

## AN ANALYSIS OF CONSUMER ATTITUDES AND PREFERENCES CONCERNING PORK PURCHASES

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### Abstract

The aim of this study was to analyze consumer behaviors and preferences related to the consumption of pork, and to identify the main criteria that influence pork purchases. The study involved a Google survey questionnaire which was filled out online by 100 respondents, which the respondent individually marked the answers to the questions. The survey was anonymous. The respondents were city dwellers as well as residents of villages situated in the proximity of urban areas. The vast majority of the respondents consumed pork, and the content of intramuscular fat was the main factor limiting pork consumption. Despite the above, most respondents were of the opinion that fat improves meat palatability. Most respondents consumed pork on account of its flavor and nutritional value. The key factors influencing consumer preferences during pork purchase were freshness, absence of visible intramuscular fat (marbling) and absence of drip loss.

### Introduction

Pork accounts for 55–57% of meat consumed in Poland. In 2007–2011, pork consumption was stable at around 42.5 kg/person/year, and it decreased to 38.5/person/year in 2013 (*Krajowy Ośrodek...* 2017). According to the Institute of Agricultural and Food Economics – National Research Institute, pork consumption increased to 40.1 kg/person in 2016, whereas per capita consumption of beef was estimated at only 1.9 kg and poultry consumption – at 29.5 kg (*Rolpetrol. Gielda...* 2017). These data clearly

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indicate that pork is the preferred type of meat in Poland, and that periodic decreases in pork consumption result from changes in consumption preferences, consumer expectations and food promotion campaigns.

Pork plays an important role in the human diet. It is a rich source of nutrients, including complete protein and highly available micronutrients such as selenium, iron and zinc. Pork is also abundant in group B vitamins, vitamins A, D and E, as well as bioactive compounds (taurine, carnosine, ubiquinone, creatine, etc.) (KOŁODZIEJ-SKALSKA et al. 2016). The nutritional value and popularity of pork are considerably influenced by the content of intramuscular fat and the fatty acid profile (FLIS et al. 2010, FIEDOROWICZ et al. 2016).

Consumers purchase meat based on its sensory attributes and expected health benefits. The eating quality of pork is influenced by parameters such as color, tenderness (marbling) and pH which determine the acidity and water-holding capacity of meat. The color of meat is influenced by pH in 50% (COLE et al. 2005). The consumers pay special attention to the color of meat, because its changes determine the freshness of meat (JAWORSKA et al. 2006). The pink-red color of pork can be attributed to its myoglobin content which ranges from 0.7 to 1.1 mg g<sup>-1</sup>. The myoglobin content of pork is 4-fold lower than in beef, but twice higher than in broiler chicken meat (BLICHARSKI et al. 2013).

Producers are making attempts to decrease the fat content of pork to cater to the growing demand for lean foods. However, these efforts compromise the quality and palatability of pork (MCAFEE et al. 2010). Intramuscular fat is responsible for marbling, but it also increases the tenderness and juiciness of meat and improves its taste and aroma (ŻAK 2010). Meat with a high content of intramuscular fat is also characterized by lower drip loss and desirable physicochemical properties, including water-holding capacity.

The main factor which discourages consumers from buying pork is its cholesterol content and, consequently, the conviction that pork does not deliver health benefits because it increases the risk of cardiovascular diseases and atherosclerosis (BIESALSKI 2005). The cholesterol content of pork ranges from 40 to 85 mg/100 g (BLICHARSKI et al. 2013). Lifestyle diseases are not caused by cholesterol in itself, but by its oxidation products which have mutagenic and carcinogenic properties (CROSS et al. 2007). The risk of heart and cardiovascular diseases increases with the consumption of diets rich in saturated fatty acids and diets with an unhealthy ratio of n-6 to n-3 fatty acids (HU 2001, HENDERSON et al. 2008). Factors that influence a product's nutritional value, eating quality and processing suitability, including pig breed, genotype, feeding regime, pre-slaughter handling and carcass processing, have to be taken into account in the process

of developing new meat products (WOOD et al. 2004, CZARNIECKA-SKUBINA et al. 2007, RAJ et al. 2010, MILCZAREK, and OSEK 2017).

