

CONSUMER PERCEPTIONS OF NON - TRADITIONAL CEREALS (BARLEY AND EINKORN) AND THEIR PRODUCTS IN REPUBLIC OF CROATIA, REPUBLIC OF BULGARIA AND REPUBLIC OF MACEDONIA

Gjore NAKOV

“Angel Kanchev” University of Ruse, Razgrad Branch, Department of Biotechnology and Food Technology, 47 Aprlosko vastanie Blvd., 7200 Razgrad, Bulgaria, Phone/Fax: +359 882956044; E-mail: gnakov@uni-ruse.bg

Corresponding author: gnakov@uni-ruse.bg

Abstract

*The aim of this paper is to study the opinion on the use of non-traditional cereals (barley and einkorn) in three different countries (Bulgaria, Macedonia and Croatia). In Bulgaria 81.90% were men and the other 18.10% were women. In Macedonia, 33% of men and 67% of women completed the survey, while in Croatia 14% of the respondents were men and the remaining 86% were women. More than half of the respondents consume cereals and cereal products. Those that consume cereals believe that whole grains have a positive impact on health. Those who do not consume cereals, do so because they are on a diet or have intolerance to cereals. In Bulgaria and Croatia, the reason listed for not consuming cereals is dieting. The most frequently consumed cereal product is bread. In Bulgaria, following closely after bread are cookies, and in Croatia and Macedonia, muesli are second used products. People from Croatia, Bulgaria and Macedonia know that barley is used in beer production, but a few people know for bread, cookies and other bakery products makes with barley flour. More than 1/4 of the respondents in Croatia and Macedonia do not know about einkorn (*Triticum monococcum* L.) and their products.*

Key words: *barley, cereals, einkorn, public opinion*

INTRODUCTION

Cereals such as wheat, corn, rice, oats, barley and others are also known as "functional cereal products" [6]. According Functional Food Science in Europe, functional foods are defined with the following terms: conventional or daily foods or supplements; naturally occurring within food; with proven positive influence on certain functions of the organism [20]. WHO and the food industry are tasked with familiarizing consumers with a healthy lifestyle, as well as with the possibilities for reducing the risk of chronic diseases. In this context, functional foods have a significant impact. They refer primarily to the nutritional value of a product, but also have a preventative role – to reduce diseases by using such raw materials, which improve the health, physiological and metabolic effects [4, 12]. Whole-grain foods are part of the “healthy food” trends due to the positive influence on human health [8].

The barley's grain belongs to the family *Poaceae*, genus *Triticeae* и *Hordeum*. Currently the most used barley in the world is from the genus *Hordeum vulgare*. Barley is a cereal crop that has been used in the production of bread since the Neolithic era. It is thought to have initially been cultivated in the Southwest of Asia or North Africa, while wild barley forms can still be found in West Asia [27].

Einkorn is one of the oldest cereals, suitable for organic production. Compared to other cereals, einkorn is more resistant to disease and crude climate. This type of wheat is still cultivated in dry lands in Italy, where other cereals cannot grow. Einkorn has a significantly lower yield compared to other cereals. It is originally from Turkey's highlands and is a wild predecessor of the *T. baеoticum* Boiss [11, 14].

The aim of this paper is to study the opinion on the use of non-traditional cereals (barley and einkorn) in three different countries

(Bulgaria (BG), Macedonia (MKD) and Croatia (CRO)). The survey in Croatia was conducted in the Osijek-Baranja County, in Bulgaria - Razgrad region, and in Macedonia in the city of Skopje.

According to the latest census in the Republic of Croatia (2015) 292 494 persons live in the Osijek-Baranja county [5]. According to the last census in Bulgaria, there are 115,402 people living in the Razgrad region [18]. According to the last census, 506 926 people live in the city of Skopje [25].

MATERIALS AND METHODS

The internet survey was uploaded on the Google platform. It was an anonymous survey. A total of 401 (149 from BG, 143 from CRO and 109 from MKD) persons participated in the survey. The survey was conducted in the period from 11/01/2019 to 11/02/2019.

The first part contains questions pertaining to social-demographic data (sex, age and education). The second part deals with the use of functional foods, as well as the knowledge of non-traditional cereals (barley and

einkorn). A total of 16 questions were asked, and the time needed to complete the survey was 10 minutes. The survey in the Republic of Bulgaria (Razgrad region) and the Republic of Macedonia (City of Skopje) was completed in the period from 01/09/2019 to 01/10/2019 and the results are presented by Nakov et al., 2018 [16]. This paper will compare the results from Bulgaria and Macedonia, with the new results from Croatia.

