

# ATTITUDES OF CONSUMERS IN SERBIA TOWARDS THE IMPORTANCE OF A BALANCED DIET AND TABLE EGGS AS FOODSTUFF

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**Abstract:** To investigate consumers' attitudes towards a balanced diet and eggs as foodstuff, 509 consumers have been surveyed. Through this survey, the consumers answered questions about the importance of a balanced diet, importance of having eggs in diet, the most common way of egg consumption, benefits and drawbacks of eating eggs. The responses were analysed by gender, age, occupation, education and place of living of the respondents (city of Belgrade, other cities and other populated places). Based on these results, it can be concluded that most of the respondents (79% males and 87% females) think a balanced diet is important, whereas 41% males and 52% females think it is very important. Moreover, most of the respondents find it important to have eggs in diet, and males and females do not differ in their responses (69%). The most common way of cooking and consuming eggs is frying, according to 68% male and 50% female respondents from all the places (60% from Belgrade, 55% from other cities and 62% from other populated places). As a benefit of eating eggs, the most frequent response is "nutritive value" (43% respondents), whereas, the most frequent drawback is "a risk of cholesterol" (19% respondents). Hence, one should pay particular attention to education on the importance of diet, at the level of the whole community.

**Key words:** diet, eggs, habits, consumer, survey

## Introduction

Throughout all life stages, diet is very important for keeping good health. It is considered to be a significant factor in preventing chronic non-communicable diseases (NCDs), which were responsible for about 60% of the 56.5 million of

deaths reported around the world in 2001 and accounted for about 46% of the disease burden (Šipetić-Grujičić, 2012). Novaković et al. (2012) suggest that according to relevant international health organisations, over 40% malignant diseases and about 80% of all cardio-vascular diseases can be prevented with a proper diet, regular physical activity and smoking cessation. From the aspect of dietitians, it is necessary to provide food that complies with principles of modern medicine. However, economic and other circumstances make people conform to the existing ways of producing and providing food, and according to Mijatović and Mirčevski (2013), it is necessary to find a balance between those opposite ends. The same authors imply that dietetics should be an interesting topic not only for experts from this area but also for each individual, and in regard to that the authors suggest we need a systemic approach when analysing the existing eating habits and perceptions of food. Over the last decades, a growing importance in different areas of research has been given to habits and attitudes of consumers. Consumers are no longer seen as passive spectators, but as someone who plays an important role, actively participating in creating the environment they live in. Jovović and Femić (2006) imply that the basis of good marketing is to be familiar with consumers' needs and expectations. Furthermore, Savović et al. (2012) point out how important it is to include consumers in the system of quality insurance, in terms of food quality and safety, and to respect their perception as users. According to Zarić and Mijajlović (2009), eating habits significantly affect the choice of food, while Pavlovski et al. (2003) point out that consumers are growingly worrying about the way food is produced, as well as food safety and harmlessness. When studied the attitude of table egg consumers, surveys have investigated their preferences, as well as factors that affect consumers' decisions regarding table eggs (Kralik et al., 2014; Mizrak et al., 2012; Pavlovski et al., 2007; Huang, 2013). Based on those studies, it can be concluded that consumers are growingly demanding, having some specific requests in terms of producing eggs with special characteristics (functional food), animal welfare, food safety, etc. Consumers' attitudes towards eggs in diet have changed several times over the last decades and in one period consumers were focused on the risk of cholesterol, which resulted in the fear of coronary diseases and a decline in egg consumption (Ruxton et al., 2010). Bertechini and Mazzuco (2013) state that egg consumption varies from country to country, and according to IEC (2012), the highest annual consumption per capita is in Mexico (365), Japan (355), and in China and Hungary (350). Egg consumption in Serbia in 2007 was about 8kg (135 eggs per capita), whereas the same year egg consumption in the EU and the USA was 12 kg (200 eggs per capita) and 14 kg (240 eggs per capita), respectively (Milošević and Perić, 2011). In the next four years eggs consumption in the EU stagnated and 2011 it was 12.9 kg, while in the same period egg consumption in the Russian Federation increased from 12.7 kg to 15.2 kg (*Trend in poultry production in Europe and around the world, 2015*). Zlatanović (2015) implies that in 2013 egg consumption in the Republic of Serbia was 222 eggs per

