

# **POULTRY MEAT AND MEAT PRODUCTS MARKET IN THE SLOVAK REPUBLIC WITH AN EMPHASIS ON CONSUMPTION**

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## **ABSTRACT**

The meat and meat products sector belongs to one of the strategic and key sectors of the food industry in the Slovak Republic. Meat and meat products are considered basic foods that are consumed by Slovak consumers. Of the food group, pork and poultry have the widest consumption. From the point of view of dietary properties, price relations, availability or speed of preparation, poultry meat and meat products appear to be the most consumed with a view to the future. In the context of the above, the aim of the paper is to point out the current market of poultry meat and meat products in Slovakia in terms of production and consumption, as well as to identify consumer behavior. Based on the results, it can be stated that the production of poultry meat has an increasing tendency and currently reaches 13 kg per capita. Poultry consumption in the Slovak Republic has been rising rapidly in recent years and exceeds the recommended dose by almost 100%. These are also confirmed by the results of the survey, which shows an annual consumption of more than 30 kg. In terms of factors, the quality, price and freshness of purchased and consumed meat are the most important for consumers. In view of future developments, it is necessary to appeal to the quality of the meat consumed, as well as to aspects relating to health recommendations, the environment, sustainability, or animal welfare.

*Keywords: poultry, meat, meat products, consumption, factor*

## **INTRODUCTION**

Poultry meat has an important role in human nutrition and is one of the most consumed types of meat in the world. This can be justified by the positive benefits of rational nutrition [1]. Compared to other types of meat, poultry meat has advantageous biological and nutritional properties and thus becomes a preferred species for consumers. Poultry meat can be considered a valuable food as it is characterized by variable and moderate energy content, high content of highly digestible proteins, high content of unsaturated essential fatty acids and unsaturated lipids, as well as the content of essential amino acids, minerals, fat-soluble vitamins, calcium, and phosphorus. Poultry meat has a good nutritional

quality and is also characterized by a lower fat content, which does not lead to health risks with increased consumption of poultry than in the case of consumption of pork and beef. Furthermore, chicken meat can be easily enriched with several other important nutrients [2], [3], [4]. In the context of this, however, it is necessary to emphasize that the nutritional value of poultry meat depends on various factors such as age, feeding, keeping, hybrids, carcass parts and type of poultry [5]. By consuming poultry meat together with the current adherence to a comprehensive rational diet, it is possible to prevent and reduce the risk of the development of overweight and obesity, cardiovascular disease, type 2 diabetes, and cancer. Poultry meat is considered a widely available, affordable food that can be consumed in all countries of the world and in developing countries [3].

When pointing out the health benefits resulting from the consumption of poultry meat, it should be added that they also depend on the quality of the meat consumed. The production of high-quality and healthy poultry meat is possible through modernly equipped production facilities, high-quality compound feeds and high-quality zootechnics, which is under constant veterinary supervision [6]. The quality of produced poultry meat is also affected by the method of cooling. High-quality poultry meat should be air-cooled and looks dull and has a drier, shiny appearance. In terms of color, quality poultry meat should be creamy white to yellowish in color with brownish spots caused by oxidation in air-cooled poultry. In addition to air cooling, European Union legislation allows for other methods of cooling poultry meat, namely air cooling with spraying and, in some exceptions, water cooling. Most imported meat sold on the Slovak market is cooled by water, which is an economically less demanding cooling process, but poultry meat is of lower quality. This is because microbial contamination can occur with this method of cooling, as the water contains a certain amount of chlorine, which inactivates the microflora on the surface of the poultry. This method of cooling also has a negative impact in the form of binding free water in poultry meat [7].

