Final Project Summary

Project title	Defining the basis for variation in water absorption of UK wheat flours		
Project number	21130025	**Final Project Report**	PR612
Start date	1 April 2016	**End date**	30 June 2019
AHDB funding	£180,000	**Total cost**	£195,000

What was the challenge/demand for the work?

Water absorption (WA) is the amount of water taken up by flour to achieve the desired consistency and create a quality end-product. It is a major factor that affects bread-making performance. The milling procedure is modified to achieve the required WA level. However, it is difficult to achieve this level with UK wheat in some years.

The study aimed to:

1. Identify factors that affect the WA of UK-grown wheat. This included a comparison of wheat grown in years with typical (2016 and 2018) and atypically low (2013 and 2017) WA levels.
2. Determine whether variation in fibre composition and properties contributed to variation in WA.
3. Determine whether variation in nitrogen fertilisation contributed to differences in WA.

How did the project address this?

The amounts and compositions of a range of components, including starch, protein and fibre components (including pentosan fractions), in white flour were determined. Cultivars/lines in the study included those used in the Wheat Genetic Improvement Network (WGIN) and lines developed specifically to contain different amounts of pentosan (arabinoxylan) in a common genetic background.

The Farrand equation (based on protein, starch damage and moisture content) is widely used to predict WA. This project used statistical analysis to determine whether the addition of specific traits could improve the predictions, compared to the baseline model.

What outputs has the project delivered?

The study demonstrated that fibre components do contribute to variation in WA between cultivars and samples grown in different years. However, no single component could be conclusively identified.
The component that made the greatest contribution, in the WGIN variety trials, was β-glucan. This is a relatively minor fibre component, compared with pentosans. Two traits improved the prediction of WA in the lines differing in pentosan content, both of which relate to differences in soluble pentosans.
No effects of fertilisation were observed beyond effects on total protein content, which is already considered in the Farrand equation.

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Who will benefit from this project and why?
Ultimately, millers will benefit. However, it is necessary to carry out further work to develop simple assays for fibre components that contribute to differences in WA.

If the challenge has not been specifically met, state why and how this could be overcome

Lead partner	Prof Peter Shewry and Dr Alison Lovegrove, Rothamsted Research
Scientific partners	Dr Paola Tosi, University of Reading
Industry partners	Dr Mervin Poole, Heygates Ltd
Government sponsor	