capita, being highest when compared to the neighbouring countries - in Macedonia it was 168, Croatia 153 and in Slovenia 76 eggs per capita. A certain number of consumers are still suspicious towards eggs, although the latest studies imply the fear of cholesterol is not grounded in science, and *Gray and Griffin (2009)* point out that cholesterol in food, such as eggs, has little and clinically insignificant effect on cholesterol in blood. The same authors suggest this is the reason why official food organisations recommend that limitations in egg consumptions should be abolished.

The goal of this paper is to identify attitudes of consumers in the Republic of Serbia towards the importance of a balanced diet and eggs as foodstuff, the most common way of cooking and consuming eggs and benefits/drawbacks of eating eggs.

## Material and Methods

The survey was conducted in the first half of 2016, on the territory of the Republic of Serbia. The survey comprised a random sample of 509 table egg consumers, bearing in mind to include different categories that are the subject-matter of the research (consumers' gender, age, education and place of living). The survey questionnaire included the city of Belgrade, other cities (52) and other populated places (38), being in line with the structure of populated areas in Serbia given by the Register of spatial units and GIS (*Statistical Office of the Republic of Serbia*). This research is a pilot research on attitudes and eating habits of the population in Serbia, as well as their preferences in terms of table eggs, conducted on the Belgrade area and in 14 districts (Braničevo, Južna Bačka, Kolubara, Mačva, Moravica, Pčinja, Podunavlje, Pomoravlje, Rasina, Raška, Srem, Šumadija, Toplica, Zlatibor).

To obtain the objectivity of data, the respondents were asked to fill in the survey questions without the presence of the surveyors. The survey questionnaire comprised the following:

1. Data on the respondents. The respondents had to circle the answers to the questions on their gender (male, female), education (primary school, secondary agricultural school, other secondary school, faculty of agriculture/veterinary science, other faculty, master's/doctoral degree in agriculture/veterinary science, master's/doctoral degree in other field), occupation/status, age (under 18, 18-25, 26-35, 36-45, 46-55, 56-65, 66-75, over 76) and place of living (the respondents had to fill in the blank space with their place of living);

2. Close-ended questions, with a Likert-type scale (from 1 – not important at all to 5 – very important (applied for the questions on the importance of a balanced diet and the importance of having eggs in diet);

3. Multiple-choice questions, from 1 to 7, where 1 means most frequent and 7 less frequent (applied on the question on the most frequent way of cooking/consuming);

4. Open-ended questions - where the respondents were asked to write their answers, i.e. to state their own opinions/attitudes (applied on the question on benefits/drawbacks of eating eggs).

The responses were analysed by respondents' gender, education, occupation/status, age and place of living. The choice of variables was based on a number of studies (*Jovičić et al. 2015; Kralik et al. 2014; Rodić-Trmčić et al., 2015*) and a starting point was that consumers' attitudes towards diet and their eating habits was determined by gender and age, social structure, demographic and social factors.

Only completed questionnaires (where the respondents marked categories and gave the answers on the questions) were analysed. The researchers used standard methods of analysis in Microsoft Excel.

## Results and Discussion

Table 1 gives an overview of the results regarding the attitude of consumers towards the importance of a balanced diet. It shows the responses on the survey question: "How important is a balanced diet to you?"