Another fact that has a significant impact on the quality of poultry meat is the fattening of chickens. In the case of broilers, fattening lasts 33-36 days. If the fattening is longer, the meat is of better quality. The slaughter weight is generally 1.6 to 2 kg. In some countries, poultry meat, especially chickens, is fattened to a higher weight and at the time of slaughter, the weight of the chicken quarter can reach 500 g. The second type is slow-growing hybrids, which are in fattening for at least 49 days, the meat is of better quality, but the costs are higher. This is mainly due to longer rearing, the use of other feed mixtures that contain lower concentrations of nutrients, a larger component consists of cereals, minerals, vitamins and vegetable oils. The characteristic of chickens is that they can naturally bind a yellow color. The average weight of this type of hybrid is 2 kg, while 1.9 kg of feed is used per 1 kg of weight [8], [9]. The higher quality of poultry meat also depends on the existence of antibiotics. Antibiotics should be used only minimally in chicken farming and should only be used when necessary and recommended by a veterinarian. There are several cases in foreign poultry

farms where antibiotics have been used to stimulate growth in chicken farming. Cases have been identified e.g., in Poland and Brazil, or in other countries where veterinary control is insufficiently performed [10].

In connection with the above, the aim of the paper is to point out the market of poultry meat and meat products in the Slovak Republic and to identify the behavior of Slovak consumers with an emphasis on key aspects of buying and consuming poultry.

## **MATERIALS AND METHODS**

The aim of the paper was achieved by using and processing secondary and primary data. Secondary data were obtained from the Statistical Office of the Slovak Republic and were the basis for examining the development of the trend in production and consumption of poultry meat which was described by using regression. Mathematical methods and calculation of the average growth coefficient were used to process the secondary data. The current situation was also confronted by meat producers who have been the subject of research. A survey focused on meat producers was carried out in 2019 and 2020 by personal and e-mail communications and was attended by 26 companies from Slovakia.

The primary data were obtained by consumer survey, the aim of which was to determine the level of consumption of poultry meat and meat products and to identify consumer behavior on the Slovak poultry market. The questionnaire survey was conducted on a sample of 1,409 respondents in Slovakia in the years 2018 - 2020 in an electronic version. Respondents involved in the questionnaire survey were divided into eight categories: gender (women 59.0%; men 41.0%), age (18-25 years 38.8%; 26-35 years 22.1%; 36-50 years 21.8%; over 51 years 17.3%); education (basic 3.4%; secondary school 47.5%; university education 49.1%), place of residence (countryside 45.5%; city 54.5%), economic status (employed 48.9%; entrepreneur 8.9%, student 31.2%, pensioner 7.6%, unemployed 0.8%, maternity leave 2.7%), number of household members (1 member 5.8%; 2 members 20.3%; 3 members 27.3%, 4 members 30.0%, 5 members 11.9%, more than 5 members 4.6%), monthly income of the respondent (up to 500 euros 39.2%; 501 – 1,000 euros 37.3% ; 1,001 – 1,500 euros 16.5%; 1,501 – 2,000 euros 4.6%; more than 2,001 euros 2.3%), monthly household income (up to 1,000 euros 17.7%; 1,001 – 2,000 euros 49.6%; 2,001 - 3,000 euros; 23.7%; 3,001 – 4,000 euros 4.8%; more than 4,001 euros 4.1%).

The collected data were processed by using Microsoft Excel and evaluated in the statistical programs IBM SPSS and to achieve a deeper analysis of research objectives, the following hypotheses were formulated:

- There is a dependence between poultry meat and meat products consumption and selected demographic characteristics

- There is a difference in the assessment of the factors determining poultry meat and meat products consumption

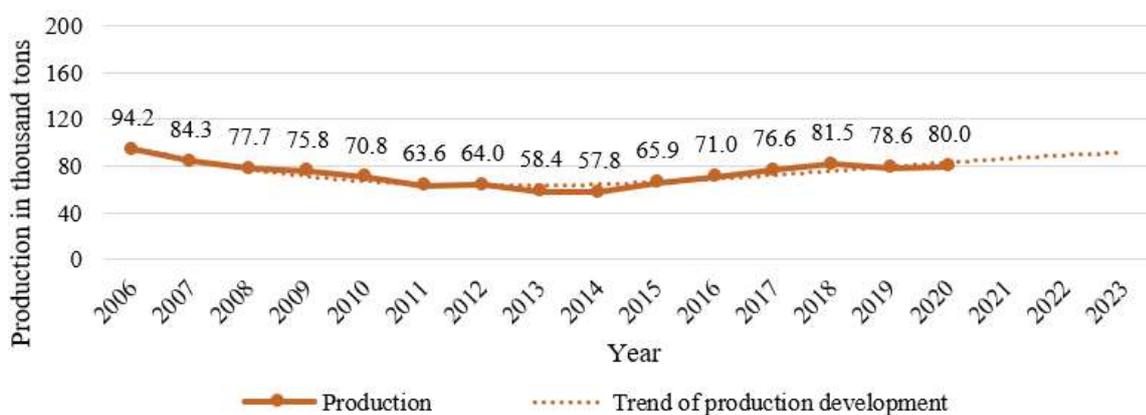
The established hypotheses were tested using statistical test Chi square test of contingency, as well as categorical principal component analysis (CATPCA).

