

## CONSUMERS' ATTITUDE TOWARDS AVAILABILITY AND QUALITY OF GLUTEN-FREE PRODUCTS IN THE LATVIAN MARKET

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### Abstract

Celiac disease is an autoimmune enteropathy disease, triggered in genetically susceptible individuals by ingested gluten from wheat (*Triticum*), rye (*Secale cereale*), barley (*Hordeum vulgare*) and other closely related cereal grains. The only way of the effective daily treatment is a strict gluten-free diet. From the investigation of products available in the local market, it was found that Latvian producers do not offer gluten-free products. The aim of this research was to study a celiac patient's attitude to gluten-free product quality and availability in the Latvian market and purchasing habits. The survey was designed using website [www.visidati.lv](http://www.visidati.lv), and a questionnaire was sent to people suffering from celiac disease. The respondents were asked to fill in the questionnaire from the beginning of December 2010 till the end of July 2011. The questionnaire was performed with 131 celiac patients, respondents were from all Latvian regions and they answered 15 questions. One of the most important questions was aimed to find out consumers' opinion about quality of gluten-free products, consumption patterns of gluten-free products, and, moreover, their interest in products made in Latvia. Respondents were asked to name gluten-free products they mainly buy and give specific purchase locations, evaluate the quality of products and necessity for products produced in Latvia. The results of questionnaire show that the consumers are satisfied with the quality of gluten-free flour, flour blends and pasta, but are not satisfied with the quality of bread and confectionery available in the Latvian markets.

**Key words:** gluten-free products, gluten-free diet, consumers, quality.

### Introduction

Celiac disease is a complex autoimmune enteropathy caused by a permanent intolerance to gluten in genetically susceptible individuals. It is not an allergy, although sometimes erroneously called so. Gluten is the main protein of wheat (*Triticum*). The alcohol-soluble fraction (prolamin) of gluten – gliadin – is a toxic component which causes celiac disease. With similar properties are hordein proteins in barley (*Hordeum vulgare*) and secalin in rye (*Secale cereale*). Celiac disease is one of the most common lifelong disorders on a worldwide basis affecting approximately 1% in the general population (Niewinski, 2008; Schober, 2009). The treatment of celiac disease patients is a lifelong elimination diet in which food products containing gluten are avoided (Fasano and Catassi, 2001). The gluten-free diet is not an easy undertaking as gluten-containing grains, especially wheat, is the main ingredient in culturally popular foods such as bread, pasta and cakes. But starch is also widely used as an additive, binder and thickener in a vast majority of processed foods such as broths, marinades, processed meat, canned goods, candy and medications (Cureton and Fasano, 2009).

The term 'gluten-free' does not refer to the total absence of gluten. In definition of 'gluten-free', some residual amount of gluten is allowed; this amount is strictly regulated (Arendt and Nunes, 2010). The International Codex standard, used in most of Europe, is in the process of revising the standards for gluten-free foods, but has been unsuccessful this far, as there was no consensus on acceptable gluten-free levels and the method of testing for gluten. The original 1983 Codex standard defines 'gluten-free' foods as follows:

- a) consisting of or made only from ingredients which do not contain any prolamins from wheat, rye, barley or their crossbred varieties with a gluten level not exceeding 20 mg kg<sup>-1</sup>; or
- b) consisting of ingredients from wheat, rye, barley, oats (*Avena sativa*), spelt (*Triticum spelta*) or their crossbred varieties which have been rendered 'gluten free', with a gluten level not exceeding 200 mg kg<sup>-1</sup>; or
- c) any mixture of the two ingredients in (a) and (b) with a gluten level not exceeding 200 mg kg<sup>-1</sup> (Cureton and Fasano, 2009).

At this time Commission Directive 41/2009/EC of 20 January 2009 order labelling of ingredients containing gluten in the manufacture of such foodstuffs, a content of gluten not exceeding 100 mg kg<sup>-1</sup> and 20 mg kg<sup>-1</sup> (EU Commission Regulation (EC) No 41/2009, 2009).