For the average consumer, the quality of products is characterized by a number of distinguishing factors, which they pay attention to when buying pork (KOSICKA-GEBSKA, GEBSKI 2014). The process of choosing pork by the consumer depends primarily on the visually appraised traits of meat often connected to the place of purchase and purchase conditions (POŁOM, BARYŁKO-PIKIELNA 2004).

The aim of this study was to analyze consumer behaviors and preferences related to the consumption of pork, and to identify the main criteria that influence pork purchases.

### Materials and Methods

The study involved a Google survey questionnaire which was filled out online by 100 respondents. The survey was anonymous. It contained 12 closed-ended questions and 5 demographic questions relating to the respondents' age, gender, place of residence, education and professional status (Table 1).

Table 1

Responder demographics ( <i>n</i> = 100)		
Specification		Share [%]
Gender	female	59
	male	41
Age (years)	20–30	22
	31–40	20
	41–50	18
	51–60	20
	> 60	20
Education	primary school	12
	secondary school	26
	vocational school	28
	university	35
Place of residence	rural area	41.8
	urban area	58.2
Professional status	student	9.3
	blue collar worker	36.1
	white collar worker	38.1
	disability/ old-age pensioner	17.5

Closed-ended questions concerning consumer behaviors and attitudes included the following types of questions:

- alternative questions where the respondent chooses one of the mutually exclusive answers (yes-no),
- single choice questions (disjunctive) and multiple choice questions (conjunctive),
- questions that filter out respondents who are not relevant to the target sample,
- scaling questions where the evaluated attitudes and preferences are ranked from the least to the most important.

The survey was conducted between 10 October and 27 November 2017 in the Regions of Warmia and Mazury, Kujawy, Wielkopolska, Śląsk, Mazowsze and Pomorze (Poland). The respondents were city dwellers as well as residents of villages situated in the proximity of urban areas. Women accounted for 59% and men – for 41% of the respondents. There were approximately 20 respondents in every age group. The majority of the respondents had university (35%), vocational (28%), secondary school (26%) and primary school (12%) education. The three latter categories were represented mainly by blue collar workers residing in rural areas.

The survey was preceded by a pilot study which was conducted in June 2017 on 20 randomly selected respondents from the Region of Warmia and Mazury and Kujawy. The study targeted respondents who fulfilled age and residential criteria. The pilot study was carried out to determine whether the questionnaire was comprehensible for the respondents. The results were used to modify the questionnaire for the needs of the survey. Selected questions were provided with explanations to guarantee that they were correctly interpreted by the respondents.

The questionnaires were analyzed and incomplete forms were eliminated from the study. The respondents who gave incomplete answers were replaced with new targeted subjects. The results were processed and presented graphically in Microsoft Excel.

The Shapiro-Wilk test was used to determine the impact of demographic factors such as: place of residence and gender of respondents on the choice of pork for consumption and to determine the link between the place of residence of respondents consuming pork and opinions regarding the selection of fatty pork, at the significance level  $\alpha = 0.05$  (STATISTICA software ver. 10 PL).

## Results and Discussion

In the first question, the respondents were asked whether they consumed pork. Only 11% of 100 respondents did not eat pork, of which 9% were female and 2% were male. Most of the subjects who did not consume pork were city dwellers (9%) – Figure 1. In relation to the above question, the questionnaire was analyzed using the Shapiro-Wilk test to determine the impact of demographic factors, such as: place of residence and gender of respondents.

