

Attitude of consumers towards the possibility of avoiding the culling of male layer-type chickens: a survey on the acceptability of the derived meat products

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Abstract

Petkov, E., Dimov, K., Popova, T. & Ignatova, M. (2024). Attitude of consumers towards the possibility of avoiding the culling of male layer-type chickens: a survey on the acceptability of the derived meat products. *Bulg. J. Agric. Sci.*, 30(1), 101–106

A pilot study as a survey about the attitude of the participants towards the widespread practice of culling male layer-type chickens was carried out. An alternative solution to the problem has been proposed by raising these birds for meat. The layer cockerels of Lohmann Brown Classic were reared in the Institute of Animal Science-Kostinbrod, Bulgaria, and slaughtered at the age of 5 and 9 weeks. Two products “Little Cockerel” (200 g) and “Big Cockerel” (900 g) were prepared from the 5 and 9 week old chickens, respectively. The opinion of the respondents was in favor of the product with the higher weight. It was further cooked and sensory evaluation was done. The volume of the production that the respondents would buy at different price ranges was determined. According to the results of the case described, we can conclude that the “Big Cockerel” test product corresponded to a greater extent to the preferences of the participants in the survey for an innovative poultry meat product. It demonstrated potential for successful market realization with maximum utilization of the product manufactured in the country.

Keywords: male layer-type chickens; survey; meat; consumers; culling

Introduction

The presence of meat in the diet culturally has been associated with a higher standard of living and its consumption is seen as a reflection of favorable economic conditions (Nestle, 1999; Kennedy et al., 2004). The consumption of red meat has declined in response to the general health concerns and particularly to the suspected higher risks type 2 diabetes, coronary heart disease, stroke and certain cancers (Farvid et al., 2021; Wang et al., 2022; Gu et al., 2023). This decrease, however, is not a recent phenomenon. It reflects a historical trend due mainly to the industrialization of the agriculture which made the production of other kinds of animal protein such as poultry and fish much more efficient

(Fernandez-Armesto, 2001). As a result, poultry meat became the most often purchased meat. Newer research from Scandinavia showed that the preferences towards the meat are associated with ideas of its origin. It was found that consumers were disgusted by the appearance of fat and blood on the raw meat, thus preferring poultry to red meat (Kubberød et al., 2002). On the other hand, consumers expect high quality products, obtained from healthy animals, reared in good environment, with fresh taste and nutritious (Morrisey et al., 1998). Product qualities might be categorized depending on whether they are related to the production process, including animal welfare and food safety issues, or to specific product qualities related to nutritional content, sensory factors and its popularity (Caswell et al., 1998).

The increase in the consumption of poultry meat is influenced by the growing concern of consumers for their own health. It is cheaper than red meat and is often preferred since it is fast and easily cooked. In addition, poultry meat has high protein absorption rate, it is rich in mono- and polyunsaturated fatty acids, and the saturated fatty acids are in much lower amount when compared to pork, lamb and beef (Riovanto et al., 2012). Poultry meat has high content of iron, zinc, selenium, niacin (Soriano-Santos, 2010). These are factors that make the production and consumption of poultry meat globally popular. According to FAO (2021), there is an increase in the production of chicken meat worldwide by more than 10% for the period 2016 – 2021 (from 107.4 million tons to 121.6 million tons).

During the same period, the production in Bulgaria increased from 86.5 to 90.7 thousand tons. Thus, the increased consumption makes it necessary to search for innovative solutions to satisfy the market. One of these possibilities is related to the utilization of the male layer-type chickens. Rearing this kind of birds is considered economically unprofitable, and as a result the mass practice applied is to cull them at one day old (Damme & Ristic, 2003; Krautwald-Junghanns et al., 2018). Due to ethical and animal welfare concerns, this practice is no longer accepted by the society. Therefore, discussions and research have been conducted to find alternatives. Considering the cruelty of chick culling, some EU countries, namely Germany, France, Italy, Luxembourg and Austria have already prohibited this practice (Vinci, 2022) and the EU Legislature is also studying the possibility of imposing an EU ban on the culling of day-old chicks and ducklings (Di Concetto et al., 2023). Hence, we have every reason to expect that in the near future this ban will grow within the EU and reach our country as well.