Based on the results and the responses of the consumers who circled "4" and "5" on the marking scale, it can be ascertained that most of the respondents (79% males and 87% females) think a balanced diet is important and 41% males and 52% females think it is very important (they circled "5" on the scale). The results are in line with the research of *Arganini (2013)*, who points out women generally pay more attention to diet than men and thinks that nutrition and health are related. Furthermore, the results are also in line with the Research on health of the population of the Republic of Serbia in 2013 (*Ipsos Strategic Marketing, 2013*), which also shows that 19.7% of adults in Serbia do not consider health aspects when it comes to nutrition, and it is even more noticeable in the male population (26.3%).

**Table 1. Responses on the survey question: “How important is a balanced diet to you?”**

Category of the respondents	How important is a balanced diet to you?					
	Marking scale*					
	%	1	2	3	4	5
<b>Gender</b>	<b>100</b>					
Male	60	3	3	15	38	41
Female	40	1	0	12	35	52
<b>Education</b>	<b>100</b>					
Primary	2	0	0	13	37	50
Secondary agricultural school	3	7	0	27	53	13
Other secondary school	26	2	2	18	32	46
Faculty of agriculture/veterinary science	33	1	0	13	37	49
Other faculty	29	2	2	9	37	50
Master's/doctoral degree in agriculture/veterinary	5	0	4	4	33	59
Master's/doctoral degree in other fields	2	0	0	20	30	50
<b>Occupation/Status</b>	<b>100</b>					
Students	13	0	0	16	47	37
Employed	72	1	2	13	35	49
Unemployed	6	7	3	10	40	40
Retired	9	2	0	12	31	55
<b>Age</b>	<b>100</b>					
18-25	14	0	0	21	41	38
26-35	16	1	1	14	39	45
36-45	25	1	2	15	38	44
46-55	29	2	3	10	32	53
56-65	12	1	0	10	38	51
66-75	4	5	0	10	14	71

\*1 – not important at all; 5 – very important

When observed by education level of the respondents, diet is most important to the respondents with master's and doctoral degree in agriculture and veterinary science (59%), and observed by occupation/status, it is most important to the retired (55%). Having analysed data on age, it can be seen that attitudes towards the importance of a balanced diet changes with age – the percentage of the respondents who think diet is very important increases, ranging from 38% (age 18-25) to 71% (age 66-75). The data show that particular attention should be paid to the education of younger generations, but also education in general, including all age categories, and bearing in mind that diet is a very important factor in preventing chronic non-communicable diseases (NCDs) (*Šipetić-Grujičić, 2012*). Moreover, a need for continuous education of wider structures on the importance of diet is also in line with *Nikolić (2011)*, who implies that the responsibility for a proper diet should be shared between individuals, society, family and health service.

Table 2 gives an overview of the results regarding the attitude of both male and female consumers of different age towards the importance of a balanced diet. It shows the responses on the survey question: “How important is a balanced diet to you?”

**Table 2. Responses on the survey question: “How important is a balanced diet to you?” given by gender**

How important is a balanced diet to you? (%)						
Age						
Male						
Scale	18-25	26-35	36-45	46-55	56-65	66-75
1	0	3	2	3	5	0
2	0	3	2	7	0	0
3	20	24	19	10	9	0
4	42	35	41	37	48	13
5	38	35	36	43	38	87
Female						
Scale	18-25	26-35	36-45	46-55	56-65	66-75
1	0	0	0	1	0	8
2	0	0	1	0	0	0
3	22	8	13	10	10	15
4	40	41	37	30	32	15
5	38	51	49	59	58	62

\*1 – not important at all; 5 – very important

The respondents aged 18-25, both males and females (38% of males and 38% of females) regardless of their education and occupation/status have the same attitude towards a balanced diet, and the importance of a diet grows with age, for both male and female respondents. The obtained data are in line with research that shows the awareness on the importance of a healthy diet rises with age (*Frazao and Allshouse, 2003*). In the category of age 25-65, more female respondents assessed a balanced diet as “very important”, which implies that diet becomes more important to women after adolescence (*Jovičić, 2015*).