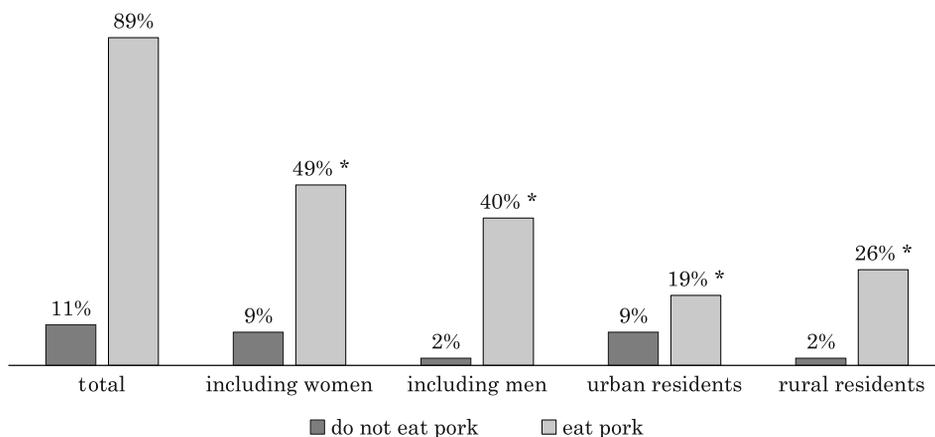


Fig. 1. The impact of demographic factors on the consumption of pork meat ( $n = 89$ )  
 \* Statistically significant value at  $P \leq 0.05$

Based on the obtained data, it was found that there is a statistically significant relationship between the answers given to the question in the survey and the place of residence and the gender of respondents. The main reason for not eating pork was its health reasons and medical advice and this answer was given by 18.2% of the respondents in the above 60 age group and by 9.1% of the respondents aged 41–50 and 51–60 (Figure 2).

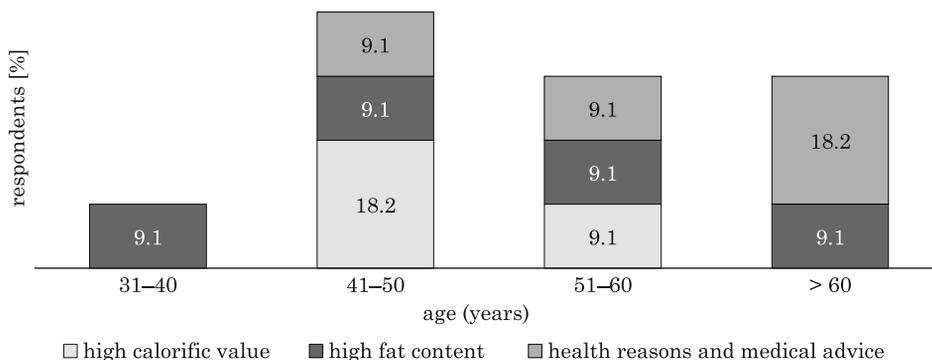


Fig. 2. Reasons for not consuming pork ( $n = 11$ )

As a reason for this fact, respondents pointed to high cholesterol in pork and liver problems. The remaining questions were answered by respondents who consumed pork (89%), of which 49% were female and 40% were male. Pork was more frequently consumed by rural residents (26%) than by city dwellers (19%) – Figure 1.

According to a survey carried out by the Institute of Agricultural Sciences in Zurich in 1996, pork is most frequently consumed on account of its taste which gives a high perception of eating pleasure (ŽAK 2010). In a study conducted by SALEJDA et al. (2013), 39.6% of the respondents chose pork on account of its high nutritional value. Similar results were noted in the present study (Figure 3). Consumers were shown to consume pork mainly due to their taste (53.9%) and nutritional value (14.6%).

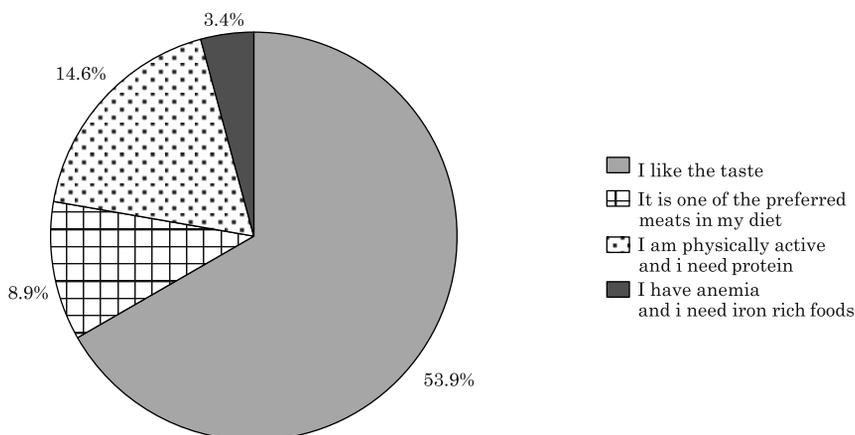


Fig. 3. Factors which contribute to pork consumption ( $n = 89$ )

The fact that consumers are twice less likely to opt for pork as a rich source of nutrition can be attributed to health campaigns which encourage consumers to limit their pork consumption due to the risk of lifestyle diseases (KOŁODZIEJ-SKALSKA et al. 2016).

