



Wheat-based foods and non celiac gluten/wheat sensitivity: Is drastic processing the main key issue?



Anthony Fardet *

INRA, UMR 1019, UNH, CRNH Auvergne, F-63000 CLERMONT-FERRAND & Clermont Université, Université d'Auvergne, Unité de Nutrition Humaine, BP 10448, F-63000 Clermont-Ferrand, France

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ABSTRACT

While gluten and wheat must be absolutely avoided in coeliac disease and allergy, respectively, nutritional recommendations are largely more confused about non-coeliac wheat/gluten sensitivity (NCWGS). Today, some even recommend avoiding all cereal-based foods. In this paper, the increased NCWGS prevalence is hypothesized to parallel the use of more and more drastic processes applied to the original wheat grain. First, a parallel between gluten-related disorders and wheat processing and consumption evolution is briefly proposed. Notably, increased use of exogenous vital gluten is considered. Drastic processing in wheat technology are mainly grain fractionation and refining followed by recombination and salt, sugars and fats addition, being able to render ultra-processed cereal-based foods more prone to trigger chronic low-grade inflammation. Concerning bread, intensive kneading and the choice of wheat varieties with high baking quality may have rendered gluten less digestible, moving digestion from pancreatic to intestinal proteases. The hypothesis of a gluten resistant fraction reaching colon and interacting with microflora is also considered in relation with increased inflammation. Besides, wheat flour refining removes fiber co-passenger which have potential anti-inflammatory property able to protect digestive epithelium. Finally, some research tracks are proposed, notably the comparison of NCWGS prevalence in populations consuming ultra-versus minimally-processed cereal-based foods.

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Introduction: position of the debate

Gluten is the protein fraction coming from *Triticum* species (wheat, rye and barley) or from their crossbred varieties and of their derivatives, which is insoluble in water and in a solution of 0.5 M sodium chloride, and to which some people are intolerant.

Wheat/gluten-related disorders gather auto-immune diseases (coeliac disease, gluten ataxia and dermatitis herpetiformis), allergies (respiratory allergy, food allergy, wheat-dependent exercise-induced anaphylaxis, and atopic dermatitis and urticarial), and unknown diseases like non-coeliac wheat/gluten sensitivity (NCWGS) [1].

The NCWGS is indeed not well-known and has poorly characterized symptoms, and that are closed to those of celiac disease: digestive disorders coupled to headaches, muscle and/or joint pains, depression... The diagnostic is most of the time made by elimination: this is not an allergy and not a celiac disease. Today,

some gastroenterologists propose to adopt a gluten-free diet for three months then progressively reintroducing gluten to determine gluten tolerance threshold, different for each patient.

While gluten and wheat must be absolutely avoided in coeliac disease and allergy, respectively, nutritional recommendations are largely more confused about NCWGS. Indeed, it seems that these symptoms would not be alleviated by only removing gluten from diet. As stated by Catassi et al.: "Recent studies raised the possibility that, beside gluten [2] and wheat amylase trypsin inhibitor [3], low-fermentable, poorly-absorbed, short-chain carbohydrates [4] can contribute to symptoms (at least those related to irritable bowel syndrome) experienced by NCWGS patients" (page 3841) [5].

In parallel to the increasing prevalence of people hypersensitive to gluten has raised a recent debate about wheat and related disorders, and whose one of the main conclusion would be that wheat protein would be responsible for wheat-related disorders and systemic low-grade inflammation [6]. As a consequence, wheat should be avoided from our diets and would be responsible for, not only wheat/gluten-related disorders, but also for Western non communicable diet-related chronic diseases raising prevalence, i.e., type 2 diabetes, cardiovascular diseases and some cancers. This idea is

Abbreviations: FODMAPs, Fermentable, oligo-, di-, monosaccharides, and polyols; NCWGS, non-coeliac wheat/gluten sensitivity.

* Tel.: +33 (0)4 73 62 47 04; fax: +33 (0)4 73 62 47 55.

E-mail address: anthony.fardet@clermont.inra.fr