

SELECTION OF DIFFERENT SOURCE OF ENRICHED WHEAT FIBRE FRACTIONS USING DRY FRACTIONATION PROCESS

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Wheat grain contains about 12-14% of fibres mainly located in the outer layers. Moreover, the composition and the structure of fibres, as well as the nature and amount of co-passengers, varie according to the tissue where they are originated from. The aleurone layer is rich in low substituted arabinoxylans esterified to ferulic acid whereas outer pericarp contains highly substituted arabinoxylans but also cellulose and lignin. Therefore wheat fibres properties (such as enzymatic hydrolysis susceptibility, fermentescibility) showed a high variability according to their origin within the grain. Conventional milling technology allows fibres separation from the starchy endosperm (recovered in flour/semolina) to the outer layers (recovered in the bran fraction). However, this process is unable to sort out the various fibres encountered in the whole grain and its peripheral layers with a view to enhance positive nutritional effect. Accordingly, other processes have to be developed with the aim to produce fractions enriched with selected fibres within the outer layers. Debranning technology was studied in order to recover enriched dietary fibre fractions with contrasted composition and properties.

At first, common and durum wheat were both processed at the pilot scale (300 kg/h) in order to identify any differences in tissue composition for similar debranning yield and to determine how tissues segregate during debranning. The influence of tempering and dehulling process on the debranning kinetics were analysed through a parametric study. Wheat grain tissue proportions were determined in each dehulled fraction by the marker methodology (Hemery et al., 2009) in order to assess the histological origin of fibres and their co-passengers. This quantitative analysis was related to a qualitative microscopic observation of debranned grains. It was then possible to follow the separation of each outer layer according to the debranning rate. Considering the wheat grain geometry no pure fraction of each tissue was obtained. However combination between markers methodology and debranning unit operations (friction and/or abrasion) allows obtaining enriched fractions either from pericarp or from aleurone layer. An optimised debranning diagram is proposed to produce contrasted fractions, in term of composition (pericarp amount vs aleurone layer amount), that could not be obtained in conventional mill streams. The potential interest of such fractions will be further evaluated on a nutritional point of view.

Keywords: wheat, debranning, fibre production, phenolic acids

Hemery, Y.; Lullien-Pellerin, V.; Rouau, X.; Abecassis, J.; Samson, M. F.; Aman, P.; von Reding, W.; Spoerndli, C.; Barron, C., Biochemical markers : efficient tools for the assessment of wheat grain tissue proportions in milling fractions. *Journal of Cereal Science* **2009**, 49, (1), 55-64.

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