Knowledge of consumer preferences and opinions is very important in the food production process. According to JAWORSKA et al. (2006), ANTOSIK (2014), more than half of consumers pay attention to the quality of meat, mainly the content of visible intramuscular fat (around 17%), in their purchasing choices. The growing popularity of low-fat products stems from health concerns, but also limited knowledge about the health benefits of pork. In our study (Figure 4), female respondents were far more likely (85.71%) to pay attention to the fat content of meat than male subjects. The majority of respondents who had a preference for lean meat were city residents (50%), and only 33,33% of rural residents belonged to this group.

The percentage of consumers who disregarded the fat content of purchased meat was twice higher in rural areas (11.67%) than in cities.

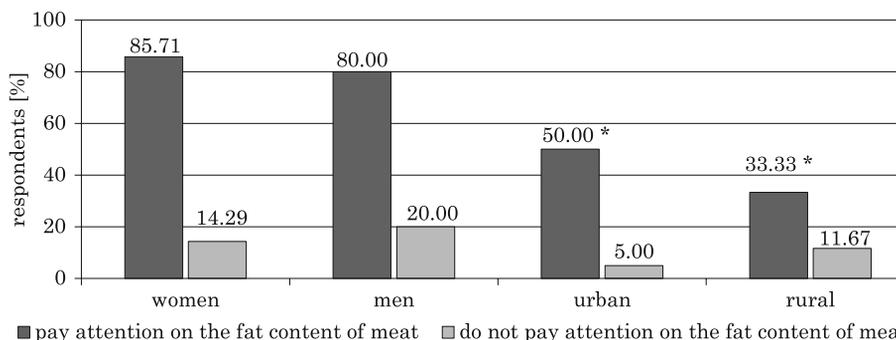


Fig. 4. Distribution of answers regarding the importance of fat content during meat purchases, given by respondents from different gender and residential groups ( $n = 89$ )

\* Statistically significant value at  $P \leq 0.05$

The Shapiro-Wilk test was used to determine the degree of connection between the place of residence of respondents consuming pork and opinions regarding the choice of fat meat. It was shown that there is a relationship between the answers given to the question in the questionnaire and the respondents' place of residence (at  $\alpha = 0.05$ ). Thus, there are statistically significant differences between the answers to this question among the residents of villages and cities.

In the next question, the respondents were asked to indicate whether they agreed with the presented statements (by giving yes or no answers) – Figure 5. More than half of the polled subjects (55%), including 33.8%

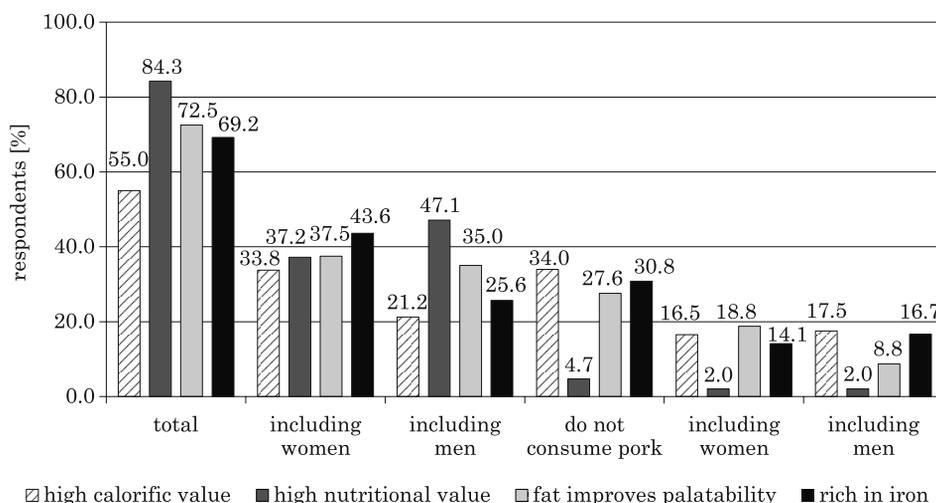


Fig. 5. Distribution of answers regarding pork consumption in gender groups ( $n = 89$ )

women and only 21.2% men, were of the opinion that pork was high in calories. A total of 84.3 of the respondents were aware that pork has high nutritional value and is a rich source of complete protein. The above was an important selection criterion for 72.5% of respondents, including as much as 47.1% of men. Only 27.6% of the polled subjects did not agree with the statement that fat improves the palatability of meat. The above answer was given by 18.8% women who were convinced that low-fat foods delivered greater health benefits.