Gluten-free products are one of the most challenging issues for food technologists due to the fact that wheat gluten has a wide variety of tasks in bread making, and a wide range of ingredients are needed to achieve a good quality product without wheat gluten. A gluten-free diet is essential for patients having celiac disease (Katina et al., 2005; Gallagher et al., 2003). Maize (*Zea mays*), rice (*Oryza*), tapioca, sorghum (*Sorghum*), amaranth (*Amaranthus*), buckwheat (*Fagopyrum esculentum*) and potato (*Solanum*) flour which are allowed in a gluten-free diet, are not able to supply the same technological characteristic as gluten (Pagliarini et al., 2010). Sensory properties (appearance, colour of crumb and crust, and odour) are

some of the most important factors for consumer liking and preference; thus it is very important to determine factors affecting the product attributes, acceptance and preference especially for foods (Dos et al., 2002; Melo de et al., 2009). Gluten-free breads often have poor crust and crumb characteristics, low quality, exhibit poor mouth feel and flavour (Katina et al., 2005; Gallagher et al., 2003). The challenge facing the gluten-free sector is that it needs to lose the image of being 'better than nothing', and to offer a credible range of products with improved choice, taste and quality (Heller, 2009).

Historically, finding safe, gluten-free foods in the market place has been an enormous challenge for people with celiac disease. Grocery shopping became extremely time-consuming, confusing and unproductive. The food labels provided little help in determining whether products are gluten free. Shopping for gluten-free food takes an average family between 10 and 20 h per month longer than average consumers, which includes contacting food manufacturers, reading product labels and searching the Internet to identify foods that are free from gluten ingredients and cross-contamination (New Food Safety Program, 2005). The aim of this research was to study a celiac patient's attitude to gluten-free product quality and availability in the Latvian market as well as purchasing habits.

**Materials and Methods**

In the survey there was studied the attitude of a celiac patient' treatment as well as the evaluation of gluten-free products' quality availability in the Latvian market. The questionnaire was used as a basic

tool which was completed by 131 celiac patients. Respondents answered 15 questions, of which nine questions were related to the gluten-free products, three – to gluten-free diet, while the rest of questions were aimed at obtaining basic information about the respondent. In the questionnaire, respondents were asked to answer both multiple-choice and open-type questions.

One of the most important questions was aimed to find out consumers' opinion about quality of gluten-free products, consumption patterns of gluten-free products, and, moreover, their interest in products made in Latvia. Respondents were asked to name the gluten-free products they mainly buy, give specific purchase locations, evaluate the quality of products and the necessity in products produced in Latvia.

The survey was designed using website [www.visidati.lv](http://www.visidati.lv), which gives an opportunity to get a quick and effective survey distribution and data collection. In order to reach the proper respondents, a link to the web-based questionnaire was sent to people suffering from celiac disease. The respondents were asked to fill in the questionnaire from the beginning of December 2010 till the end of July 2011.

Means and standard division of the means were calculated using Microsoft Office Excel 2007 (Microsoft Corporation, Redmond, WA).

**Results and Discussion**

The questionnaire was performed with 131 celiac patients, 9% of all respondents were men, and 91% – women. Respondents were from all Latvian regions – Kurzeme (13.7%), Zemgale (14.5%), Vidzeme (21.4%), Latgale (7.6%) and Riga (42.7%). Breakdown of respondents according to their age is presented in the Figure 1.