The aim of the this study was to investigate consumers' attitudes towards the decision we propose to raise male layer-type chickens for meat in search of an alternative to the existing practice of culling them at one day of age, as well as to evaluate the sensory indicators, and the possibility of successful market realization of the product at different price ranges.

Materials and Methods

The experiment was carried out in the experimental poultry farm of the Institute of Animal Science- Kostinbrod, Bulgaria in 2022. The object of the study were Lohmann Brown Classic male chickens, reared until 5 and 9 weeks of age. Two products "Little Cockerel" (200 g) and "Big Cockerel" (900 g) were prepared from the 5 and 9 week old chickens, respectively. The study was further carried out as a survey

with 17 questions. Four of them were general and included information about the respondents – sex, age, education, and incomes. Other four of the questions concerned the attitude of the consumers towards the practice of culling the male layer-type chickens. Six of the questions regarded the preferences of the consumers for a kind of chicken product, weight category and sensory traits after cooking. Three of the questions were economic and referred to the preference of the consumers for the price range and the frequency of purchase the proposed product.

Results and Discussion

A total of 56 respondents equally divided according to their sex were involved (Table 1). In terms of age, the age limit up to 18 years prevails. This is due to the fact that some of the respondents were graduate students from the catering school, who were directly involved in the processing of the chicken product. With regard to educational qualifications, the largest part were respondents with secondary, specialized secondary and higher education holding Master's degree. As to income, the most significant part was the group with an average income per family member in the range of €400-600. A part of the respondents did not answer the last two questions about education and income, probably due to privacy concerns.

The second group of questions regarded the attitude of the respondents towards the existing practice of culling the

Table 1. Sample structure

Data	Trait	Percentage of the participants, %
Sex	Male	50
	Female	50
Age	Up to 18 years	51.79
	19÷29 years	5.35
	30÷39 years	5.35
	40÷49 years	14.29
	50÷59 years	21.43
	above 60 years	1.79
Education	Primary	5.36
	Secondary	26.79
	Specialized secondary	17.86
	BSc	7.14
	MSc	16.07
	PhD	7.14
No answer	19.64	
Income	Up to 400 €	16.07
	400÷600 €	33.93
	600÷800 €	16.07
	800÷1000 €	14.29
	Above 1000 €	3.57
	No answer	16.07

male layer-type chickens (Table 2). In the first question, a large part of the respondents united around the final opinions proposed in the survey: “I think it is unacceptable” (33.33%), and “I think it is horrible” (29.82%). A less extreme, but also negative reaction was observed in 14.04% of the respondents, who consolidated around the answer “I think it is inhumane”. Therefore, the overall negative reaction to the existing practice is 77.19%. Between 1/6 and 1/7 of all respondents could not decide on this problem (15.79%), while 7.02% of them stated that they were not interested. Our results were similar to those of Spain et al. (2018) who reported that the majority of the respondents (78%) were somewhat or very concerned about the welfare of animals raised for food. While the awareness of the problem only showed the effect of respondents’ initial reaction to the existing practice of culling the male layer cockerels, the second question of the survey could answer whether we would have support for our proposed way of solving the problem by raising these chicks for meat. The ratio between the positive and negative answers of this question was 3.5 to 1, revealing the genuine attitude toward exploring ways to solve the problem. To the question if they would buy the derived innovative products, the results showed that 53.56% would purchase the proposed products, whereas 16.08 % would not do that. It should be noted, that a large proportion of the respondents (over 30%) could not decide. This was not surprising, since

Table 2. Respondents’ attitude towards the practice of culling the male layer-type chickens and their support for alternative solution

Question	Possible answers	Percentage of the respondents, %
What is your attitude towards the practice of culling the male layer-type chickens after hatching?	I think, it is unacceptable	33.33
	I think it is horrible	29.82
	I think it is inhumane	14.04
	I have no opinion	15.79
	I am not interested	7.02
Would you support their rearing for meat as an alternative solution of the problem?	I definitely would	14.29
	I rather would	42.86
	I have no opinion	28.57
	I would definitely not	1.79
Would you purchase the derived innovative meat products?	I definitely would	21.42
	I rather would	32.14
	I have no opinion	30.36
	I rather would not	14.29
	I would definitely not	1.79
Which of the innovative products derived from the male layer-type chickens would you be willing to buy?	Little cockerel – 200 g	24.56
	Big cockerel – 900 g	40.35
	Both	21.05
	None	14.04

we assumed that the participants in the survey were not familiar with the quality of the proposed products or with the possible price to be paid for them. Hence, the questions that followed were in this direction.

