



Crop quality matters

For food and beverage manufacturers in bakery, it is important to understand the quality of ingredients being used in production. This is especially true for vital wheat gluten, where quality differences can impact both manufacturers' production process and the final product.

Wheat growing conditions, which vary from region to region and year to year, have a huge impact on wheat and gluten quality. Understanding deviations from last year's crop quality enables manufacturers to adjust production practices for better results. Testing with new samples and if needed, adapting configurations to these insights, can make

a difference, both in terms of consumer experiences and manufacturer profitability.

Cargill's *Wheat Sourcing Insight Report* details the importance and methods of our annual quality analysis. It explains the comprehensive testing procedures we use to assess wheat flour and gluten quality characteristics as well as dough properties, and provides a summary of our laboratory testing on a variety of wheat-based finished products. The report includes high-level insights into this year's wheat harvest. We would be delighted to share the 2022 insights with you on gluten quality, specific to each of Cargill's plant locations in Europe.*

* Because analyses are based on a partial sampling of all wheat deliveries from selected regions of origin, the results shown here only give an **indicative overview** of the regional wheat quality.

Wheat gluten's role in flour milling, bakery, and snacks

Vital wheat gluten is the insoluble protein fraction of wheat flour. It stands apart from other plant proteins for its unique visco-elastic properties. It's most commonly used in pasta, bakery and flour milling, but is also well suited for snacks and cereals.

Adding wheat gluten to a dough increases its protein level, giving it the strength and elasticity necessary to withstand commercial mixing and kneading processes. In this manner, vital wheat gluten allows manufacturers of e.g. pan breads to manage the consistency of their end products.

In bread making, wheat gluten fulfils many functional roles, including:

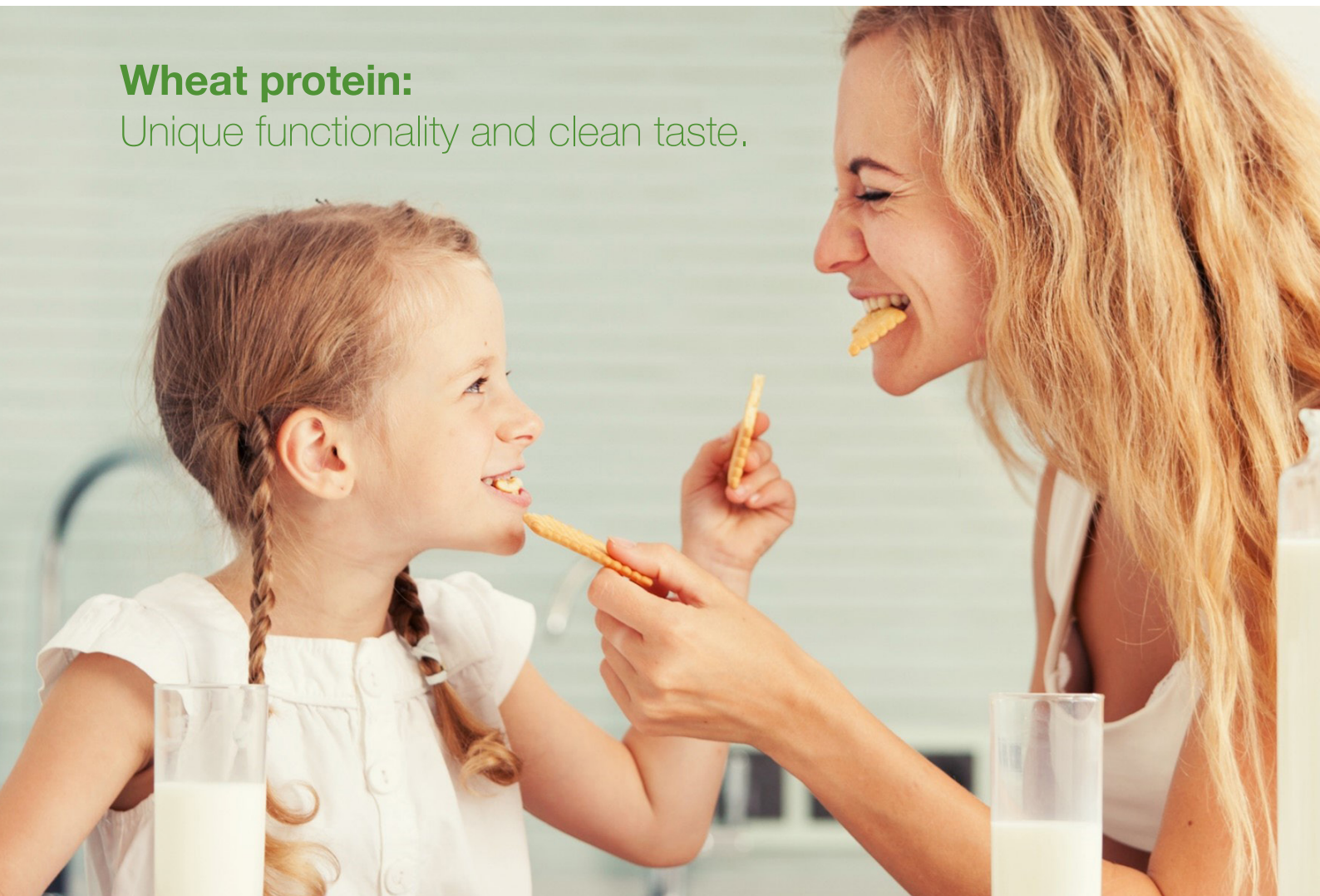
- Dough stabilization
- Dough volume increase
- Protein level enhancements
- Proteins strengthening in flour