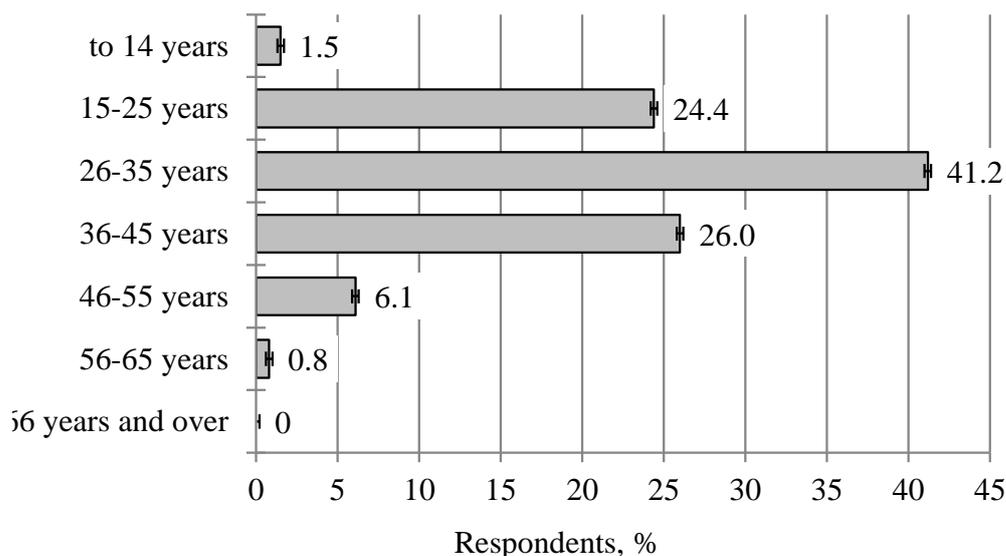


Figure 1. Respondents' breakdown according to their age, %.

The largest respondent group presented in the research was from age 26 to 35, while the smallest part – from the group of age 56 to 65. The above mentioned distribution of respondents according to their age may be due to the way of questionnaires were distributed and collected – electronically via Internet. In Latvia majority of the people at age over 56 significantly less use computers and internet therefore only few respondents from this age group participated in the questionnaire. The questionnaire data shows that in majority of the surveyed households, celiac disease affects children, not their parents. In these cases the questionnaire was filled out by the parents who were purchasing gluten-free products. Majority of parents indicated that they prefer to cook gluten-free food at home.

Analyses of gluten-free dieting duration shows that nine (7.6%) respondents slim gluten-free diet since birth; these are mostly children whose diagnosis of celiac disease could be established early because new methods of detection have been developed. Eighty-two (62.6%) respondents slim by following a gluten-free diet more than one year – 3–15 years. Most of the respondents slim gluten-free diet for approximately 4–6 years, which could be explained with evolution of diagnostic tools. There are many respondents who indicated that their diagnosis initially had not been correctly established; thereby treatment of celiac disease has been started only two or three years ago although they have been suffering from this disease for much longer time. Consequently, the respondents are familiar with the products available in the market and the prevailing situation. Wheat (gliadin) and rye (secalin) flour contains gluten therefore persons with celiac disease have to avoid these flour following

strict gluten-free diet. For that reason family members often adjust their diets to the diets followed by celiac patient excluding from diet products containing gluten. The results of the questionnaire presented that 65.5% of respondents indicate that other family members adapt or partially adapt these diets and use gluten-free products, 26.7% of them completely adapt – in this case there is no necessity to cook separate dishes. Often these are families where young children suffer from celiac disease; it helps children to get used to their diet. Respondents' family members (38.8%) adapt partly, mostly gluten-free flour is used in sauces and soups or meals, where flour does not significantly affect the taste of the finished product. But 34.5% of respondents' family members do not adapt, because they think it is not necessary to adjust their diet, as well as because gluten-free products are expensive and family cannot afford them for all family members.

Respondents mainly buy flour, pasta, bread, confectionery and flour blends in local markets (Fig. 2). Some respondents (5.5%) are purchasing other gluten-free products, such as candies, muesli, oatmeal, food supplements and special vitamins, but 0.4% does not purchase gluten-free products. They choose to decrease the amount of cereal products in their daily menu. Consumers mostly purchase flour, because 87.8% of respondents choose to prepare gluten-free products at home, as, according their opinion, homemade products are more tasty and varied.

Consumers have limited opportunities to buy gluten-free products for daily consumption because of the economic situation in the country and relatively high prices of gluten-free products. Figure 3 presents average monthly expenses of respondent households spent for the purchase of gluten-free products.