Table 3 gives an overview of the results regarding the attitude of consumers towards the importance of eating eggs. It shows the responses on the survey question: “Do you think you should have eggs in your diet?”

Based on the results, it can be ascertained that females think it is important to have eggs in diet - 38% marked “5”, which is slightly higher than in case of males (33%). If we take into account the responses marked with “4” and “5”,

however, there is no difference between males and females (69%). In available literature no data on gender preferences for egg consumption in Serbia have been found. When analysed by respondents' education, we can see that eggs in diet are very important (marked with "5") to people with the lowest level of education (primary education) and the highest level of education (master's/doctoral degree in agriculture or veterinary). The obtained results can be explained by the fact that experts in agriculture and veterinary have the most extensive knowledge on eggs as highly valuable foodstuff, whereas when it comes to the respondents with the lowest level of education, some additional research is needed to explain their attitude towards the importance of having eggs in diet.

**Table 3. Responses on the survey question: "Do you think you should have eggs in your diet?"**

Category of the respondents	Do you think you should have eggs in your diet?					
	Marking scale*					
	%	1	2	3	4	5
<b>Gender</b>	<b>100</b>					
Male	40	1	7	22	37	33
Female	60	2	3	26	31	38
<b>Education</b>	<b>98</b>					
Primary	2	0	0	13	37	50
Secondary agricultural school	3	0	13	34	20	33
Other secondary school	26	2	3	27	27	41
Faculty of agriculture and veterinary science	33	1	4	25	39	31
Other faculty	29	2	5	22	34	37
Master's/doctoral degree in agriculture/veterinary	5	0	4	17	29	50
Master's/doctoral degree in other science fields	2	0	30	30	30	10
<b>Occupation/Status</b>	<b>100</b>					
Students	13	0	3	38	42	17
Employed	72	1	5	23	31	40
Unemployed	6	3	7	23	37	30
Retired	9	5	5	18	29	43
<b>Age</b>	<b>100</b>					
18-25	14	0	4	37	41	18
26-35	16	2	8	30	36	24
36-45	25	0	2	23	36	39
46-55	29	3	5	22	25	45
56-65	12	2	6	16	33	43
66-75	4	5	0	10	33	52

\*1 – not important at all; 5 – very important

Moreover, when observed by respondents' occupation/status, having eggs in diet is most important to the retired (43%), and least important to students (17%). The obtained results can be related to the lifestyle of these categories, since the retired have more time to prepare food themselves and the younger population unfortunately, more often based their diet on fast food (*Mijatović and Mirčevski,*

2013). Furthermore, it can be seen that the attitude towards the importance of having eggs in diet changes with age. The percentage of those who think it is very important increases, from 18% (age 18-25) to 52% (age 66-75). In this survey, the nutritive value of eggs was the most commonly listed benefit (219 respondents, i.e. 43%).

The importance of eggs in diet has also been pointed out in some research. *Mijatović and Mirčevski (2013)* mention that eggs are a healthier morning meal than pastries made of white flour; and in a healthy-eating pyramid eggs are placed on the top (*Healthy Eating Plate & Healthy Eating Pyramid, 2005*). According to *Rodić-Trmčić et al. (2015)* egg consumption in Serbia has shown a trend of slight growing, amounting to 4.3, 4.4 and 4.5 eggs per capita per week in 2011, 2012 and 2013, respectively. What would help increase egg consumption is better knowledge of all structures of the population, especially of young population, since there are still some concerns in our country regarding a negative impact of eggs on the level of cholesterol in blood. In this survey, 19% of the respondents (95 people) mentioned fear of increased cholesterol levels as a drawback of eating eggs. When analysed by age structure, the results show that fear of increased cholesterol is highest (28%) in the age group 35-55, which can be related to earlier misconceptions about cholesterol. The younger population had half as less percentage of those who expressed the fear of cholesterol, i.e. 14% respondents in the age group 18-25 stated a high level of cholesterol as a drawback of eating eggs. Numerous studies have shown, however, that cholesterol level in food is neither associated with cholesterol level in blood (*Song and Kerver, 2000*), nor with an increased risk of heart diseases (*Barraj et al., 2009*), and that is the reason why focus should be put on educating people in Serbia on this topic. Furthermore, *López-Sobaler and González-Rodríguez (2015)* point out that leaving eggs out from diets is unnecessary and undesirable.

