

SITUATION ON THE MARKET OF EGGS FROM NON-CAGE PRODUCTION SYSTEMS

Nataša Tolimir¹, Marijana Maslovarić¹, Zdenka Škrbić², Miloš Lukić², Dragan Milić³, Jelena Nedeljković Trailović⁴

¹Institute for Science Application in Agriculture, Bulevar Despota Stefana 68b, 11000, Belgrade, Republic of Serbia

²Institute for Animal Husbandry, Autoput 16, 11080 Belgrade-Zemun, Republic of Serbia

³Alpex Feed doo, Braće Novakov 61, 21433 Silbaš, Republic of Serbia

⁴University of Belgrade, Faculty of Veterinary Medicine, Bulevar oslobođenja 18, 11000 Belgrade, Republic of Serbia

Corresponding author: Nataša Tolimir, ntolimir@ipn.bg.ac.rs

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Abstract: The objective of the study is to determine the share of eggs from non-cage production systems compared to eggs from cage systems, in the year when the extended transitional period expires (December 2023) for Serbian producers to comply with the welfare legislation, mandating the transition from the conventional cage breeding system to permitted systems (enriched cage system and non-cage systems (floor, aviary, free breeding – free ranges, organic production). Also, the objective of the study is to determine the structure of consumers within the group valuing the breeding system, which declares that it prefers free range eggs and organic eggs. The examination of the Belgrade market supply of eggs, including supermarkets (11), green markets (5) and specialized stores (5), and consumer attitudes was conducted through a survey (247 respondents in the Belgrade region). According to the results of the survey, it can be concluded that the supply of eggs from non-cage systems is minor, compared to eggs from the cage system, which have a share of 100%, it is 81.82% for eggs from the floor system, 54.54% for eggs from free range and 9.10% for organic eggs. The supply of organic eggs on the market is insufficient and mainly associated with specialized stores. For about 30% of consumers, the egg production system is very important, whereby the majority of consumers (53.45%) would prefer the eggs from free ranges, and among them the largest share are women (76.03%), consumers with higher education (67.10%), employed (78.38%), aged 36-55 and with higher monthly incomes. Based on the research results, it can be concluded that the process of harmonizing egg production with welfare regulations has an impact on the egg market, i.e. resulting in changes in the sense of greater share of eggs from non-cage systems compared to similar research in the earlier period. At the same time, although there is a growing awareness among consumers about the

importance of the production/rearing system, it is still insufficient compared to certain European countries. The development of non-cage systems, as more favourable from the point of view of welfare and consumer expectations, should be given greater attention in the coming period, by acting through regulatory measures, education of producers and consumers, research and support in terms of incentives, subsidies and loans to producers who switch to alternative systems of raising laying hens.

Key words: layer hens, non-cage rearing systems, market, consumers, survey

Introduction

The ban of conventional cage systems in the EU countries followed different dynamics, from the slow process in case of certain member countries, to those that completed the process quickly and even introduced stricter national laws. Looking at egg production from the perspective of the representation of individual systems, it can be concluded that of the total of 376 million laying hens in the European Union in 2022, the smallest share is in organic production (7.1%) and in the in the so-called "Free range" or free keeping system (15.5%), while the largest share of hens is still in the cage system, i.e. in "enriched" cages around 39.7%, with similar representation of hens in the floor system (37.8%) (European Commission, 2023). Enriched cages are dominant in EU member states from Eastern, Central and Southern Europe, while in Northern and Western European countries they are represented in low percentage (Urios et al., 2022). The percentage of individual birds that are grown in one of the so-called "uncaged methods" is constantly increasing, so that in Great Britain the percentage is already over 60% (United Kingdom egg statistics, 2022), in Ireland, Austria and France 46.1, 31.5 and 29.8%, respectively, while some European countries, such as Austria, the Czech Republic and Germany, are gradually excluding enriched cages from use (Rodenburg et al., 2022). Further developments in the egg production sector may be affected by the citizens' initiative launched in Europe, called "End the Cage Age", to which the European Commission responded positively on June 30, 2021 and presented plans for a legislative proposal to ban cages for numerous domestic animals (European Commission, 2021).