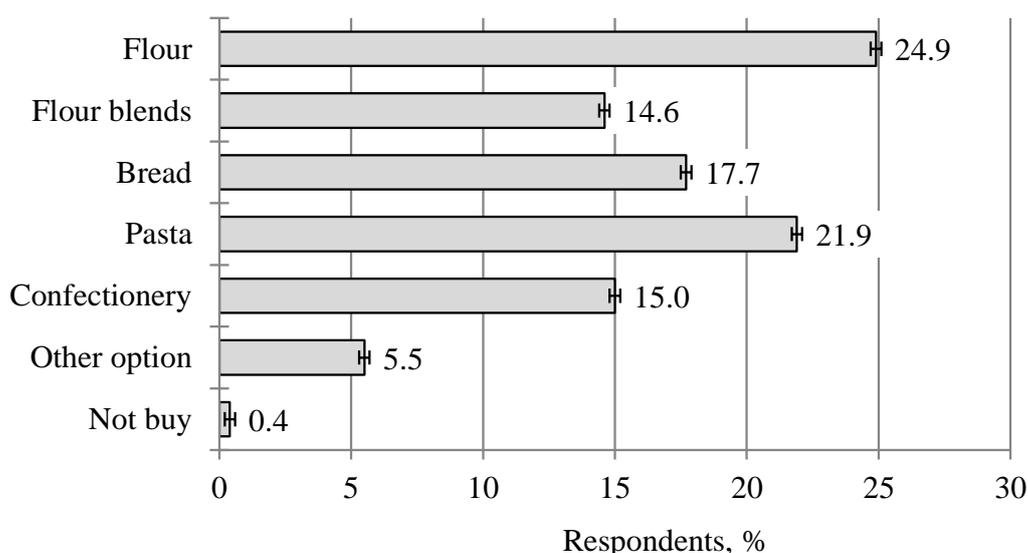


Figure 2. Gluten-free products, which respondents mainly buy in commercial networks.

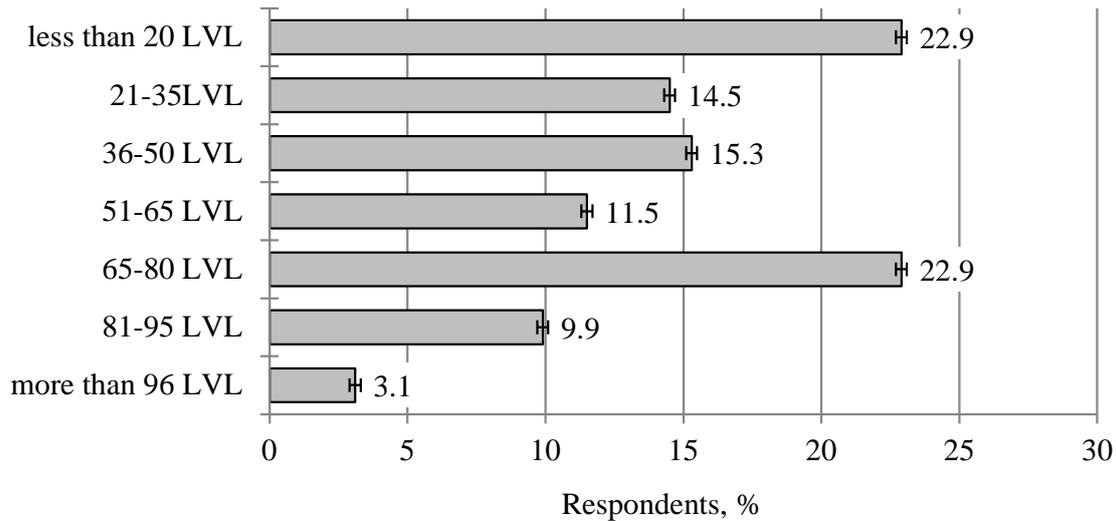


Figure 3. Monthly household expenses for the purchase of gluten-free products.

