

Assessment of celiac disease-triggering peptides in different wheat varieties

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- *Wheat impact on Celiac Disease onset evaluation using in vitro gastrointestinal digestion*
- *Identification of gluten peptides related to Celiac Disease via mass spectrometry*
- *Genotype and cultivation area effects on gluten peptides amounts*

Celiac disease (CD) is a genetically determined chronic inflammatory intestinal autoimmune disease. CD is related to environmental and genetic factors. Wheat gluten is the primary external trigger of the immune response in CD. Indeed, the gluten epitopes eliciting the immune response are present in the peptides resisting the complete gluten digestion.

The content of peptides known to induce immune response in CD patients were analysed after simulated *in vitro* gastrointestinal digestion, as a function of genotype and cultivation areas. UPLC/ESI-MS was used to identify and quantify peptides in the obtained digested mixtures. Two durum wheat collections were used. The first collection was made up of 76 varieties, cultivated in the same area, to determine the impact of genotype on allergenicity, while the second one, made up of 6 genotypes, was cultivated in four different regions with the aim to investigate cultivation area impact.

The identification of peptides carrying CD epitopes indicated that most of them belonged to gliadins. Peptides related to CD obtained derived mainly from γ -gliadins, more specifically; our results showed that major immunogenic peptides came from γ -gliadins. Regarding the first collection, the projection of the studied samples on the factorial space created by the two first components showed important variability, confirming the high genetic diversity among the genotype set.

The second collection hinted to the impact of cultivation area and climatic conditions. A multivariate analysis of variance was conducted on 36 durum wheat genotypes cultivated in four regions using Pillai's trace test. The variability of allergens content was significantly under the effect of region (Pillai's trace value=2.38, $P<0.001$), genotype (Pillai's trace value=3.96, $P<0.001$) and their interaction (Pillai's trace value=6.20, $P<0.05$).

Future works will focus on *in vivo* trials to confirm the low impact of the identified genotypes on the immune mechanisms involved in the CD onset.

Fatma Boukid is a research fellow at the University of Parma. She holds a degree in food sciences engineering and a Masters in food sciences and technologies from the national institute of agronomy in Tunis, and she is currently a PhD student (3rd year) in food technologies at the national engineering school in Sfax. She is also working at the food and drug department with food chemistry division. She is in charge of the in vitro digestion of wheat in order to identify wheat proteins epitopes associated with disorders such as celiac disease and baker's asthma using mass spectrometry technique.