

# The Innovation of Bread Wheat Quality, Processing and its Influencing Factors

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## DESCRIPTION

Bread, often referred to as the "staff of life," has been a staple in human diets for millennia. Central to the production of high-quality bread is the wheat from which the flour is derived. Bread wheat quality is a multifaceted topic that encompasses a range of factors, including wheat genetics, flour properties, and dough characteristics. From the ancient techniques of artisanal bakers to the cutting-edge innovations of modern food scientists, the pursuit of optimal bread wheat quality is a balance between tradition and technology. This article delves into the intricacies of bread wheat quality, exploring the factors that influence it and the importance of this essential ingredient in the art of breadmaking.

### The bread wheat spectrum

Bread wheat, scientifically known as *Triticum aestivum*, is the most widely cultivated and consumed cereal crop globally. Its grains, or kernels, are ground to produce flour, the foundation of bread and numerous other baked goods. Within the realm of bread wheat, various classes and varieties exist, each with unique characteristics that influence the quality of the flour they yield.

**Hard vs. soft:** Bread wheat is categorized as either "hard" or "soft" based on the texture of the kernel. Hard wheats have higher protein content and are often preferred for breadmaking due to their ability to form strong gluten networks. Soft wheats, on the other hand, are used for products like cakes and pastries due to their lower protein content and finer texture.

**Red vs. white:** The color of bread wheat kernels can be red or white, which relates to the presence of pigments in the bran layer. Red wheats tend to have a higher fiber content and more robust flavor, while white wheats yield a milder flavor and lighter color.

**Spring vs. winter:** Bread wheat can also be classified as spring or winter based on the planting season. Spring wheat is sown in the spring and harvested in the summer, while winter wheat is planted in the fall, overwinters, and is harvested in the following summer. Winter wheat tends to have higher protein content and is often favored for breadmaking.

### Factors influencing bread wheat quality

Several factors influence the quality of bread wheat, ultimately affecting the flavor, texture, and performance of the resulting bread. These factors operate synergistically, requiring a delicate balance to achieve the desired quality:

**Protein content:** Protein content, particularly gluten proteins, is a critical determinant of bread wheat quality. Gluten forms the protein network responsible for dough elasticity and bread structure.

**Gluten strength:** The strength of the gluten network influences the volume and texture of bread. Strong gluten contributes to a well-risen loaf with a desirable crumb structure.

**Starch quality:** Starch, the primary carbohydrate in wheat, affects bread moisture retention, crumb texture, and crust formation.

**Enzymes:** Enzymes present in wheat influence the fermentation process and contribute to flavor development during breadmaking.

**Mineral content:** Minerals such as potassium, magnesium, and zinc play a role in dough hydration and the overall nutritional profile of bread.

**Lipids:** Lipids affect dough handling and can influence bread texture and flavor. Fats also contribute to crust crispness and crumb softness.

### Bread wheat processing

The journey of bread wheat from kernel to crust involves a series of intricate steps that contribute to the overall quality of the final product:

**Harvesting:** Wheat is harvested when the kernels are fully mature, typically in the late summer or early fall. Proper timing is crucial to ensure optimal protein content and yield.

**Milling:** Harvested wheat kernels are cleaned, conditioned, and milled to produce flour. The milling process affects the particle size, which in turn influences flour texture and performance.

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**Flour characteristics:** Flour properties, including protein content, gluten strength, and starch quality, are critical in determining its suitability for different types of bread.

**Mixing and fermentation:** In breadmaking, flour is combined with water, yeast, and sometimes other ingredients. Kneading develops gluten structure, and fermentation allows flavors to develop and the dough to rise.

**Baking:** During baking, the dough undergoes transformation as the heat causes starch gelatinization, proteins coagulate, and moisture evaporates, resulting in the final bread texture and flavor.

### Balancing tradition and innovation

The art of breadmaking is a balance between tradition and innovation. Ancient techniques, honed over generations, have given rise to iconic bread styles around the world. These

traditional methods often rely on simple ingredients and time-honoured processes that emphasize the natural flavors of bread wheat.

In contrast, modern food science has brought about innovations that enhance bread wheat quality and optimize production. Advances in breeding have led to wheat varieties with improved yield, disease resistance, and baking qualities. Enzymes, additives, and processing techniques have been developed to enhance dough handling, fermentation, and shelf life.

### CONCLUSION

Bread wheat quality is the cornerstone of the art and science of breadmaking. From the hands of ancient bakers kneading dough by touch to the laboratories of food scientists analyzing protein compositions, the pursuit of high-quality bread wheat is a testament to human ingenuity and innovation.