About 23% of respondents spend less than 20 LVL per month and the same percentage of respondents spend 65–80 LVL per month for purchasing of gluten-free products, while 3.1% spend more than 90 LVL per month. Those who spend less than 20 LVL per month mainly buy only gluten-free flour and choose to prepare gluten-free products at home or reduce use of flour-containing products in their menu. The group of respondents who spend 65–80 LVL per month mostly includes families with children suffering from celiac disease; they can afford spending more money, because they receive some allowance. According to the section 13 (paragraph 8) of the Social Services and Social Assistance law, the children suffering from celiac disease which do not

have a disability can receive allowance. The Cabinet of Ministers Regulation No. 928 ‘Provisions of State support to children with celiac disease who do not have a disability’ (MK noteikumi Nr. 928, 2004) has established the amount and conditions of allowance. State support can receive only children up to 18 years; amount of allowance is 75 LVL per month. Many of the respondents reveal that an allowance is extremely important and necessary, because without it that would be impossible to afford buying a gluten-free products, which are expensive. Other respondents note that it would be great if such support would be granted not only to children but also to adults.

Figure 4 presents commercial places respondents mainly use to purchase gluten-free products.

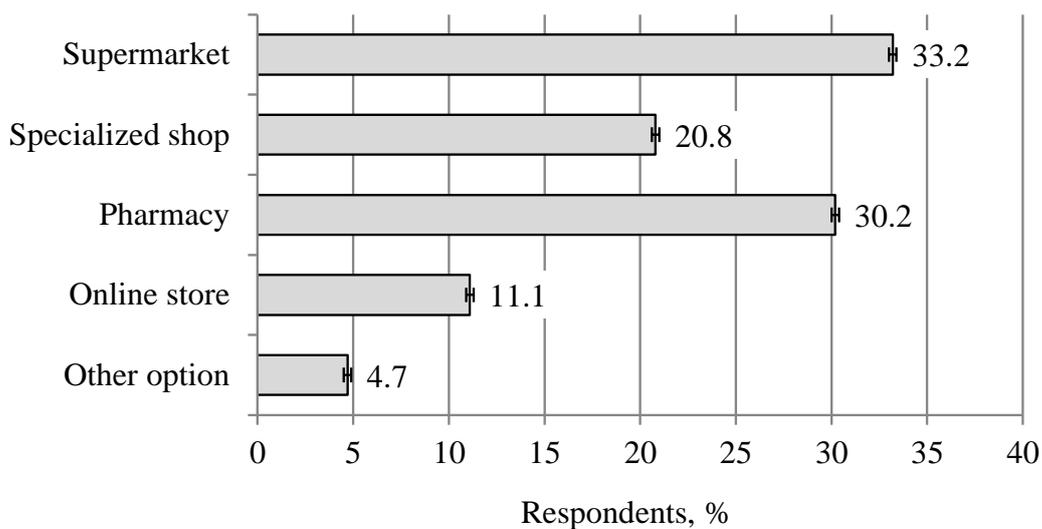


Figure 4. Commercial places where gluten-free products mainly are purchased.