The answers given by the respondents when asked whether high fat content limited their pork purchases are presented in Figure 6. Only 47.2% of pork consumers were more likely to select lean cuts. City dwellers accounted for 36% of the respondents in the above group, whereas 16.9% of rural residents were not bothered by the high fat content of pork, and 10.1% of rural residents did not pay attention to the fat content of purchased pork. Fat content was a more important criterion for female (32.6%) than male (14.6%) respondents.

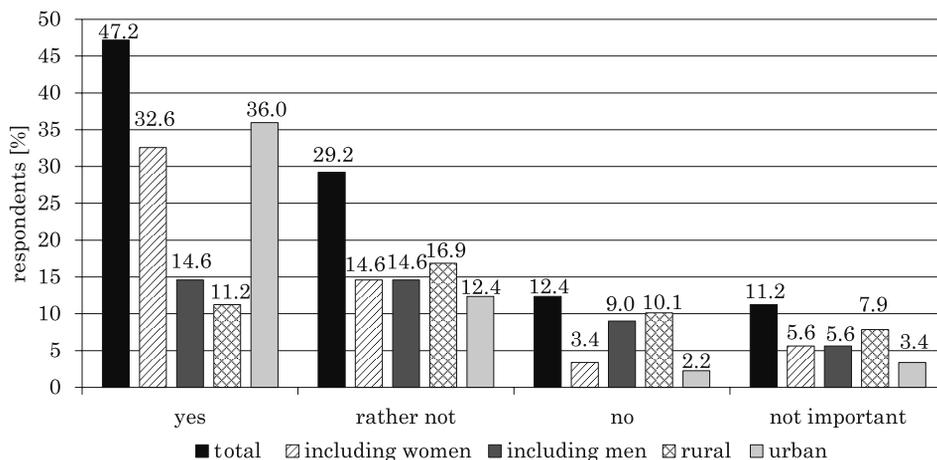


Fig. 6. Distribution of answers regarding the importance of fat content during meat purchases, given by respondents from different gender and residential groups ( $n = 89$ )

The results of this study (Figure 7) revealed that 21.8% of the respondents older than 60 years regarded pork as a high calorie food despite the fact that most of them were of the opinion that fat increases the flavor of pork (16.3%). The average consumer pays attention to several quality indicators when purchasing pork (KOSICKA-GĘBSKA, GĘBSKI 2014). The high iron content of pork was more often recognized by younger respondents of reproductive age (Figure 7), mostly women (43.6%) who were of the opinion that pork is a rich source of this mineral. Respondents older than 60 years tend to observe dietary guidelines and restrict their intake of foods

with a high fat content and high calorific value. These consumers are aware that high-fat foods increase the risk of cardiovascular diseases, and that seniors have lower energy requirements (KOŁODZIEJ-SKALSKA et al. 2016).

