



Non-Gluten Proteins in Wheat: Composition, Function and Health Implications

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INTRODUCTION

Wheat is a staple grain that provides essential nutrients and serves as a major source of dietary protein. While much attention is given to gluten proteins due to their impact on baking and human health, non-gluten proteins also play crucial roles in the nutritional profile and functionality of wheat. This article delves into the composition, functions and health implications of non-gluten proteins in wheat.

Composition of Non-Gluten Proteins

Non-gluten proteins in wheat, which make up about 15-20% of the total protein content, can be categorized into several groups:

1. **Albumins:** Water-soluble proteins that are essential for various metabolic processes in the wheat kernel. They include enzymes like amylases and proteases, which are vital for seed germination and growth.
2. **Globulins:** Soluble in salt solutions, globulins are storage proteins that also play a role in seed germination. They are less abundant than albumins and gliadins but contribute to the overall protein content of wheat.
3. **Prolamins:** While glutenin and gliadin (the main components of gluten) are classified as prolamins, there are other minor prolamins in wheat that do not form part of the gluten network but contribute to the grain's nutritional and functional properties.

Function of Non-Gluten Proteins

Non-gluten proteins serve various functions that are essential for the wheat plant and its nutritional value for humans:

1. **Enzymatic Activity:** Albumins and globulins include enzymes that facilitate biochemical reactions during seed germination and plant development. For example, amylases break down starch into sugars, providing energy for the growing plant.

2. **Nutritional Value:** These proteins are a source of essential amino acids that contribute to the overall nutritional profile of wheat. They are particularly important for populations that rely on wheat as a primary protein source.
3. **Plant Defense:** Some non-gluten proteins have antimicrobial properties that protect the wheat plant from pathogens and pests.

Health Implications of Non-Gluten Proteins

The non-gluten proteins in wheat can impact human health in several ways:

1. **Allergenic Potential:** While gluten is the primary allergen in wheat, non-gluten proteins like albumins and globulins can also trigger allergic reactions in some individuals. Wheat allergy symptoms can range from mild (skin rashes, gastrointestinal discomfort) to severe (anaphylaxis).
2. **Digestibility:** Non-gluten proteins are generally more easily digested than gluten proteins, which can be beneficial for individuals with sensitive digestive systems or certain gastrointestinal disorders.
3. **Nutritional Benefits:** The presence of essential amino acids in non-gluten proteins enhances the nutritional quality of wheat. These proteins contribute to the overall protein intake and provide essential nutrients that support various bodily functions.

Non-Gluten Protein Content in Wheat Varieties

Different wheat varieties have varying levels of non-gluten proteins. For instance:

Durum Wheat: Used primarily for pasta, it has a higher protein content overall, including

both gluten and non-gluten proteins, which contributes to the firmness and cooking quality of pasta.

Hard Red Wheat: Commonly used for bread-making, it has a higher gluten content but also significant levels of non-gluten proteins that enhance its nutritional value.

Soft Wheat: Typically used for pastries and cakes, it has lower protein content but still provides essential non-gluten proteins that contribute to the final product's quality and nutritional profile.

Enhancing Non-Gluten Proteins Through Breeding

1. Breeding programs aimed at improving wheat's nutritional quality often focus on increasing the content and quality of non-gluten proteins. This involves:
2. Selection for High Protein Varieties: Breeding wheat varieties with higher levels of albumins and globulins can enhance the nutritional profile of wheat-based foods.
3. Biofortification: Genetic techniques are used to increase the levels of specific amino acids or beneficial proteins in wheat, making it a more complete source of nutrition.

CONCLUSION

Non-gluten proteins in wheat, including albumins, globulins and minor prolamins, play crucial roles in the plant's biology and contribute significantly to the nutritional quality of wheat. Understanding these proteins' composition, functions and health implications can help enhance wheat breeding programs and develop wheat-based products that meet diverse dietary needs and preferences.