In Serbia, harmonization with European standards (Directive 1999/74/EC) is related to the Law on Animal Welfare (2009) and the Rulebook on Breeding Conditions (2010). The process of abandoning the conventional cage system and transition to permitted systems is slow. Tolimir et al. (2020) reported that by the end of 2020, only around 16% of surveyed producers have switched to permitted systems. The egg producers in our country, in addition to the challenges related to

the large investments that require the transition from conventional cages, are also faced with the decision to choose a housing system. According to the above mentioned research, all surveyed producers (100%) declared that their choice would be an "enriched" cage system. However, the fact should also be taken into account that at the time of the survey, within the mentioned research, only 61.7% of producers were aware of the initiative on the complete abolition of cages, which could have an impact on the decision on the choice of the system. This statement of the producers was probably influenced by the perception of the negative sides of non-cage systems, in terms of high costs for setting up production, reduction of production capacity, higher costs in production and a more complex management system compared to the cage system. However, although non-cage rearing systems have certain disadvantages, for making the final decision on the choice of the system, it would be important to look at the advantages, which are primarily related to respect for welfare, product quality, environmental protection and competitive advantages in the market, as well as a better status with consumers.

In the world, consumers have a differently developed awareness in individual countries about animal welfare, which often depends on gender, education, occupation, eating habits, understanding of ethical value and welfare, economic opportunities and personal preferences (Cornish et al., 2016). Research on laying hens housing systems in Serbia (Tolimir et al., 2019; 2020) indicate that there is a tendency of increasing welfare awareness, but there is still a need for education on the benefits of cage-free systems and transparency regarding production, which could play a key role in promoting positive attitudes towards these systems.

In anticipation of future changes in the egg production sector in Serbia, the objective of the paper is to determine how the changes so far in the process of compliance with regulations have been reflected in the market regarding the supply of eggs from non-cage production systems compared to eggs from cage systems. Also, the paper aims to indicate the structure of consumers who prefer eggs from cage-free systems, which can be important for producer decisions regarding the choice of rearing system.

Materials and Methods

The examination of the supply of eggs from non-cage farming systems on the Belgrade market was conducted in the period from April to June 2023, by monitoring the supply in 11 of the most represented super markets, 5 green markets and 5 specialized stores. The supply and price of eggs were monitored on a monthly basis, in the first week of the month, and recorded within each of the sales facilities, including: the number of producers, the representation of eggs according to the production system - floor system, free range eggs, eggs from organic

production, as eggs from the cage system for the purpose of comparison. The average price per egg for grade M was calculated for each of the rearing systems, including the price of eggs at all test sales points. The survey of consumers of edible eggs from the Belgrade region included 247 respondents who filled out the survey questionnaire. The structured questionnaire consisted of: a) data on the respondent, obtained by rounding the offered answers, for the following categories: gender (male, female), education (secondary school, higher education), status (student, employed, unemployed, retired), age (below 18, 26-35, 36-55, over 55); income (less than 40,000 dinars, 40-70,000 dinars and more than 70,000 dinars) and b) questions with suggested answers: 1) "How important is the rearing system when buying eggs" - the answers were marked from 1 - not important at all to 9 - very important (Likert scale was used) and 2) "Which eggs would you most often buy" - answers offered: eggs from a cage system, free range eggs, organically produced eggs and others. Within the group declaring that the farming system is important (the group that scored 7 to 9 for the importance of the farming system) and the group of consumers who declared that they would prefer to buy free range eggs, the structure of the respondents was made. Standard methods of analysis in the Microsoft Excel program were used for data processing.

Results and Discussion

Table 1 shows the results related to the monitoring of the situation on the Belgrade consumption egg market, in terms of the supply and prices of eggs from different rearing systems and at different points of sale, i.e. in supermarkets, markets and specialized organic food stores.

Based on the data in Table 1, it can be concluded that the number of producers within the single market ranged from 1 to 4, within green markets from 2 to 5, and within specialized stores from 1 to 2. All markets (11) offered eggs from the cage system, while the supply of eggs from non-cage systems was minor, that is, eggs from the floor system were represented in 9 markets, eggs from free ranges in 6 markets and eggs from organic production in only one market. If the supply of eggs from the cage system is taken as a basis for comparison, with a representation of 100% in markets, the supply of eggs from the floor system was 81.82%, from free range for 54.54% and from organic production 9.10%. Analysing the supply of eggs from different systems, it can also be concluded that eggs from the cage system were represented in all markets (100%), and the supply also included eggs from free ranges, with 60% share in relation to the cage system, while eggs from the floor system and organic production were not on offer. The supply of eggs from organic production is mainly related to specialized stores, in which one to two producers are represented, offering eggs from non-cage systems (free range, free range eggs and organic eggs).