In other bakery and snacks applications, wheat gluten delivers important benefits, including:

- Protein enrichment
- Excellent extrudability
- Improved chewiness and crunchiness
- Increased binding can help to replace egg albumen

Wheat protein:

Unique functionality and clean taste.



Our approach to quality determination

In addition to our region-specific harvest testing, Cargill continues to monitor wheat and gluten quality throughout the year. This process helps us provide customers with vital wheat gluten products with stable quality attributes, from one month to the next. Our comprehensive testing includes:



Moisture Content

Assessing moisture content is an essential first step in analyzing wheat or flour. Wheat with lower moisture is more stable during storage. Flour or wheat with high moisture content attracts molds, insects and bacteria. Flour millers also use this figure, as they add water to adjust moisture content to a standard level before milling.**



Protein Content

Protein content impacts many processing properties, such as water absorption and gluten strength, as well as finished product attributes like texture and appearance. Applications like snacks and cakes often require low protein, while breads, buns, pasta and other yeast-leavened bakery products typically need higher protein levels.**



Gluten Strength

Two factors, flour gluten levels and gluten strength, determine the quality of wheat and vital wheat gluten. Gluten strength is measured using the gluten index, regardless of the quantity of gluten present.

Wet gluten is a measure of the quantity of gluten in wheat, determined with the glutomatic system. The wet gluten is then dried to obtain the dry gluten content.



Test Weight

Test weight measures the sample's density, which may be an indicator for milling yields and the condition of the wheat. When problems occur during the growing season or at harvest, test weight is often reduced.



Falling Number

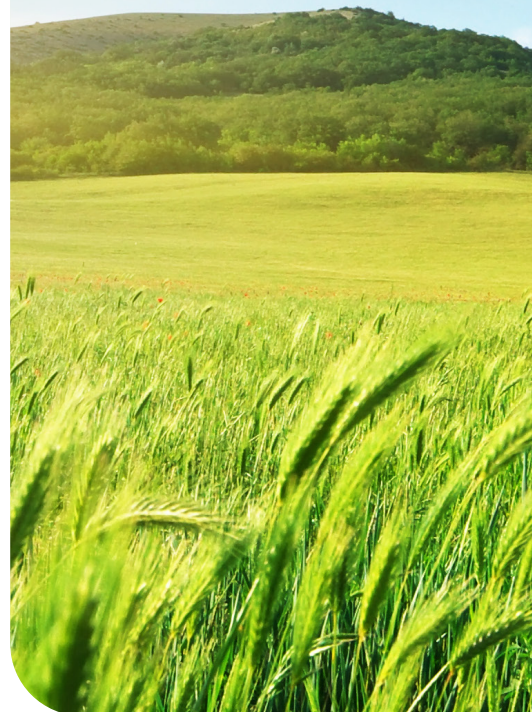
The falling number measures the enzyme activity (alpha-amylase) in flour coming from sprout damage. A high falling number indicates low activity and vice versa. Optimal baking results require balanced enzyme activity.

Sustainability focus

The well-informed consumer is more likely to choose products that support sustainability throughout the supply chain.

At Cargill, we are working to nourish the world in a safe, responsible, and sustainable way and drive positive change across our supply chains. This includes creating a more sustainable crop supply for our ingredients and applications.