Table 4 gives an overview of the results regarding the attitude of both male and female consumers of different age towards the importance of eating eggs. It shows the responses on the survey question: "Do you think you should have eggs in your diet?"



**Table 4. Responses on the survey question: “Do you think you should have eggs in your diet?” given by gender**

Do you think you should have eggs in your diet? (%)						
Age						
Male						
Scale	18-25	26-35	36-45	46-55	56-65	66-75
1	0	3	0	3	0	0
2	8	12	6	9	5	0
3	27	35	20	19	14	0
4	38	35	37	28	48	50
5	27	15	37	41	33	50
Female						
Scale	18-25	26-35	36-45	46-55	56-65	66-75
1	0	2	0	2	2	8
2	3	6	0	3	8	0
3	42	24	25	25	17	15
4	42	37	35	22	25	23
5	13	31	40	48	48	54

\*1 – not important at all; 5 – very important

More female respondents aged 25-75, regardless of their education and occupation/status, find it important to have eggs in diet (Table 4). In available literature, no data were found on differences in attitudes of male and female consumers of different age towards having eggs in diet. However, what can be important is the research of *López-Sobaler and González-Rodríguez (2015)* on nutritive requirements of men and women, indicating that women in certain life stages and at a certain age have specific requirements. According to these authors, egg consumption can prevent certain chronic diseases and improve general health of women at an old age.

Table 5 gives an overview of the attitudes towards a balanced diet and eating eggs, given by the place of living. Differences in diet in different regions in Serbia were determined in the research of *Rodić-Trmčić et al. (2015)*. On the other hand, the aim of this paper was to identify differences in consumers' attitudes towards the importance of a balanced diet and eggs in diet, depending on their place of living – a city with over a million people, other cities with a much smaller number of people or other populated places with the smallest number of people. As a starting point, the authors made an assumption that different place of living differed in attitudes and eating habits. Data found in the research of *Mijatović and Mirčevski (2013)* support this assumption, stating that egg consumption in agricultural households is higher (181 egg per person per year) than the consumption in non-agricultural households (171.6 eggs per person per year).

Taking into account the answers marked “4” and “5”, 84% of respondents from the Belgrade area assessed a balanced diet as “very important”, whereas in

other cities (83%) and other populated places (81%) that percentage was slightly smaller. The obtained result shows that the population in Serbia, whether they live in the capital, smaller cities, or other populated places, has a similar opinion on the importance of a balanced diet. The importance of having eggs of diet was poorest assessed by the respondents from “other populated places” (58%) and highest assessed by the respondents from “other cities” (73%), when observed the answers marked with “4” and “5”.

**Table 5. Responses of the consumers from cities and other populated places, regarding a balanced diet and eggs in diet**

Place of living	Part of the sample %	How important is a balanced diet to you?					Do you think you should have eggs in your diet?				
		Marking scale*					Marking scale*				
		1	2	3	4	5	1	2	3	4	5
Total	100	1	1	14	36	48	2	5	25	32	36
Područje grada Beograda	41	2	0	14	36	48	1	6	26	30	37
Other cities	47	1	3	13	36	47	2	4	21	35	38
Other populated places	12	3	2	14	39	42	2	8	32	34	24

\*1 – not important at all; 5 – very important;

Table 6 gives an overview of the results regarding the ways of consuming eggs. Frying (fried eggs and scrambled eggs) are most common way of consumption for all the respondents, regarding of their gender, occupation/status and place of living.