Table 1. Supply of eggs from cage-free systems on the Belgrade market (market, green market, specialized store)

Sale point	Total No. of egg producers	No. of present production systems	No. of egg producers			
			Cage systems	Floor system	Free range	Organic eggs
Supermarkets						
SM1	2	2	2	-	1	-
SM2	2	2	2	2	-	-
SM3	3	3	1	1	1	-
SM4	3	2	3	1	-	-
SM5	1	3	1	1	1	-
SM6	1	3	1	1	1	-
SM7	3	2	2	1	-	-
SM8	3	2	2	1	-	-
SM9	3	1	3	-	-	-
SM10	2	3	2	1	2	-
SM11	4	4	3	2	2	1
Green markets						
GM1	5	2	5	-	2	-
GM2	2	1	2	-	-	-
GM3	5	2	3	-	2	-
GM4	3	1	3	-	-	-
GM5	3	2	2	-	1	-
Specialized stores of organic products						
SS1	2	2	-	1	-	1
SS2	2	2	-	-	1	1
SS3	1	1	-	-	-	1
SS4	2	2	-	1	-	1
SS5	2	1	-	-	-	-

The results of the research, compared to a similar research by Tolimir et al. (2017), when only eggs from cage systems were offered, indicate that the process of harmonizing the egg production sector with welfare regulations in Serbia resulted in an increase in the supply of eggs from non-cage systems. The supply of eggs from cage-free systems in the market is in line with the representation of these systems in Serbia (about 15%) (Krnjajić, 2019; Tolimir et al., 2020). In the coming period, given that the process of harmonization of egg production sector with welfare regulations will continue in Serbia, a growing trend in the supply of eggs from non-cage systems can be expected. Such expectations are also based on tendencies in EU countries, where an increase in the number of producers, as well

as buyers, is observed, who commit to supply only eggs from non-cage systems (cage free) (Egg Track Report, 2021). Also, the strengthening of the "End of the cage age" movement should be taken into account, which could also affect further changes in the egg production sector in EU countries, given that the share of hens (39.7%) is still in enriched cages. Allowed, cage-free systems, which could be the choice of the producers, are the following: 1) Free-Range rearing system, in which layers have access to an open area, usually a grassy area; 2) A free-range system of rearing with portable poultry facilities, whereby layer hens are allowed to consume grass in one place before moving to another; 3) Organic production - implies free access to open space and eating organically produced food; 4) Floor system, as free rearing in a closed space (Cage-Free); 5) Aviary system - when several levels or floors are used for rearing layer hens and implies optimal use of space. It should be noted that for small farms, the traditional system (Backyard Farming), in which hens are reared in their backyards for their own use of eggs, can be important on a smaller scale, and can be useful for local food production.

Based on the results related to the share of production systems by producers, it was found that out of nine producers present in markets, 7 of them have the cage system, 5 producers have the floor system, 3 produce free range eggs and one producer has organic production. The number of systems per one producer ranges from one system (4 producers only produce eggs from the cage system, 1 producer only eggs from the floor system and 1 producer only eggs from organic production) to a maximum of 3 systems per one producer (3 producers simultaneously produce eggs in cage, floor system and on free range). The producers present on the market mostly have cage system, and from non-cage systems, free range eggs. Producers in specialized stores are committed to non-cage systems, primarily organic production.

Analysing the data, it can be concluded that certain producers decide for simultaneous production in several systems, which provides them with greater market security in the transition period. Although the producers in the research by Tolimir et al. (2020) state the enriched cages as their choice when switching to other rearing systems (100%), the situation in the market indicates that a number of producers are opting for non-cage systems. Bearing in mind the tendencies in the EU, it would be important in Serbia in the coming period to engage in the development of non-cage systems, through a systemic approach, which implies a combination of: regulatory measures, producer education, research and development of new technologies and approaches that improve the efficiency and sustainability of alternative cultivation systems, support for this sector in terms of incentives, subsidies and loans to producers who switch to alternative systems of raising laying hens and strengthening consumer awareness. This approach is in agreement with Đoković et al. (2018), who point out that a series of measures are important during the transition period, which include the joint work of the

administration, scientific and professional institutions and the creation of economic and infrastructural conditions.