## RESULTS AND DISCUSSION

The trend in poultry meat production was accompanied by an average annual decrease of 1.2% ( $k' = 0.988$ ) and the current production of this type of meat is at the level of 80 thousand tons, which represents a decrease of 15.1% compared to the first year of the analyzed period (Fig. 1). In the production of poultry, the Slovak Republic accounts for 0.5% of the total production of the European Union and the production of poultry meat per capita in Slovakia is approximately 13 kg. We described the trend of poultry meat production in Slovakia using a cubic function with the following parameters:

$$q_t = 108.47 - 13.953 * t + 1.2934 * t^2 - 0.0137 * t^3 \quad R^2 = 0.881$$

The development of meat and meat products production is significantly influenced by several factors, which are also expected in the future direction of poultry meat and meat products production. Based on the information obtained from poultry producers and processors in Slovakia, we state that the key factors determining poultry meat production are price aspects, factors related to the support of poultry meat production and meat products, the most important of which are financial support and subsidy policy, sales problems, as well as restrictions on international trade and compliance with relatively strict legislation. Based on the chosen cubic function, it is possible to assume a relatively favorable development in the production of poultry meat with a view to the future. Production should increase slightly over the next three years, which could be mainly due to increased demand for fresh poultry meat, which Slovak consumers may tend to prefer due to the existence of beef-related food scandals or concerns about swine disease.

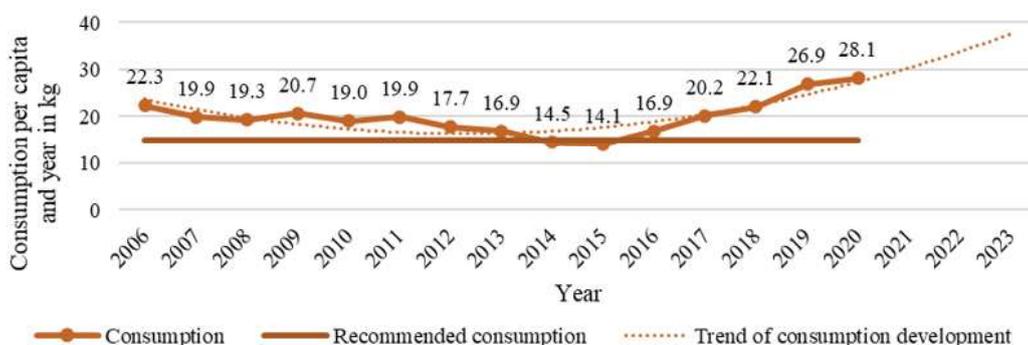


**Fig. 1.** Poultry meat and meat products production in Slovakia in 2006-2020  
Source: own processing

In the analysis of the market of poultry meat and meat products, it is necessary to point out the development of consumption. The development of poultry meat consumption in the first and last year of the observed period is at approximately the same level. Consumption of poultry meat and meat products was accompanied by slight fluctuations in the form of growth and decline. For the whole analyzed period, the average growth coefficient  $k'$  reached the value of 1.017 and it is possible to state a stagnant and relatively stable development of poultry meat consumption. In 2014 and 2015, the consumption of poultry meat did not reach the level of the recommended consumption doses and lagged behind by approximately 5%. However, a growing trend in poultry meat consumption has been recorded again since 2016, reaching a level of 28.1 kg in 2020, which represents an increase of almost 4.5% compared to the previous year (Fig. 2). Until 2018, the Slovak Republic was included among the EU countries with relatively low consumption of poultry meat, but gradually until 2019 we are approaching the EU-28 average with the current level of consumption (24.7 kg). We described the development of poultry meat consumption using a polynomial function of the 2nd degree (quadratic function) with the following parameters:

