

AWB Wheat Quality Fact Sheet

Protein Quality – Protein Level

AWB Receival Standards

The protein targets for AWB binning grades such as AWB Prime Hard (13%), AWB Hard (11.5%) and AWB Premium White (10%) are widely known. These minimum protein contents reflect the necessary level to ensure the optimal functionality of Protein Quality for varieties eligible to enter the particular binning grades.

In some instances such as AWB Soft, a maximum Protein Level exists rather than a minimum because lower Protein Levels are required. In special cases such as the AWB Standard White Noodle grade, a protein window with an upper and lower limit exists to ensure a specific protein band is achieved.

Nature

A common misconception is “the higher the protein level the better the quality”. Whilst this is true for some wheat types and end products, matching the Protein Level and Protein Quality together has a much greater impact than just the Protein level alone.

Protein content is well recognised by growers as this result determines part of the payment rate and is measured on every individual delivery during the harvest period. Protein Quality or protein functionality on the other hand is determined by the breeding process and is indirectly ascertained at the receival stand via growers declaring which variety(s) constitute the load they are tendering for delivery.

Cause

The relationship between Protein Level and its quality is important because of the influence it has on end product performance. For example, when making a loaf of bread if the total protein is too “strong”, there is too much resistance to the gas bubbles expanding during baking, so the loaf does not rise properly.

Wheat varieties differ in their end product performance due in part to their unique combination of gluten molecules present. Gluten, which is the common name for a

complex structure of protein, gives dough its strength, causes resistance to stretching and allows bubble entrapment. In the case of a volume style bread, if the dough is too weak, it will stretch but then collapse again. Glutens differ in quality because they are made up of a mixture of large proteins called glutenins, and smaller proteins called gliadins. The relative proportion of these two fractions significantly affects the dough properties described as viscosity, extensibility and resistance/strength and indirectly its handling and baking/cooking properties.

This is where varietal classification is important, as this is the process that allocates particular varieties into grades based on a number of inherent quality characteristics, including the effects of protein. Any variety can be grown at high protein, but its protein quality will determine whether it is eligible for classification into a particular grade.

Impact

The main reason varieties are classified into different grades is based on their functionality or ability to make certain end products at specific protein levels. For example, 10 – 12% protein is required for Australian bread flours, while 7.5 – 8.5% protein is preferred for biscuit and cake flours. Japanese udon noodles are best made from wheat at 10.5% protein. As mentioned previously this is where the classification process is important as it matches protein quality and protein level together. This is reflected in AWB's Golden Rewards payment scheme where excessively high protein levels for certain grades are now paid a flat rate as higher protein is of no value to the flour miller or manufacturer.

When a flour miller decides which wheat to buy they consider their customers physical specifications and processing requirements.

Therefore in the flour mill there is a focus on the variety and/or grade as this determines the protein quality and the protein level of the wheat milled.

What can be done?

To produce the best quality product a grower must select a variety then grow it at the target protein level as outlined in the AWB Wheat Receival Standards.

Final grain protein, whilst at the mercy of the environment, can be controlled in part through good crop management. Crop rotations, weed control, fertiliser application and sowing rates all can have either a positive or negative effect on the protein level. For further details contact the State Agriculture Department or your local agronomist to tailor a protein package suitable for you.