The research included the price of eggs from different farming systems, grade M, which is shown in the Figure 1.

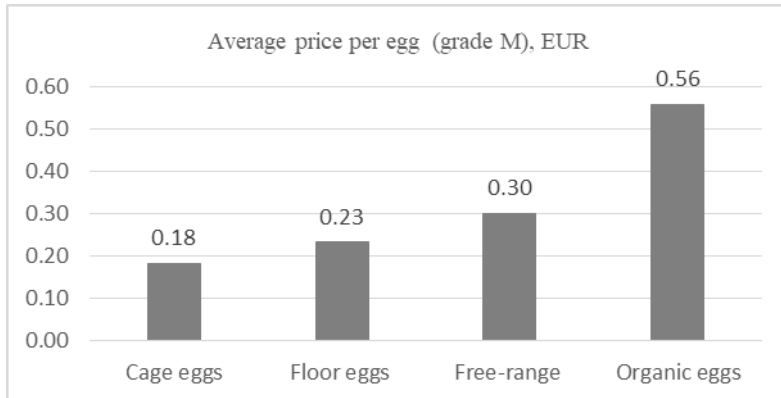


Figure 1. Price of eggs from different rearing systems

According to the obtained results, the average price of eggs from different rearing systems, on the Belgrade market, for grade M, was the lowest for eggs from the cage system (0.18 EUR), while the average price of eggs from non-cage systems was higher, by 26.70% for eggs from the floor system, 63.40% for eggs from free range and 204% for organic eggs. By comparing the results obtained from the EU, a greater difference in the price of cage and non-cage systems can be noted. According to data of the European Commission (2023), the price of eggs from the free range system was higher by 45.60%, and organic by 108%, compared to the cage system.

According to the results of the survey of consumer attitudes, it is determined that for 29.96% of consumers the production system is very important, and within the group of these respondents, the majority are female (76.03%), consumers with higher education (67.10%), age structure from 36 to 55 years (59.46%), employed (78.38%), with high income (55.41%) (Table 2). Also, on the basis of the survey research, it is determined that more egg consumers (53.45%) declared that they would prefer to buy free range eggs, whose structure is very similar to the group of consumers for whom farming systems are important, i.e. this farming system is mostly preferred by women (76.52%), consumers of higher education (59.85%), age structure from 36 to 55 years (40.90%), employed (71.21%), with high income (50.00%) (Table 2).

Table 2. Structure of egg consumers within the group that finds the hen farming system very important and the group that would buy free range eggs

Parameters	Structure of egg consumers who find the rearing system important, %	Structure of egg consumers who would buy free range eggs, %
Sex		
Male	23.97	23.48
Female	76.03	76.52
Education		
Highschool	31,51	40.15
Faculty degree	67,10	59.85
Status		
Student	9.46	15.91
Employed	78.38	71.21
Unemployed	4.05	3.03
Retiree/Pensioner	8.11	9.85
Age		
18-25	12.16	19.70
26-35	14.86	22.00
36-55	59.46	40.90
Over 55	13.52	17.40
Monthly income (RSD)		
30.000-40.000	10.81	15.15
40.000-70.000	33.78	34.85
>70.000-100.000	55.41	50.00

Knowing the attitudes of consumers is important for the process of transitioning to permitted systems and can be one of the factors in making decisions for manufacturers when choosing a system. By looking at earlier research in this area, it can be concluded that in Serbia, consumer preferences regarding free range eggs have not changed significantly for more than a decade, for which, according to research by Pavlovski et al. (2010), 51.2% declared as their choice, which can be explained by the traditional understanding that "real" eggs are those laid by chickens that walk around.

By comparing the obtained data on the structure of consumers for whom the rearing system is important, with the results of research on the structure of consumers for which the welfare of hens is very important (Tolimir et al. 2019), differences can be noted that indicate that consumers do not see a more complete connection between the rearing system and welfare. The mentioned differences point to the need for consumer education in the area of rearing systems and the welfare of laying hens, with special reference to the advantages of non-cage rearing systems. In addition to the question of understanding and connecting the system of rearing and welfare, there is also an open question of whether the statements of consumers about commitment to a certain system coincide with the actual

purchase, and this problem was pointed out by the European Commission in 2007 and 2016 (European Commission, 2007; European Commission, 2016).