Figure 1 presents the results about the preferred weight category when purchasing the whole chickens. The majority of the participants (83.33%) preferred chickens over 1 kg. Our products were in the lower range, and the preferences of the respondents were for range 0.5–1 kg (11.11%) in comparison to up to 0.5 kg (5.56%). From both products proposed – „Little Cockerel“ of 200 g and „Big Cockerel“ weighing 900 g, the participants would like to purchase the second one (40.35% vs. 24.56%) (Table 2). These results corresponded to the answer of the question where the weight range of the “Big Cockerel” is two times preferred than the weight range of the “Little Cockerel”. A small part of the respondents would buy both products (21.05%), whereas 14.04% would not buy any (Table 2).

Figure 2 presents the results of the answer how often the respondents would buy the products. Each of the participants had one option. The majority of the participants would buy the products once a month (43.87%) and once a week (29.82%).

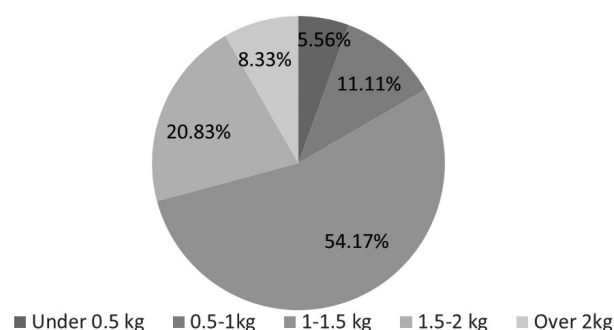


Fig. 1. Preferred weight category when purchasing a whole chicken

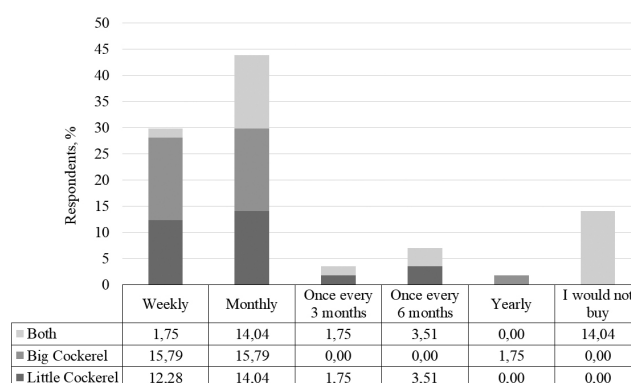


Fig. 2. Frequency of purchase of the offered products

According to the responses to the last question, the participants preferred the “Big Cockerel”. This was the reason, that all the questions in the second part of the survey concerned the “Big Cockerel”. The respondents in the second part of the survey were asked to answer a few general questions, concerning their preferences for poultry products, the frequency of purchasing and the extent to which it responds to their capabilities to buy the products. Furthermore, the participants were asked to answer what their preferences for a price of the product were, as well as the extent to which some of its traits might affect their final decision.

Figure 3 presents the preliminary attitudes of the respondents towards chicken products. Five possible answers were given, covering pretty much the entire spectrum available on the market. With the lowest degree of approval (9.09%) is the product “Fast growing broiler from the store”. In so far as this is the most widespread product on the market, the answers of the respondents showed an unpleasant finding of the quality of the production that the population consumes. On the other hand, as many as 63.63% of respondents preferred chickens raised at home, with the larger share being the product “Backyard chicken” (36.36%). The so-called backyard chickens differ from conventionally produced broilers mainly in the way of feeding and the free access to a larger area. The advantage of the broilers kept in conventional systems, however, is the lower production cost (Gocsik et al., 2016), while products from the home raised chickens are preferred because of their taste characteristics, and even better nutritional and functional qualities (Sharma et al., 2023).