RESULTS AND DISCUSSIONS

From the data presented in Table 1 it can be seen that in BG, most of the respondents are male, whereas in MKD and CRO the majority are women (67.00% and 86.00% respectively). According to their age in BG and CRO, the majority of the respondents are aged 21-30, while in MKD the majority of the respondents are aged 31 to 40 – 31.50%. In accordance with their education, in all three states where the survey was conducted, the majority of respondents have finished their high education (68.50% in BG; 60.60% in CRO and 58.70% in MKD).

Table 1. Social and demographic characteristics of the respondents

		Bulgaria (BG)		Macedonia (MKD)		Croatia (CRO)	
		Number	%	Number	%	Number	%
SEX	male	27	81.90	36	33.00	20	14.00
	female	122	18.10	73	67.00	123	86.00
Age	under 20	10	6.70	13	11.90	4	2.80
	21-30	47	31.50	50	45.90	44	30.80
	31-40	42	28.20	22	20.20	45	31.50
	41-50	38	25.50	21	19.30	33	23.10
	51-60	8	5.40	3	2.80	15	10.50
	over 60	4	2.70	-	-	2	1.40
Education	Primary	2	1.30	5	4.60	4	2.80
	Secondary	39	26.20	38	34.90	28	19.60
	Higher	102	68.50	66	60.60	84	58.70
	Ph.D	6	4.00	-	-	-	-

Source: Google Drive: <https://docs.google.com/forms/d/e/1FAIpQLSeKFUExCBfD-DpLtd-qQf71t3lyLH4Dnsv0wgEL4MhZESY1A/closedform>, Accessed on: 15.02.2019.

In the three countries, more than half of the respondents answered positively to the question "Do you eat cereals"? In BG and CRO only 0.70% said that they do not consume cereals, while in MKD only 6.40% of the respondents do not consume cereals. The remaining percentage stated that they only consume cereals occasionally. The answers are presented in Fig. 1.

Fig. 2 presents the possible reasons as to why people do not consume cereals in the three countries. In MKD, an equal percentage of those surveyed do not consume cereals and cereal products because they suffer from celiac disease (autoimmune disease) or are on a diet.

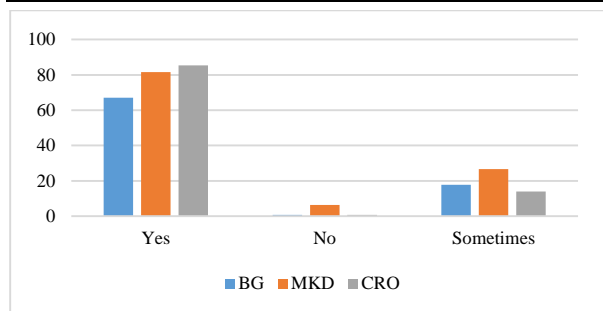


Fig.1. Answers to the question "Do you eat cereals?"

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Cereal intolerance is present in 1-3% of the world's population, but this percentage is different in different countries. Proteins (gliadin and glutenin) found in the different types of wheat and similar proteins that are found in barley and rye are the main culprits for this disease, known with one name "gluten" [9]. Almost half of the respondents in Bulgaria (42.90%) and CRO (44.40%) do not consume cereals because they are on a diet.

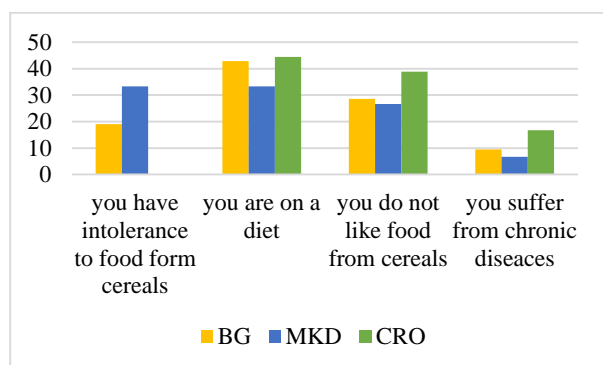


Fig. 2. Possible reasons for not using cereals

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The answers to the question "Which cereal product do you consume most often?" are represented in Fig. 3. The surveyed people in the three countries answered that they mostly consume bread, and more specifically 78.80% in Bulgaria, 78.90% in Macedonia and 85.30% in Croatia. These percentages confirm the fact that bread is an essential part of our daily diet [22]. The least consumed cereal foods in Macedonia are muffins, polenta in

BG and bread sticks in CRO. One of the reasons for the low consumption of muffins may be that they are high-calorie products [23]. In recent years, consumers' opinions on the nutritional status of food and proper feeding have been increasing. Because of this, consumers are increasingly focused on a balanced and healthy diet.

