE
November 23-26, 2026	36th Annual IAOM MEA Conference & Expo 2026	Cape Town, South Africa
March 15–19, 2027	Gulfood 2027	Dubai, UAE
March 23–25, 2027	AFMASS Food Expo Tanzania 2027	Dar es Salaam, Tanzania
May 4–6, 2027	AFMASS Food Expo West Africa Nigeria 2027	Lagos, Nigeria
May 11–13, 2027	GrainCom 2027	Geneva, Switzerland
May 20-22, 2027	Agrofood Ethiopia	Addis Ababa, Ethiopia
October 6–8, 2027	AFMASS Food Expo Zambia 2027	Lusaka, Zambia
October 24–28, 2027	iba 2027 – The World's Leading Trade Fair for Baking and Confectionery	Munich, Germany

Pakmaya®

UNAPRIM PIZZA IMPROVER

Unlock the Full Potential of Your Pizza Flour

Advanced enzyme technology that transforms standard flour into high-performance pizza dough.



Why Unaprim Pizza Improver?

Effortless Dough Handling

Facilitates easy stretching and shaping during processing.

Optimal Volume

Delivers perfect dough stability and volume, even in short fermentation processes.

Gourmet Texture & Color

Ensures a uniform crumb structure and the desired golden crust color for premium pizzas.

Local Expertise, Global Quality

Dosage: 20 g per 100 kg flour

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Pakmaya®

UNAZIM

Master of Oven Spring.

The Ultimate Performance Stabilizer for Flour Stored in Extreme Heat.



Why Unazim?

Climate-Resilient Stability

Ensures high dough stability even with flour stored for 3–5 months in hot climate conditions.

Superior Oven Spring

Revitalizes heat-damaged protein structures to eliminate "flat" loaves and ensure maximum bread volume.

Baguette Scoring Excellence

Solves dough tightening issues, allowing for clean, beautiful score openings (grigne) essential for professional baguettes.

Standardized Quality

Guarantees consistent performance and professional bread results regardless of flour storage duration.

Local Expertise, Global Quality

Dosage: 24 g per 100 kg flour

Produced in Türkiye by Pakmaya