We source certified wheat, benchmarked at Silver level according to the SAI Platform's Farm Sustainability Assessment. This industry-recognized benchmark system supports good agricultural practices in key sustainability areas, including soil & biodiversity conservation and water quality.



2022 preliminary wheat production adapt expectations

Across Europe harvest 2022 has started 10-15 days earlier than previous years. Dry weather in Western Europe is allowing a fast harvest of wheat fields in generally good conditions. Still too early to draw final conclusions, but first trends seem to indicate low moisture, high test weight, good falling number and rather low protein across the European wheat belt. Eastern Europe has seen cooler temperatures and more rain in July, which increased the risk of strong damages to test weight and falling numbers for Poland, Baltic states and Scandinavia. More definitive conclusions can be drawn by September.

Our approach to sourcing

Cargill's regional approach to sourcing allows the company to provide wheat and gluten products with a range of quality attributes.

Wheat sourcing

Cargill operates four wheat processing plants for food grade, spread across Europe's top wheat production regions. Another processing plant will be added in Krefeld, Germany. Which is currently being transformed to process wheat instead of corn. Completions scheduled for early 2023.

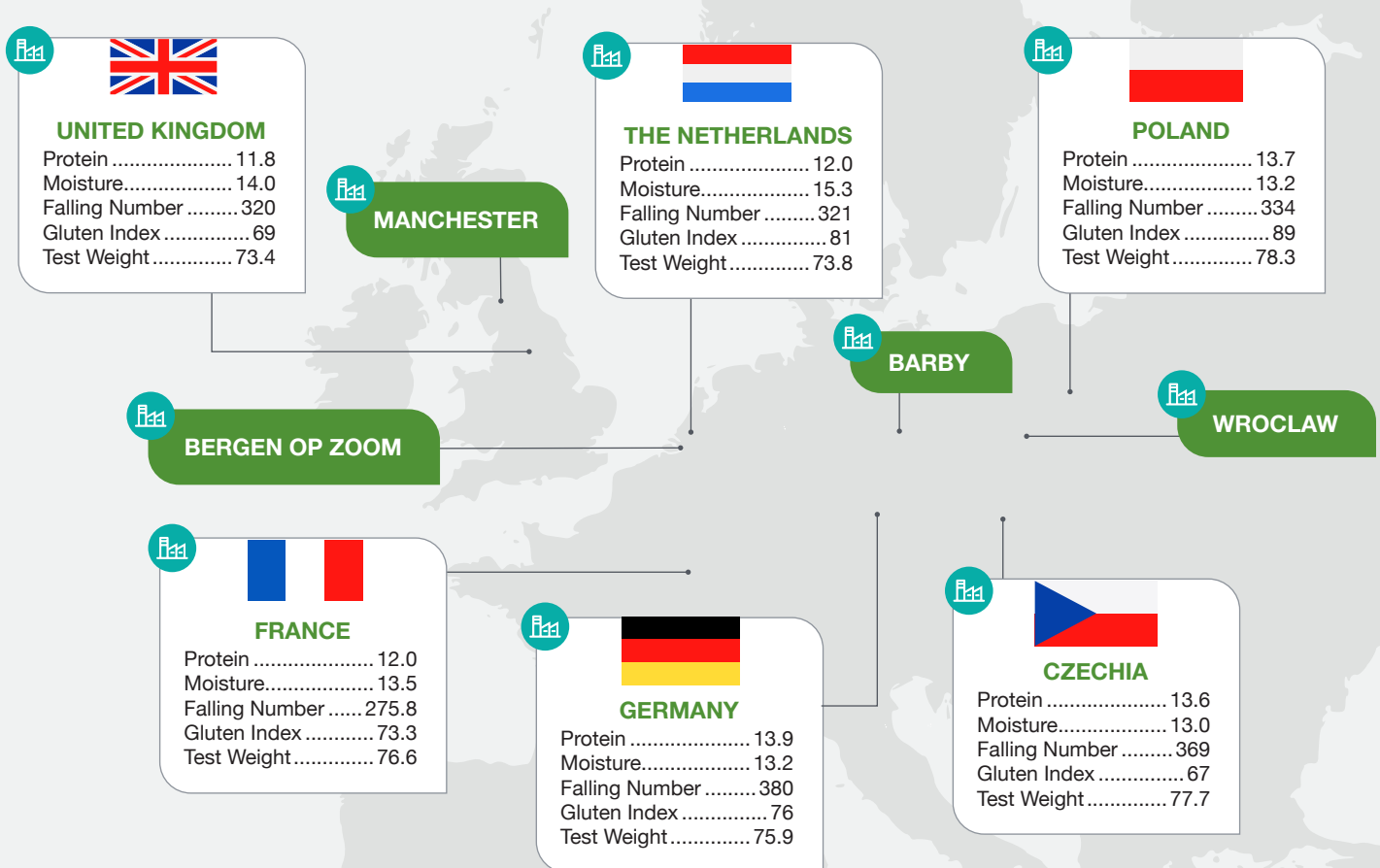
Within each region, farmers deliver their wheat harvest to a central point, where samples are analysed to evaluate quality. Whenever possible, our plants use wheat from the same region year-round, to help deliver product with consistent quality.

