

Food Packaging: providing reliable information to consumers with gluten intolerance

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Introduction

Food safety continues to mobilize all aspects of the food chain, from producers to consumers. Thus, labelling has proved to be an important tool during the buying decision: the label is the first link between the product and consumers. Food packaging provides consumers with relevant information about the product, allowing them to make conscious, healthy and safe choices, especially to those suffering from food allergies or intolerances.

Celiac disease (CD) is a chronic small intestinal immune-mediated enteropathy precipitated by exposure to dietary gluten in genetically susceptible individuals, hampering macro and micro nutrients absorption. It has not been possible until now to establish an acceptable daily intake of gluten that can be tolerated by people with celiac disease, which treatment currently consists of a gluten-free diet (GFD) throughout life.

The Codex Alimentarius defines gluten as "a protein fraction from wheat, rye, barley and oats or their crossbred varieties and derivatives thereof, to which some persons are intolerant and which is insoluble in water and 0,5 M sodium chloride solution". Gluten is a mixture of prolamin and glutelin proteins present in wheat, rye, barley and oats. Prolamins differ their names according to the cereal from which they derive: gliadin (wheat), secalin (rye), hordein (barley) and avenin (oats). They exhibit greater evidence of toxicity, being responsible for the development of lesions in the intestinal mucosa of celiac patients.

In the last years, the substantial growth of CD incidence, significantly provoked changes in the dietary habit of an increasingly large population, with a rise in demand of gluten-free products. GFD is a complex and challenging diet but recent advances in the food industry are making it easier to follow.

In accordance with the European Regulation No 1169/2011, which came into force on 13 December 2014, it is required to indicate on the label substances or products causing allergies or food intolerances. At European level there is a great concern with this type of food intolerance, therefore foodstuffs intended for particular nutritional use have a specific regulation (No 41/2009). This regulation, applicable since January of 2012, concerns the composition and labelling of foodstuffs suitable for people with gluten intolerance.

In this context and to confirm gluten-free information on packaged food products, Food and Nutrition Department's Chemistry laboratory works with the food industry and carries out analysis for the assessment of gluten content.

Aim

The aim of this work was to evaluate the conformity of labelling, connected with gluten-free information, by carrying out analysis for detection and quantification of gluten in packaged food products from food industry.



<http://www.thedieline.com/blog/2014/8/18/opinion-10-food-packaging-innovations>

Methodology

The Codex Alimentarius specifies in Codex Standard 118-1979 (2008) the R5 antibody based ELISA as the standard method for the determination of gluten, allowing for the detection of α -, β -, γ - e ω -prolamins.

This method is an ELISA "sandwich" in which the wells of the microtiter strips are coated with specific antibodies against gliadins. The monoclonal antibody R5 reacts with the gliadin-fractions from wheat and corresponding prolamins from rye and barley.

In this study (2010-2016) we evaluated the gluten content of 51 samples from 5 food groups using the Sandwich R5-ELISA (RIDASCREEN® Gliadin) in conjunction with a cocktail solution, that allows the extraction of wheat, barley and rye prolamins from both unheated and heated foods.

Results

Table 1. Analytical limits of Sandwich R5-ELISA method.

Analytical Limits	
Limit of Detection	3 mg/Kg
Limit of Quantification	5 mg/Kg

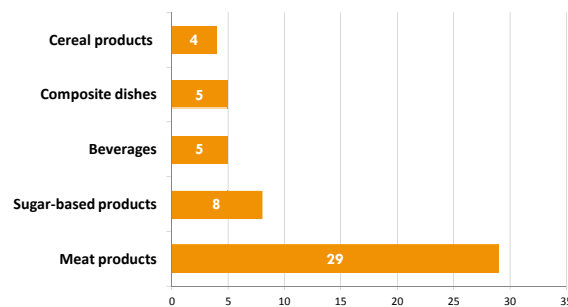


Figure 1. Number of samples analysed by food groups.

Table 2. Results of gluten analysis.

Food groups	Gluten results (mg/Kg)
Meat products	< 3
Sugar-based products	< 3
Beverages	< 3
Composite dishes	< 3
Cereal products	< 20

Conclusion

Food labelling helps consumers to get important information about the food products that they consume. This information is particularly important for those with food intolerances, like celiac patients.

According to the European Regulation No 41/2009, concerning the composition and labelling of foodstuffs suitable for people intolerant to gluten, the label of these foodstuffs shall bear one of the terms: "Gluten-free" - label placed on foodstuffs with gluten content below 20 mg/kg; "Very low gluten" - label placed on foodstuffs with gluten content between 20 and 100 mg/kg.

All the samples analysed in this study contained levels of gluten below the 20 mg/Kg limit proposed by the Codex Alimentarius Commission for gluten-free foods. These results were in agreement with gluten-free information presented on the labels of food packaging.

These analysis underline the importance of the laboratory in ensuring that gluten-free information on the labels of food packaging is reliable, so people with CD can make informed and safe choices about the products available on the market.

References

[1] Codex Standard for Foods for Special Dietary Use for Persons Intolerant to Gluten (Codex Stan 118-1979); [2] Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to Consumers; [3] Commission Regulation (EC) No 41/2009 of January 2009 Concerning the composition and labelling of foodstuffs suitable for people intolerant to gluten; [4] RIDASCREEN® Gliadin - Enzyme immunoassay for the quantitative analysis of gliadins and corresponding prolamins; [5] Piné, MR. Validation of an alternative method for gluten analysis in foodstuffs ELISA-R5: compared with current official method of analysis. Master's thesis in Quality Control and Food Toxicology. Faculty of Pharmacy, University of Lisbon, in 2007.