Tables 3 and 4 show some preliminary attitudes of the respondents towards individual parts of the carcass and skin color of the chicken products. Thighs, breasts and wings had the highest percentage of approval, and the same were enjoyed with the lowest share of disapproval. Among the products that the respondents did not approve with the highest

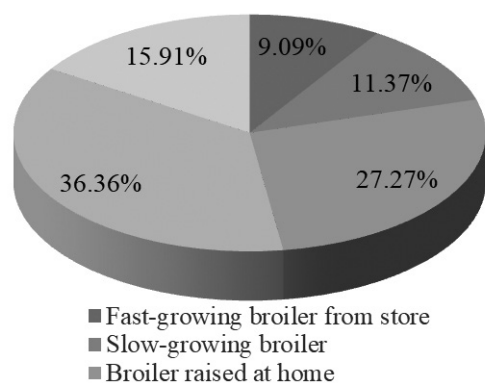


Fig. 3. Preference for the type of chicken product

Table 3. Attitude towards the separate parts of the chicken products

Carcass parts	Approval, %	Disapproval, %
Breast	44.44	16.67
Thighs	72.22	2.78
Back	8.33	27.78
Tail	13.89	41.67
Wings	38.89	8.33
Liver	11.11	47.22
Heart	2.78	36.11
Spleen	0.00	55.56
Gizzard	8.33	30.56
Neck	0.00	30.56
Skin	8.33	38.89

Table 4. Attitude towards the skin colour of the chicken product

Skin colour	Approval, %	Disapproval, %
White	47.22	2.86
Yellow	47.22	17.14
Blue	2.78	65.71
Gray	5.56	48.57
Black	0.00	68.57
No opinion	11.11	8.57

percentage were the spleen, liver and tail. The respondents were allowed to give up to 3 answers, so the sum in the table exceeded 100%.

The preferred colors of the skin of the chicken products were white and yellow with an equal share of all respondents (Table 4). The remaining colors predictably caused overwhelming disapproval, as respondents associated them with varying degrees of product spoilage due to poor storage or expired shelf life.

The evaluation of the texture of the whole chicken and its separate parts – breast, thighs and skin after cooking is presented on Figure 4. Very few of the respondents (below 3%) determined the whole chicken texture and the texture of its parts as tough. The whole chicken and breast were evaluated as normal (83.33% and 69.44%, respectively), the thighs were firm (47.23%), and the skin – tender (66.67%).

Sensory evaluation is often the only way to fully quantify the flavour and texture characteristics of meat by consumers. This more complex testing is necessary since meat flavour is a combination of factors that cannot yet be measured simultaneously by laboratory techniques.

The important sensory characteristics that could be evaluated after cooking and consumption of the meat include flavour and tenderness. The latter is one of the main parameters of tenderness (Castellini et al., 2008). Flavour is one of

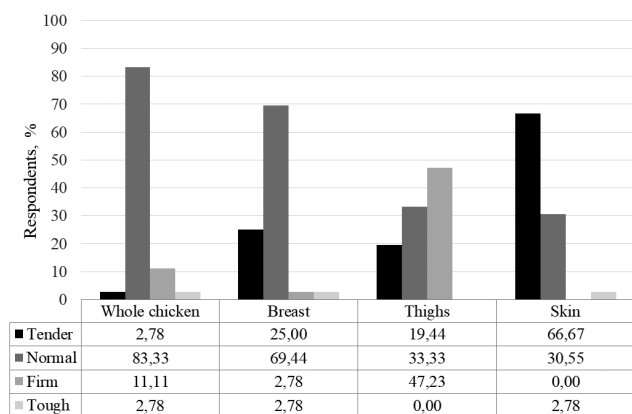


Fig. 4. Texture of the “Big Cockerel” – 900 g

the most important organoleptic properties. When evaluating this trait, each respondent were free to cook the product of own choice. The opinion of the participants in regard to flavour are summarized on Figure 5. The results showed that no one evaluated the flavor as unpleasant. A small part (2.78-5.41%) could not determine to which category to assign it to. The majority of the respondents defined the flavour of the breast and skin as normal, and that of the thighs as pleasant. A part of the respondents associated the flavour of the product with backyard chicken. As we have already seen, this was the most preferred category by all the respondents and is an assessment of the quality of the product we offer.