$$q_t = 26.186 - 2.6972 * t + 0.185 * t^2 \quad R^2 = 0.7484$$

Based on the quadratic function, it is possible to assume the consumption of poultry meat and meat products in the future. Poultry consumption should increase and reach the level of 30-35 kg per capita in the Slovak Republic in the coming years. If the consumption of poultry meat and meat products in quantities of more than 35 kg per person per year, the recommended dose of consumption of this type of meat will be exceeded by more than 130%. In connection with the given assumption resulting from the chosen cubic function, it is necessary to focus on the factors influencing the higher consumption of poultry meat with a view to the future. Consumption can be influenced by favorable price relations, the purchasing power of the population, or new nutritional trends and lifestyles of consumers. The consumption of this type of meat is also significantly affected by the fact that this type of meat is a substitute product, especially for beef and pork, which are characterized by higher prices compared to poultry meat. Consumption of poultry meat can also be significantly determined by the offer of poultry products and price relations between individual types of meat [11], [12].



**Fig. 2.** Poultry meat and meat products consumption in Slovakia in 2006-2020

Source: own processing

Consumption of poultry meat and meat products was also evaluated by Slovak consumers. The results of the consumer survey showed that only 3.8% of consumers do not consume poultry meat and meat products. These respondents were excluded from answering other questions. The survey aimed at Slovak poultry consumers was also focused on identifying the amount of consumed poultry meat. This was achieved based on detailed recalculations of portions of poultry meat and meat products. Consumers determined the average quantities consumed per week in portions, which were then converted to kilograms per year. Based on the results, it can be stated that the poultry consumption is excessive and 82.4% of consumers consume more than the interval of recommended doses (more than 16.5 kg per year). On the other hand, it should be emphasized that 6.8% of consumers consume an adequate amount of poultry meat in terms of recommended doses, which represents the consumption of 13.5 to 16.5 kg per year. The next finding was that 10.8% of consumers do not reach the recommended interval of poultry meat consumption.

In connection with poultry consumption, we also found the dependences between the amount of consumption and selected demographic characteristics of respondents. Based on the results of the applied Chi square test, it can be stated that the amount of consumption of poultry was identified differently from the aspect of gender. Poultry meat and meat products are more consumed by women compared to men. This may be because men prefer red meat, and women prefer poultry due to its easy digestibility and reasonable price. Differences in the consumption of poultry meat were also found in the case of dietary preferences and habits. Consumers whose diet is based on animal products tend to consume more poultry meat compared to consumers who prefer other food groups to eat. An interesting finding was the fact that differences in the amount of poultry consumption were not identified in the case of other demographic characteristics, which implies that the consumption of poultry meat in Slovakia is preferred and does not depend on age, income, economic status, or place of residence. The popularity of poultry meat among consumers has been confirmed by other studies [13].

**Table 1.** Results of Chi-square test to test dependences between poultry meat and meat products consumption and demographic characteristics

<b>Factor</b>	<b>Chi-square</b>	<b>p-value</b>
Gender	10,126	0,006
Age	11,324	0,184
Place of residence	0,743	0,946
Monthly income	6,042	0,643
Education	7,711	0,103
Economic status	29,738	0,582
Dietary preference	23,790	0,002

*Source: own processing*

The average annual consumption of poultry meat and meat products is 31.77 kg per respondent involved in the questionnaire survey and a weekly consumption is at the level of approximately 0.61 kg per consumer. The weekly consumption of the average Slovak consumer consists of 370 g of poultry meat, 100 g of poultry sausages, 80 g of poultry ham, 60 g of canned poultry, or another poultry product. In connection with the consumption of poultry meat, it is necessary to evaluate the main reasons for its consumption. The results of the consumer survey showed that Slovak consumers consume poultry mainly due to rational diet (32.3%), taste (27.5%) and habit (20.1%).