**Table 6: Ways of cooking / consuming eggs**

Category of the respondents	Ways of cooking / consuming eggs								
	Part of the sample %	Boiling		Frying			Other		
		Soft-boiled	Hard-boiled	Fried	Scrambled	bled with ham, mushrooms, ooms,	Eggs as an ingredient (in cakes, salads, etc.)	Other	
<b>Gender</b>	100								
Male	60	11	11	30	22	16	8	2	
Female	40	10	18	22	18	10	19	3	
<b>Occupation/Status</b>	100								
Students	13	1	9	25	24	24	12	5	
Employed	73	11	15	26	19	11	16	2	
Unemployed	6	14	25	11	32	18	0	0	
Retired	8	13	22	20	20	2	19	4	
<b>Place of living</b>	100								
Belgrade area	41	8	15	22	22	16	15	2	
Other cities	47	10	17	28	16	11	17	1	
Other populated areas	12	11	12	24	24	14	10	5	

Previous research has shown that eggs consumption varies significantly between different counties (*Magdelaine, 2011*). Moreover, available literature suggests that there are differences among countries in the way of cooking/consumption (*Mizrak, 2012; Zelić, 2015*), which can be explained by differences in traditional cuisine. In that sense, the results of this research indicate similarity with the results from the neighbouring countries (*Zelić, 2015*) and differences when compared to Turkey (*Mizrak i sar., 2012*).

## Conclusion

According to the results of the survey about the importance of a balanced diet and eggs as foodstuff, it can be concluded that most consumers in Serbia consider a balanced diet as important. More female respondents (87%) give importance to balanced diet than male respondents (79%). Particular attention should be paid to education on the importance of diet as an important factor in preventing diseases, on the level of the whole community. A special focus should be put on younger generations, putting a focus on the importance of eggs as highly-valuable foodstuff. Since there are still some concerns and confusion among the population of Serbia regarding egg consumption and cholesterol increase, special attention should be given to eliminate this unreasonable fear. Egg consumption in Serbia is lower than in some developing and developed countries. In this sense, educational and other measures should be taken in order to increase the percentage of eggs as a highly nutritious foodstuff in the diet of all population categories.

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## Stavovi potrošača u Srbiji o značaju uravnotežene ishrane i konzumnim jajima kao namirnici

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## Rezime

U cilju ispitivanja stavova potrošača o značaju uravnotežene ishrane i jajima kao namirnici anketirano je 509 potrošača, na području Republike Srbije.

Kroz anketno ispitivanje potrošači su se izjasnili o značaju uravnotežene ishrane, značaju jaja u ishrani i najčešim načinima konzumiranja, prednostima i nedostacima jaja. Odgovori anketiranih potrošača obrađeni su po polu, starosti, zanimanju, obrazovanju i sredini u kojoj žive (grad Beograd, ostali gradovi, ostala naseljena mesta). Na osnovu rezultata ispitivanja može se zaključiti da je većini anketiranih potrošača važna uravnotežena ishrana (79% za muški i 87% za ženski pol), pri čemu se o ishrani kao veoma važnoj izjasnilo 41% muškaraca i 52% žena. Takođe, za većinu anketiranih potrošača zastupljenost jaja u ishrani je važna, a po ovom pitanju među pripadnicima različitih polova nema razlika (69%). Najčešći način pripreme, odnosno konzumiranja, su pržena jaja, kod oba pola (za muškarace je to 68%, a kod žena 50%) i u svim životnim sredinama u Beogradu 60%, ostalim gradovima 55% i ostalim naseljenim mestima 62%). Kao prednost jaja u ishrani potrošači su najčešće naveli hranljivost (43% ispitanika), a kao najčešći nedostatak strah od povećanja holesterola (19% ispitanika). Edukaciji o značaju ishrane, sa akcentom na značaj jaja kao visokovredne namirnice, trebalo bi posvetiti posebnu pažnju, na nivou celokupne društvene zajednice.

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