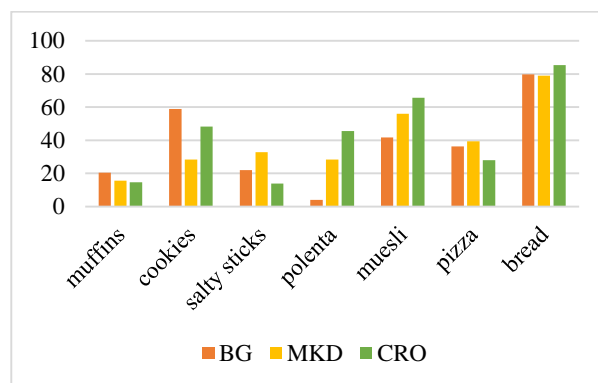


Fig. 3. Answers to the question "What do you usually consume from the food from cereals?"

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In addition, consumers pay great attention to the labels of foodstuffs, and they require information on whether the selected foods are safe and quality [15].

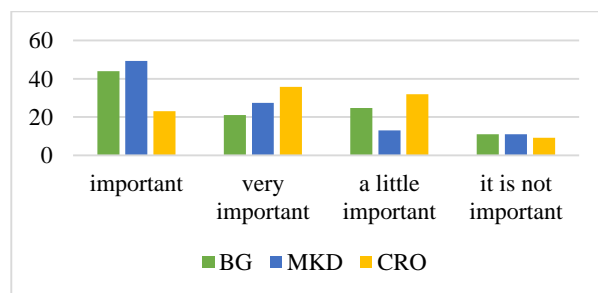


Fig. 4. Answers to the question "Is it important for you to have proper information about the ingredients and energy value of cookies?"

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To the question "Is it important for you to have complete information about the composition and nutritional value of the cookies?", 49.30% of the respondents in BG and 44.00% in MKD believe that it is important for them to have complete

information about the composition and nutritional value of the cookies. Unlike this group, 35.70% of the respondents in CRO consider this information very important (Fig. 4).

Whole grain products are considered better regarding nutrition, but also as healthier and more natural [2, 19].

When asked "Do you think that whole grain products have a positive impact on health?" the respondents from the three countries had a positive response (Fig. 5) which means that the surveyed persons are aware of the positive impact of whole grain products on human health.

The percentage of respondents who believe that wholegrain products do not affect human health is the smallest.

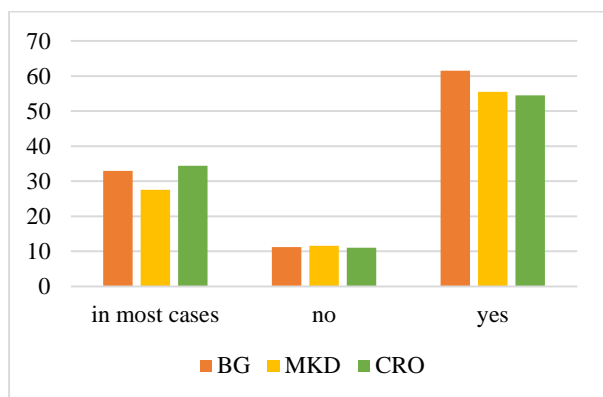


Fig. 5. Answers to the question "Do you think that wholemeal products (products from whole wheat grain) have positive effect on Your health?"

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Cookies are popular products made from various cereals that are consumed all over the world [10, 26].

Fig. 6 presents the answers to the question "Would you buy cookies, which with regular consumption, could reduce the risk of certain diseases?". Most of the respondents in Croatia, Bulgaria and Macedonia responded that they are willing to buy cookies that reduce the risk of certain diseases.

Barley is one of the oldest cultivated cereals in the world. It is becoming increasingly popular among manufacturers of functional

foods primarily because of the high concentration of β -glucans [7, 13, 21, 24].