The successful sale of a product, even of the highest quality, depends on the price customers would pay for it. Our next survey question was related to the price range in which participants would purchase the product (Figure 6). The general trend, as can be expected, was that as the price increased, the number of people willing to buy the product decreased. This trend was relatively smooth until the last price range – above 13.50 €/kg, where the leap was sharper. An interesting result was that the lowest price range was not the most

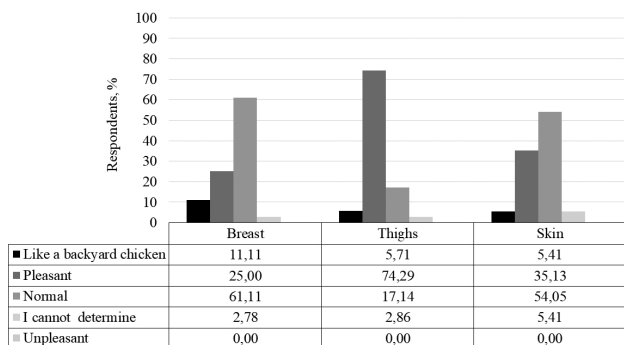


Fig. 5. Evaluation of the flavour of the “Big Cockerel” – 900 g

preferred. Probably some of the respondents associated the too low price with questionable quality of the offered product. This research showed that a large number of consumers were willing to pay more than the market price for a product of better quality. Similar attitudes were observed in another study (Napolitano et al., 2008), where consumers were willing to pay more for products produced with higher animal welfare standards, as well as in a study by Spain et al. (2018), where the average amount the consumers were willing to pay extra was \$0.96 for 1 pound of chicken breast (48% more).

Figure 7 shows the assumed quantity of the product to be purchased by a survey participant on an annual basis. The difference in the quantity of the product purchased between the lowest and the highest price range was more than 100 times. It is obvious that for a large part of the respondents there is a psychological threshold in the price of a given product, which they would not cross regardless of its quality. For each person, this threshold is different and is related

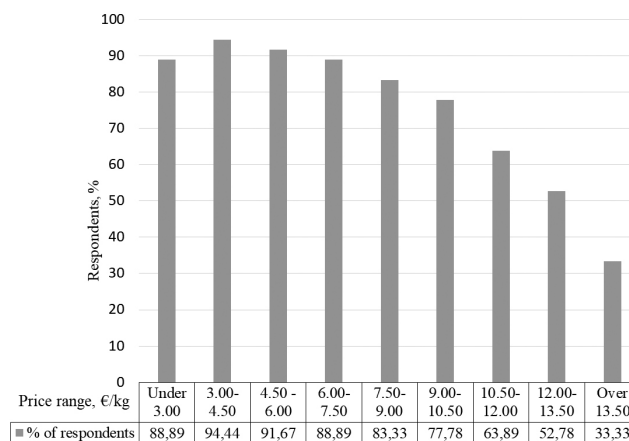


Fig. 6. Interested of purchasing a product “Big Cockerel” – 900 g

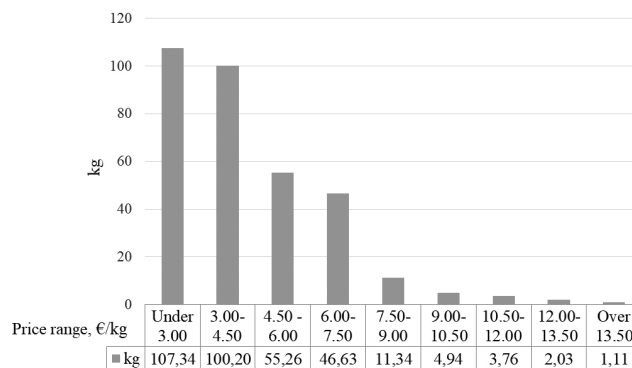


Fig. 7. Estimated purchase quantity of “Big Cockerel” product by respondent for a year

to their material capabilities, but not only to them. In our research, the psychological thresholds were 4.50 €/kg and 7.50 €/kg, after which there is a sharp drop in the perceived quantity of the product purchased.

Conclusion

The results of the survey showed a high degree of disapproval of the existing practice of culling the male layer-type chickens after hatching. The decision proposed by us to rear them for meat was supported by the majority of respondents, with their proportion being more than 3 times larger than those supporting the opposite opinion. Of the two offered products with weights of 200 g and 900 g, the preferences of the participants were for the product with the higher weight called „Big Cockerel“. The sensory qualities of this product were rated highly, and none of the respondents gave a negative assessment of the flavour of the product. Consumer preferences for different price ranges indicated the potential for successful sale of the product.

Acknowledgements

The authors would like to thankfully acknowledge the funding provided by the Bulgarian National Science Fund, Ministry of Education and Science in Bulgaria (Project INOVAMESPRO, Contract N° KP-06-N56/10,12.11.2021).

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