

Profiling gluten genes and proteins in wheat species and cultivars with respect to coeliac disease

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The position of wheat in the food industry is mainly due to the unique viscoelastic, gasholding and thermosetting properties of its major protein fraction: gluten. However the importance of the gluten is overruled by its characteristic to provoke coeliac disease (CD; gluten intolerance) in sensitive persons (~0.5 to 1% of the population) upon ingestion. CD-patients have to follow a lifelong strict gluten-free diet. The presented joint research aims at identification and selection of non-toxic or low-toxic wheat cultivars to allow production of wheat products for CD patients and to help prevent the disease. The project includes:

- genomics of wheat gluten genes ;
 - epitope screening of a broad collection of wheat species and cultivars;
 - clinical testing of selected cultivars with reduced toxicity;
 - testing of industrial quality of proven low-toxic cultivars;
 - introduction of suitable cultivars in the food production chain.
- Hence, the project will contribute to a reduction of the coeliac problem worldwide.

The number of gluten genes can range from 25 to 150, depending on the wheat species, its cultivar and the ploidy level. The gluten protein composition can differ considerably between species and cultivars, and can also vary within a cultivar due to growing-conditions. The start of the project focuses on screening and genomic characterization of representative selection of wheat species and cultivars of the Centre of Genetic Resources, the Netherlands (www.genebank.nl). This selection includes *Triticum aestivum* (hexaploid, carrying the AABBDD genomes, old landraces and old and recent summer and winter cultivars), *T. turgidum* (tetraploid, with AABB genomes) and various (wild) diploid ancestor species (donors of A, B or D genome).

Using a specifically designed set of primers, the profile of the gluten gene family was analysed with focus on sequence composition and domain organization. Concomitantly, gluten proteins have been extracted from grains for testings in a T-cell panel specifically sensitive to gluten epitopes considered relevant to CD. The poster presents the first results of the project.

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