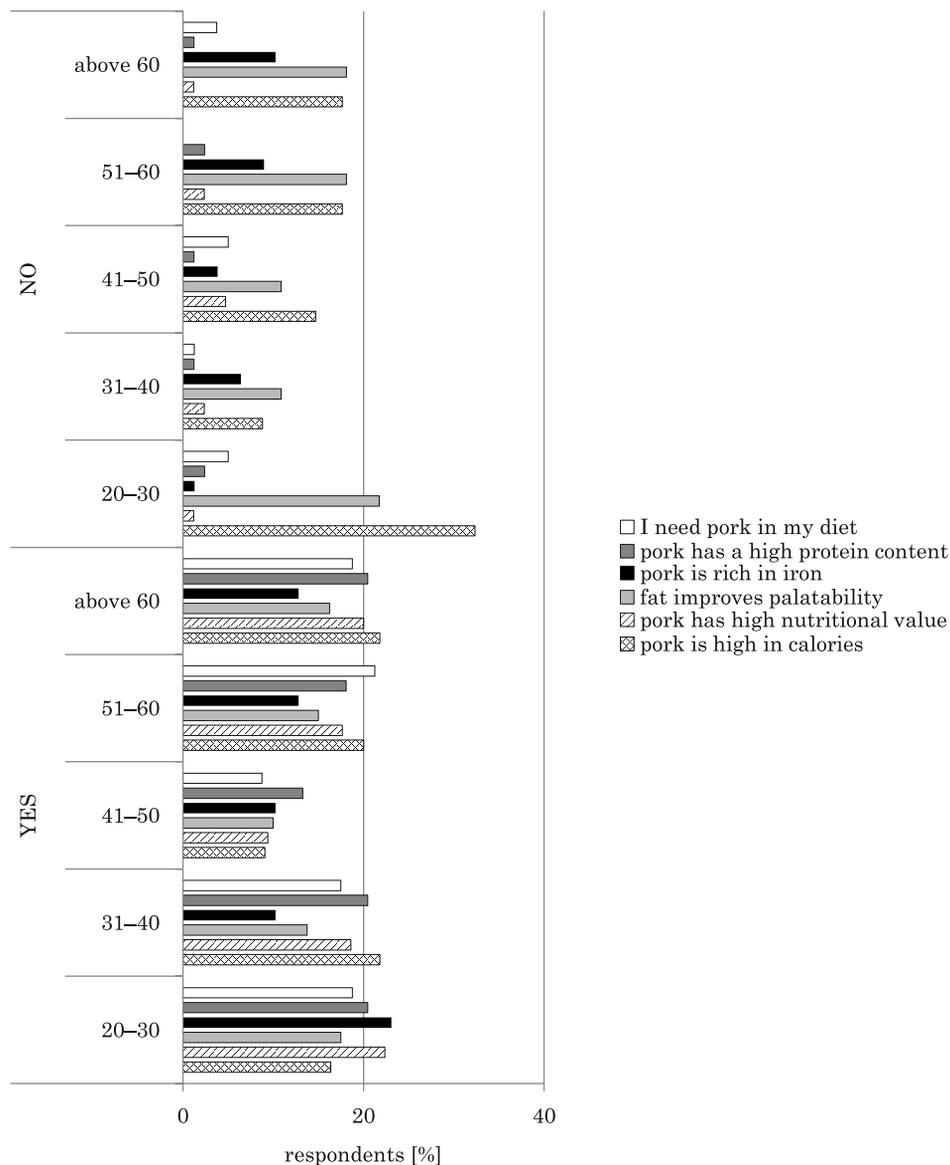


Fig. 7. Distribution of statements regarding pork given by respondents from different age groups (n = 89)

Explain: Answer given by respondents to specified questions „YES” or „NO”

In the scaling questions, the respondents were asked to evaluate the importance of the key criteria which influence consumer perceptions of pork quality on a scale of 1 to 5 (1 – least important, 5 – most important) – Figure 8. According to the surveyed subjects, the most important criterion in the selection of pork was: freshness (64%), aroma (47%), lean content (42%), color (38%), hardness and fat content (35%). The second most important criterion was: drip loss (22%), lean content (21%) and fat content (17%).