As a result, we know the wheat and gluten quality per factory. This allows us to ship product from the supplying location that best aligns with a customer's specific needs, such as higher protein content, or stronger or weaker gluten. Further, we continue to monitor quality throughout the year to avoid deviations from our wheat quality report data.

Informed by our comprehensive crop quality analysis and baking trial results, customers have the information they need to help them achieve optimal results.

Cargill's regional approach to sourcing offers another key advantage for customers, as it allows the company to provide wheat and gluten products with a range of quality attributes.

CARGILL'S SOURCING FOOTPRINT & 2021 ANALYSIS RESULTS



Crop harvest was delayed past year but did not result in lower quality or lower yield. Overall, the wheat quality 2021 showed noticeable difference compared to previous years with higher moisture, higher protein and Gluten Index. Falling Number and Test Weight were significantly lower resulting in grinding / milling differences.

Source: Cargill analysis

Because analyses are based on a partial sampling of all wheat deliveries from selected regions of origin, the results shown here only give an indicative overview of last year's regional wheat quality.

The proof of the pudding is in the eating



Going one step further, Cargill is also capable of performing baking trial testing, which allows us to provide customers with product evaluation data that provides insights into actual processing performance and end product quality. This includes laboratory testing on a variety of wheat-based finished products.

We use a baking test to demonstrate gluten strength without interference from flour variations and interaction with other components.


We conduct this evaluation on a routine basis at all our wheat processing facilities, rating both the baking quality and the dough performance of each location's gluten using this test.


On top of that, we have extensive experience in trialling whole wheat bread, bran bread or sponge and dough bread. Our application centre in Vilvoorde is fully equipped for any bake-off: we trial our ingredients and monitor the quality of the end-results in such applications as biscuits, crackers, snacks and bars and muffins.

Cargill's plant protein solutions

Cargill's line of wheat and pea protein ingredients offers manufacturers plenty of benefits, including consistent quality backed by extensive testing and analysis. They also align with consumer desires, helping brands create the nutritious and sustainably sourced foods they desire.

Gluvital® vital wheat gluten*  is one of Cargill's main baking ingredients that helps provide consistency in flour, improved dough machinability and extended shelf life for finished products. It is most commonly used in pastas and bread, but also offers functionality in snacks and cereals.

Prowliz® hydrolyzed wheat protein (HWP)*  is most often used in bread and cereals, but is also suited for protein enrichment in a wide array of food and beverages.

The Cargill® pea protein offering  consists of label-friendly pea protein solutions, with outstanding emulsion and foaming capacities, with a mild taste impact. Most often used in crackers, cereal bars, extruded products, muffins, cakes, and yeast leavening bread.

* According to EU Regulation (EC) 2073/2005 on microbiological criteria for foodstuffs, wheat protein are not intended for direct human consumption (i.e. not "ready-to-eat") without further processing (e.g. cooking, baking, frying) to eliminate or reduce microorganisms to an acceptable level.




16% of European population have indicated to have increased their protein intake in the past year.

Source: Innova Consumer Survey 2021

The Cargill advantage

As a global ingredient leader, and leading wheat gluten supplier in Europe, Cargill's portfolio of plant-based protein is complemented by a broad range of nature-derived sweeteners, texturizers and specialties. Backed by world-class formulation expertise and supply chain reliability to help food and beverage manufacturers meet the most challenging application goals and marketplace demands, whether they're creating an entirely new product or reformulating existing ones.

2022 results from the majority of locations are expected by early October. Available upon request during discussion with accounts teams. Get in contact or leave your details [here](#). 

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** Wheat and Flour Testing Methods: A Guide to Understanding Wheat and Flour Quality. Version 2, Kansas State University, September 2008.

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