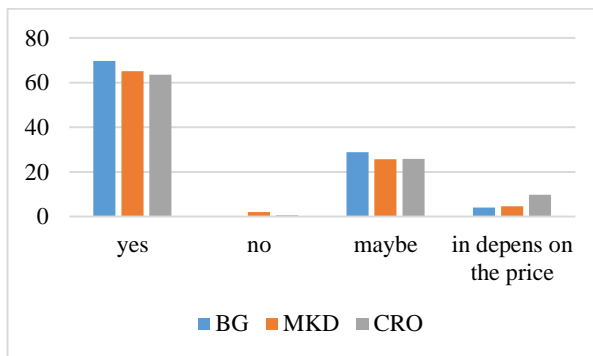


Fig. 6. Answers to the question "Would you buy cookies, which with regular consumption, could reduce the risk of certain diseases?"

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To the question "What is barley used for?" almost all respondents in Macedonia and Croatia responded that it is used in beer production, while in Bulgaria that percentage is 79.50%. Fig. 7 shows that almost equal percentage of respondents in Croatia and Macedonia think that barley is used in the production of cookies.

Einkorn is a diploid on hard and bread wheat, significant because of the high content of proteins, carotenoids and tococls, as well as due to excellent organoleptic characteristics [3].

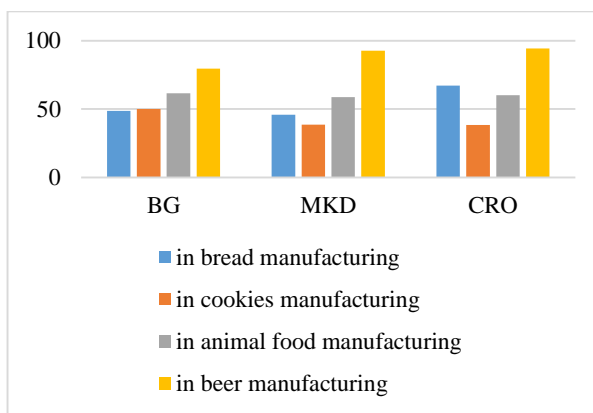


Fig. 7. Answers to the question "What is barley used for?"

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Today, the single grain einkorn is cultivated in the Mediterranean region, but there is an increased interest in re-cultivating this culture due to frequent scientific theories about the nutritional aspects of this type of wheat, primarily because of the prevention of diseases like cancer, diabetes and chronic diseases. Due to the excellent nutritional composition, this type of wheat is recommended for the production of new types of food such as macaroni and other bakery products, baby foods and fortification of already existing food [1].

Fig. 8 shows that most of the respondents in Croatia and Macedonia answered that they have not heard of this type of cereal until now, while in Bulgaria this percentage is much lower.

The reason for this is that in Bulgaria this kind of cereal is very popular and products produced from it can be found everywhere. In one of our previous papers, we have proven that there is a real possibility for the production of cookies that contain 30%, 50%, 70% and 100% einkorn flour [17].

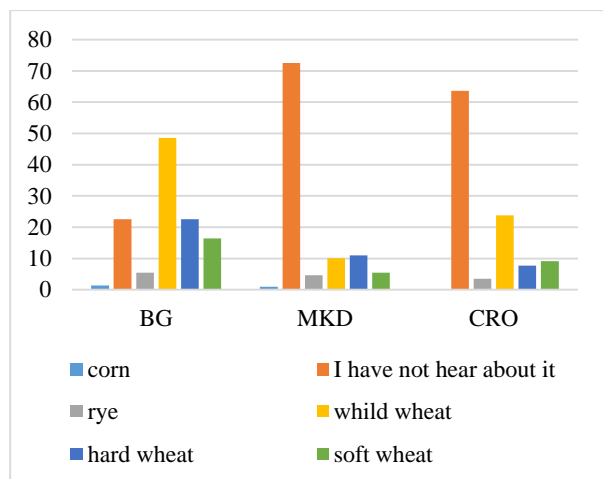


Fig. 8. Answers to the question “What type of cereal is *Triticum monococcum*?”

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CONCLUSIONS

The survey shows that most of the respondents in the three countries (Bulgaria, Croatia and Macedonia) consume cereals and cereal products. The reason why some of the

respondents do not consume cereals in BG and CRO is that they are on a diet, whereas in MKD the reason is due to the intolerance to the cereals and food produced by them. Bread is the product most widely used by people in all three countries. Most of the respondents consider that whole grain products have a positive impact on human health. They also consider that if these products are sold, regular consumption can reduce the occurrence of various diseases and most of the respondents would consume this type of food. In the three countries where the survey was conducted, respondents consider that barley is used in beer production, and very few of the respondents think that barley can be used in the production of cookies. Einkorn is a cereal which is not familiar to the majority of people in Croatia and Macedonia, while in Bulgaria this percentage is much lower. This is due to the fact that this type of cereal cannot be found on the markets in Macedonia and Croatia.

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