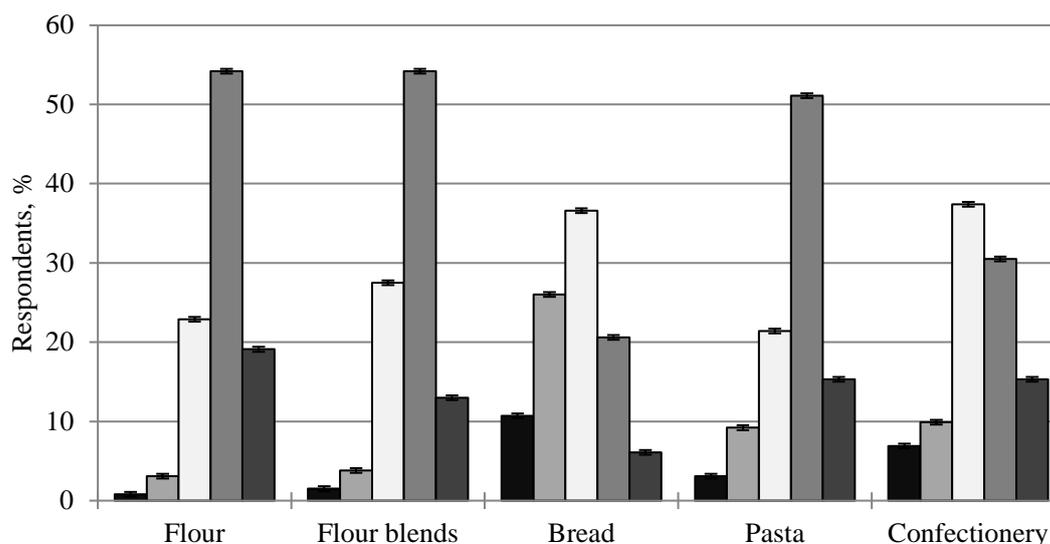


Figure 5. Celiac patients' opinion on the quality of commercial gluten-free products available in market:  
 ■ - Very poor □ - Poor □ - Average □ - Good ■ - Very good

One third of respondents are purchasing gluten-free products in supermarkets – mostly in 'Rimi', because this supermarket store chain network is spread all over the territory of Latvia, while the 'Stockman' and 'Maxima' store network offers the largest choice of gluten-free products. Approximately 30% of respondents purchase gluten-free products in pharmacies, mostly mentioning 'Meness aptieka', 'A aptieka' and 'Mana Aptieka', spread all over the territory of Latvia as well. Those respondents (20.8%) who prefer to have different varieties of gluten-free products (frozen products, candy, beer, etc.) mainly do shopping in specialized shops ('Veselibas Veikals' in Riga, and 'Pie Undines' in Kuldiga). Some respondents (11.1%) prefer to buy products online ([www.bodebode.lv](http://www.bodebode.lv), [www.pirkumins.lv](http://www.pirkumins.lv), a German online shop), because some products are cheaper in online stores than in supermarkets or specialized shops. The rest of respondents (4.7%) prefer to choose other option – ordering gluten-free products from foreign countries where their relatives or friends live. Respondents declare that it is almost impossible to buy gluten-free products in rural areas.

The results of the questionnaire show that the celiac patients mainly evaluate the quality of gluten-free flour, just like the quality of flour blends as good (54.2%). Flour quality as average was characterized by 22.9% of respondents, while flour blends got average evaluation in 27.5% cases. About 37% of respondents evaluate bread quality as average, 26.0% – as poor, but confectionery – as average (37.4%) or good (30.5%) (Fig. 5). Consumers are satisfied with the quality of gluten-free flour, flour blends and pasta available in the markets and mainly characterize it as good, but they are not satisfied with the quality

of bread and confectionery and mainly evaluate it as average. Therefore, this is a great opportunity to producers develop flour blends which could be used for production of quality gluten-free bread. If flour blends would be produced and sold in Latvia, it would reduce the price of the product and it would be more competitive.

All respondents noted that it is necessary to increase the range and assortment of gluten-free products. Respondents (37.3%) would like to have cheaper products, 36.4% of them are interested in products produced in Latvia and hope that it would reduce prices of gluten-free products. Respondents were asked to leave a comment; they mentioned that the label of a gluten-free product should include more detailed information on the composition of the product. Consumers would like to have increased range of gluten-free products – chocolate bars, sweets, ice cream, convenience foods such as meat products. As well it would be necessary to educate employees in the commercial sector about celiac disease and gluten-free products, because respondents indicate frequent situations – when consumers ask, where gluten-free products are located in the store, employees are unable to answer because they do not understand the question. Gluten-free products should be located together at the same spot of the supermarket having the special sign 'gluten-free', which would help consumers. The public catering system should include gluten-free flour products in the menu or be ready to offer such dishes upon request.

### Conclusions

1. The consumers mainly buy gluten-free flour, pasta, bread, confectionery and flour blends in

- supermarkets, pharmacies and specialized shops.
2. The results of the questionnaire show that the consumers are satisfied with the quality of gluten-free flour, flour blends and pasta available in the Latvian markets and mainly characterize it as good, but they are not satisfied with the quality of bread and confectionery and characterize it as average.
  3. The quality and health of the life of the patients with celiac disease could be improved by

increasing availability of good quality gluten-free products in the markets and restaurants, and more by a detailed labelling of food ingredients.

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