The aim of the survey was also to identify determinants influencing the selection of a specific poultry product consumed. For this reason, consumers rated 25 selected factors on a scale of 1 to 10, with 1 representing the insignificance of the factor and 10 representing the high importance in the purchase and consumption. The results showed that the quality and freshness of poultry meat, the proportion of meat in the products, the appearance and smell of poultry meat, as well as the country of origin of poultry are the most important aspects for Slovak poultry consumers. Our results are confirmed by other studies and freshness and quality are the most important aspects for consumers [14]. For a deeper analysis of the factors determining consumer behavior, we also identified hidden relationships between the examined factors. Based on the achieved results and the application of the categorical analysis of the main components (CAPTCA), three latent components were created, which can confirm our assumption about the existence of differences in the evaluation of factors by Slovak consumers (Table 2). The first latent component consists of factors such as freshness, quality, price, appearance, smell, meat content, country of origin, manufacturer, shelf life, previous experience, health aspect, or information on the product packaging. These factors can be considered as the main ones that consumers notice when buying and subsequently consuming poultry meat, and therefore the given factor is named as "key factor". The second latent component includes the content of saturated fatty acids, salts, nitrates, water, proteins, emulsifiers, or energy data. These factors are linked to the composition of the product and the nutritional aspect, and therefore the component has been named "composition factor". The last component contains factors such as the promotion, the size and appearance of the packaging, the speed of preparation and the information that it is meat and meat products produced under organic farming conditions. These aspects are complementary for Slovak consumers and are often associated with marketing activities to support the sale of poultry meat and products, so the component is named as "consumption support factor".

**Table 2.** Factor loadings from Categorical Principal Component Analysis (CATPCA)

Factor	1.Component	2.Component	3.Component
freshness of the product	<b>0,903</b>	0,206	0,095
quality	<b>0,831</b>	0,240	-0,012
product fragrance	<b>0,798</b>	0,254	0,187
proportion of meat	<b>0,778</b>	0,384	-0,005
product appearance	<b>0,760</b>	0,202	0,199
country of origin	<b>0,752</b>	0,317	0,194
durability	<b>0,717</b>	0,217	0,328
previous experience	<b>0,708</b>	0,131	0,311
product price	<b>0,678</b>	0,077	0,270
manufacturer	<b>0,672</b>	0,335	0,273
health aspect	<b>0,596</b>	0,417	0,355
product information on the packaging	<b>0,530</b>	0,339	0,501
saturated fatty acid content	0,172	<b>0,836</b>	0,250
salt content	0,215	<b>0,818</b>	0,237
nitrate content	0,151	<b>0,797</b>	0,181
water content	0,338	<b>0,763</b>	0,117
protein content	0,283	<b>0,751</b>	0,141
fat content	0,276	<b>0,750</b>	0,260
energy value	0,212	<b>0,747</b>	0,316
emulsifiers	0,387	<b>0,727</b>	0,105
product promotion	0,114	0,219	<b>0,841</b>
the appearance of the packaging	0,217	0,149	<b>0,831</b>
package size	0,322	0,151	<b>0,720</b>
preparation speed	0,153	0,259	<b>0,682</b>
ecological aspect (organic food)	0,170	0,451	<b>0,598</b>

*Source: own processing*

## CONCLUSION

The market of poultry meat and meat products has recently developed dynamically in Slovakia under the influence of various determinants, such as pandemic situation related to COVID-19, the environmental aspect, sustainability, health benefits resulting from poultry consumption or a change in eating habits. The aim of the paper was to point out the Slovak poultry market with an emphasis on production and consumption, as well as the behavior of Slovak consumers. This was identified based on secondary data, and we can state the relatively stable poultry meat production, but also its lack, as poultry consumption is constantly increasing. At present, it is possible to produce 13 kg of poultry meat per capita, while consumption is up to 28 kg. We found that

increasing poultry consumption is expected and can be justified by favorable prices, quick preparation, easy digestibility, or the absence of food scandals. By conducting a consumer survey, we conclude that the average Slovak consumer involved in the survey weekly consumes 610 grams of poultry meat and products. We also identified three latent components affecting the poultry consumption, namely the key factor, the composition factor, and the consumption support factor. With a view to the future, we assume that Slovak consumers will continue to consume poultry, but they should focus not only on the quantity but also on the quality of consumed poultry with emphasis on the country of origin and support of Slovak producers. Due to health recommendations, rationalization in diet, sustainability and environmental aspects, annual consumption of 15 kg per capita is desirable.

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