Conclusion

Based on the results of the research, which aimed to determine the situation on the egg market, i.e. the supply of eggs from non-cage systems, it can be concluded that the process of compliance with welfare regulations resulted in changes in the Belgrade market, in terms of a greater share of eggs from non-cage systems compared to similar researches in the earlier period. In the following period, in accordance with the developments in the EU countries, where consumers increasingly appreciate products that reflect ethical values, animal care and sustainability, as well as considering that the "Cage Free" movement has an increasingly noticeable effect, for the further development of the egg production sector in Serbia, it is important to focus attention on the establishment of production from non-cage systems on a larger scale. When choosing a system, the attitudes of consumers in Serbia should also be taken into account, who recognize free range eggs as their first choice (53.45%). For the development of the egg production sector in Serbia, systemic action aimed at producers and consumers, through a combination of regulatory measures, education, research and financial support, is of key importance.

Stanje na tržištu jaja iz nekaveznih sistema gajenja

Nataša Tolimir, Marijana Maslovarić, Zdenka Škrbić, Miloš Lukić, Dragan Milić, Jelena Nedeljković Trailović

Rezime

Cilj rada je da utvrdi zastupljenost jaja iz nekaveznih sistema proizvodnje u poređenju sa jajima iz kaveznog sistema, u godini kada za proizvođače u Srbiji, ističe produženi prelazni rok (decembar 2023. godine) za usaglašavanje sa zakonskom regulativom o dobrobiti, koja nalaže prelazak sa konvencionalnog kaveznog sistema gajenja na dozvoljene sisteme (obogaćeni kavezni sistem i nekavezni sistemi (podni, avijarni, sloboda uzgoj – ispusti, organska proizvodnja). Takođe, cilj rada je bio da se utvrdi struktura potrošača unutar grupe kojoj je važan sistem gajenja, koja se deklarira da najviše preferira jaja sa pašnjaka i organska jaja. Ispitivanjem tržišne ponude jaja obuhvaćeni su supermarketi (11), pijace (5) i specijalizovane prodavnice (5), a stavovi potrošača utvrđeni su anketnim

istraživanjem (247 ispitanika u Beogradskom regionu). Prema rezultatima ispitivanja može se konstatovati da je na tržištu Beograda ponuda jaja iz vankaveznih sistema manja, u poređenju sa jajima iz kaveznog sistema, koji imaju zastupljenost od 100%, iznosi 81.82% za jaja iz podnog sistema, 54.54% za jaja sa pašnjaka i 9.10% za organska jaja. Ponuda organskih jaja na tržištu je nedovoljna i vezana za specijalizovane prodavnice. Za oko 30% potrošača, sistem proizvodnje jaja je veoma važan, pri čemu bi se najveći broj potrošača (53,45%) najradije opredelio za jaja sa pašnjaka, a među njima je najveći udeo žena (76.03%), potrošača sa visokim obrazovanjem (67,10%), zaposlenih (78,38%), starosti od 36-55 godina i sa najvišim mesečnim primanjima. Na osnovu rezultata istraživanja može se zaključiti da proces usaglašavanja proizvodnje jaja sa regulativama o dobrobiti ima uticaja na tržište jaja, odnosno da je rezultirao promenama u smislu veće zastupljenosti jaja iz nekaveznih sistema u poređenju sa sličnim istraživanjima u ranijem periodu. Istovremeno, iako je prisutna rastuća svest kod potrošača o značaju sistema gajenja, ona je i dalje nedovoljna u odnosu na pojedine evropske zemlje. Razvoju nekaveznih sistema, kao povoljnijim sa aspekta dobrobiti i očekivanja potrošača, u narednom periodu treba posvetiti veću pažnju, delovanjem kroz regulatorne mere, edukacij proizvođača i potrošača, istraživanja i podrške u smislu podsticaja, subvencija i kredita proizvođačima koji prelaze na alternativne sisteme gajenja kokoši nosilja.

Ključne reči: kokoš, nekavezni sistemi gajenja, tržište, potrošači, anketa

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Conflict of interest

The authors declare that they have no conflict of interest.

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