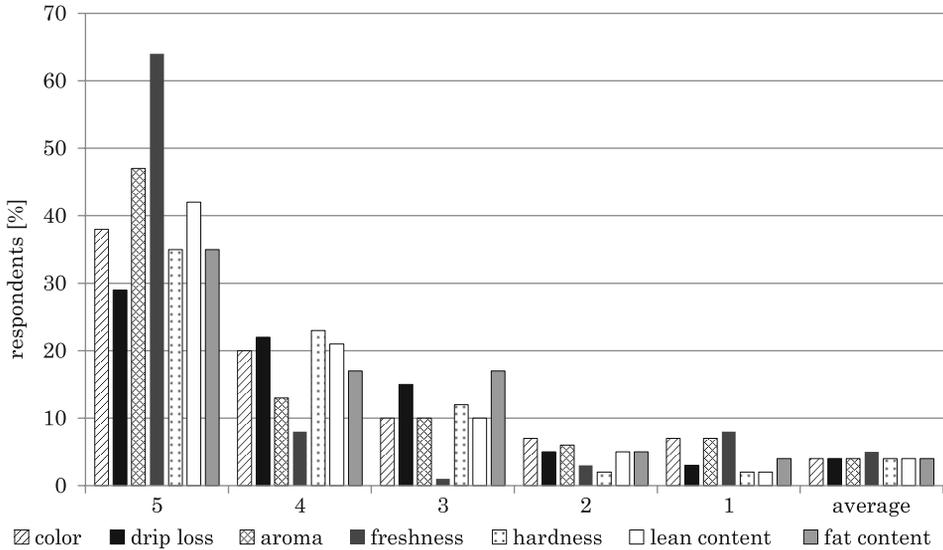


Fig. 8. The influence (1 – least important, 5 – most important) of selected attributes on consumer perceptions of pork (*n* = 89)

These results indicate that freshness, absence of intramuscular fat (marbling) and absence of drip loss are the key determinants that influence the respondents’ perceptions of pork quality. According to ANTOSIK (2014) (citing HUFF-LONERGAN, LONERGAN 2007), consumer acceptance of packaged meat with visible drip loss is low. ANTOSIK (2014) also pointed to a correlation between high drip loss and a low content of intramuscular fat. In a study by KOSICKA-GEBSKA, GEBSKI (2014), fat content was the second most important attribute determining the choice of pork after overall appearance (25% of indications). The results of the present study are consistent with the findings of other authors.

## Conclusions

1. It has been shown that the vast majority of respondents eat pork meat. Fat content was the main factor limiting the surveyed subjects' pork consumption. Despite the above, most respondents were of the opinion that fat improves the palatability of meat.

2. More than half of the respondents, mostly women, were of the opinion that pork has high calorific value. Despite the above, the polled subjects were aware that pork has high nutritional value and is a good source of complete protein.

3. Respondents older than 60 years tend to observe dietary guidelines and restrict their intake of foods with high fat content and high calorific value.

4. The attributes that were most likely to influence the respondents' pork purchasing decisions were freshness, absence of visible intramuscular fat (marbling) and absence of drip loss.

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## References

- ANTOSIK K. 2014. *Genetic conditions of intramuscular fat content and its usefulness in diagnosing pork quality (in Polish)*. Rozprawa Naukowa 128, Wydawnictwo UPH, Siedlce.
- BIESALSKI H.K. 2005. *Meat as a component of a health diet-are there any risk or benefits if meat is avoided in the diet? – review*. Meat Sci., 70: 509–524. DOI:10.1016/j.meatsci.004.07.017.
- BLICHAŃSKI T., KSIĄŻEK P., POSPIECH E., MIGDAŁ W., JÓŹWIK A., POŁAWSKA E., LISIAK E. 2013. *The current dietary value of pork, its importance in the diet of humans and the impact on the health of consumers*. POLSUS Warszawa.
- COLE J.A., CLOSE W.H., BROOKES P.H., HARDY B. 2005. *Kosten in Produktionsprozess. Fleischwirtschaft*, 1: 12–14.
- CROSS A. J., LEITZMAN M.F., GAIL M.H., HOLLENBECK A.R., SCHATZKIN A., SHINA R. 2007. *A prospective study of red and processed meat intake in relation to cancer risk*. PLoS Medicine, 4(12): 1973, DOI:10.1371/journal.pmed.004035.
- CZARNIECKA-SKUBINA E., PRZYBYLSKI W., JAWORSKA D., WACHOWICZ., URBAŃSKA I., NIEMYJSKI S. 2007. *Characteristics of pork meat with varying intramuscular fat content*. Żywn. Nauka. Technol. Jakość, 6(55): 285–294.
- FIEDOROWICZ E., SOBOTKA W., STANEK M., DRAŻBO A. 2016. *The effect of dietary protein restriction in finishing pigs on the fat content, fatty acid profile and atherogenic and thrombogenic indices of pork*. J. Elem., 21(3):693–702. DOI: 10.5601/jelem.2015.20.2.949.
- FLIS M., SOBOTKA W., ANTOSZKIEWICZ Z., LIPIŃSKI K., ZDUŃCZYK Z. 2010. *The effect of grain polyphenols and the addition of vitamin E to diets enriched with  $\alpha$ -linolenic acid on the antioxidant status of pigs*. J. Anim. Feed Sci., 19(4): 539–553. DOI:10.22358/jafs/66319/2010.
- HENDERSON S., LAMPEL J., HOLLENBECK C.B. 2008. *The effect of 4:1 eicosapentaenoic acid/docasahexaenoic acid fish oil supplement on plasma lipid profile*. J. Am. Diet. Assoc., 108(9): 104–115.
- HU F.B. 2001. *The balance between  $w$ -6 and  $w$ -3 fatty acids and the risk of coronary heart disease*. Nutrition, 17(9): 741–742.

- JAWORSKA D., PRZYBYLSKI W., KOŁOZYŃ-KRAJEWSKA D., CZARNIECKA-SKUBINA E., WACHOWICZ I., TRZĄSKOWSKA M., KAJAK K., LECH A., NIEMYJSKI S. 2006. *Relationships between traits determining technological and sensory quality of pork*. Anim. Sci. Pap. Rep., 24(2): 121–135.
- KOŁODZIEJ-SKALSKA A., MATYSIAK B., GRUDZIŃSKI M. 2016. *Pork meat and human health*. KOSMOS. Probl. Nauk Biol. Polskie Towarzystwo Przyrodników im. Kopernika, 65 (4): 535–542.
- KOSICKA-GĘBSKA A.M., GĘBSKA J. 2014. *The impact of meat quality factors on the behavior of meat consumers*. Roczn. Nauk. Stowarzyszenia Ekonom. Rol. i Agrobizn., Zeszyt 1, (16): 98–104.
- Krajowy Ośrodek Wsparcia Rolnictwa*, [www.arr.gov.pl](http://www.arr.gov.pl), access: 18.10.2017.
- MCAFFEE A.J., MCSORLEY E.M., CUSKELLY G.J., MOSS B.W., WALLACE J.M.W., BONHAM M.P., FERARON A.M. 2010. *Red meat consumption: An overview of the risks and benefits – review*. Meat Sci., 84: 1–13, DOI:10.1016/j.meatsci.009.08.029.
- MILCZAREK A., OSEK M. 2017. *Meat quality in pigs fed mixtures with low-tanin faba bean*. Ann. Warsaw Univ. of Life Sci.-SGGW, Anim. Sci., 56(1): 103–112, DOI:10.2630/AAS.2017.56.1.1
- POŁOM A., BARYŁKO-PIKIELNA N. 2004. *Analysis of factors determining the preferences of pork consumers*. Żywn. Nauk. Technol. Jakość, 3(40):7–23.
- RAJ S., SKIBA G., WEREMKO D., FANDREJEWSKI H., MIGDAŁ W., BOROWIEC F., POPLAWSKA E. 2010. *The relationship between the chemical composition of the carcass and the fatty acid composition of intramuscular fat and backfat of several pig breeds slaughtered at different weights*. Meat Sci., 86: 324–330, DOI:10.1016/j.meatsci.2010.04.037.
- Rolpetrol. Gielda rolno-paliwowa. Ceny zbóż, notowania, aktualności*, [www.rolpetrol.com.pl/pliki/arr-prognoza/](http://www.rolpetrol.com.pl/pliki/arr-prognoza/), access: 18.10.2017.
- SALEJDA A.M., KORZENIOWSKA M., KRASNOWSKA G. 2013. *Consumer behavior on the meat market*. Nauki Inżynierskie i Technologie (Engineering Sciences and Technologies), 4(11): 94–110. [www.ibuk.pl](http://www.ibuk.pl), [www.ebscohost.com](http://www.ebscohost.com).
- WOOD J.D., NUTE G.R., RICHARDSON R.I., WHITTINGTON F.M., SOUTHWOOD O., PLASTOW G., MANSBRIDGE R., COSTA N., CHANG K.C. 2004. *Effects of breed, diet and muscle on fat deposition and eating quality in pigs*. Meat Sci., 67:651–667. DOI:10.1016/j.meatsci.004.01.007.
- ŻAK G. 2010. *Pork meat is healthy – this is confirmed by research results*. Trzoda Chlewna, 8–9: 65–67.