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INFLUENCE OF BLOOD OESTRADIOL LEVEL IN GILTS ON SELECTED BLOOD AND MEAT QUALITY PARAMETERS

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Abstract

The aim of the research was to determine the impact of oestradiol levels on selected haematological and biochemical blood parameters, on the slaughter characteristics and on the quality of meat obtained from gilts. The research material included 60 gilts with a body weight over 125 kg. The concentration of oestradiol and the levels of selected haematological and biochemical parameters were examined in the blood samples obtained during slaughter. Next, basic slaughter characteristics and meat quality parameters were measured. It was observed that the carcasses of the gilts with a higher concentration of oestradiol were characterized by a significantly higher temperature, pH_{45} and pH_{24} of the ham, and a lower degree of post-slaughter bleeding of the muscles. The obtained results and the results of previous own research suggest that the increased concentration of the analysed hormones causes a range of physiological, metabolic and behavioural changes, typical of the oestrus phase and its external manifestation. The above-mentioned changes and their interactions can influence selected meat parameters and can shape its technological usefulness. The obtained results are interesting and encourage further discussion and a continuation of research on the impact of sex hormones on the quality parameters of gilt carcasses.

Keywords: pigs, gilts, sex hormone levels, oestradiol, quality of pork meat

Introduction

Pork is the second most popular type of meat consumed globally and the most frequently consumed meat in Asia and in Europe (Lebret and Čandek-Potokar, 2022). In Poland, the consumption of pork remains stable and amounts to 40 kg per person per year, which constitutes 55–60% of the total meat consumption (Laskowski et al., 2018; Stoś et al., 2022). Globally, the production of pork is based on the fattening of gilts, boars and male castrates. Boar castration can be performed by surgery or by immunization against gonadotropin-releasing factor (GnRF) (Zamaratskaia et al., 2008; Pawlicki et al., 2022). In Poland, pork is obtained from

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the slaughter of gilts and barrows. Boar fattening and immunocastration procedures are not employed on an industrial scale (Pawlicki et al., 2022).

The observed trends within the aspects of pork production show a significant change characterized by evolving into lower consumption in terms of meat mass while increasing the quality of consumed meat products. An insight into the consumption structure reveals an increased demand on ecologic and sustainable systems of production. The mentioned trends allow extrapolating the future importance and the research on the factors enabling the impact on the quality of final pork meat products (Lebret and Čandek-Potokar, 2022; Antosik, 2023). The factors being of interest for the researchers contributing to food production in the area of pork meat are physiological and genetic determinants of gender and hormone status of investigated animals (Lebret and Čandek-Potokar, 2022; Zamaratskaia et al., 2008; Aaslyng et al., 2018; Alonso et al., 2009; Bee et al., 2015; Foury et al., 2005; Tereszkiewicz et al., 2023).

It is known that the sex of the carcasses is an important factor influencing the slaughter value. Sex influences the meatiness index and fat content of the carcasses. The carcasses of gilts in comparison to the carcasses of barrows are characterized by a higher meatiness index and a greater meat-cutting efficiency. Carcasses with the lowest content of subcutaneous fat are obtained from boars, followed by gilts and barrows (Lebret and Čandek-Potokar, 2022; Foury et al., 2005; Latorre et al., 2004). The differences in the content of intramuscular fat between the sexes are smaller than those observed in the content of subcutaneous fat (Schwob et al., 2020). However, most studies (Aaslyng et al., 2018; Alonso et al., 2009; Trefan et al., 2013) show a higher content of intramuscular fat in the meat of barrows and a lower content in the meat of boars. Sex influences the lipogenic activity of the fat tissue as well (Aaslyng et al., 2018). According to Schwob et al. (2020), the fat of male castrates contains more unsaturated fatty acids in comparison to gilts, furthermore they contain less fat in comparison to boars. According to most researchers, sex has a moderate impact on pork quality (Lebret and Čandek-Potokar, 2022).

Research shows that the carcasses obtained from fatteners of different sexes are characterized by different technological parameters. The characteristics and the scope of those differences have been recognized and documented in previous studies (Alsonso et al., 2009; Foury et al., 2005; Trefan et al., 2013). However, the differences in the quality parameters of the carcasses observed within individual sexes remain an unresolved issue. It can be assumed that the activity of the endocrine system may play some role in shaping the carcass features of gilts.

So far, research has shown an important role of numerous hormones in shaping meat quality. The impact of stress hormones, cortisol and catecholamines (adrenaline and noradrenaline) on the quality of pork meat has been observed. The above influence is associated with a strong stress reaction in the animals caused by pre-slaughter and slaughter conditions (Foury et al., 2005). Among sex hormones, scatole and androsterone have a significant role in shaping the quality features of pork, high levels of which in the meat obtained from males cause negative changes in the smell of meat and fat (Zamaratskaia et al., 2008; Bee et al., 2015).

There is a lack of data on the influence of hormonal changes associated with the phases of the reproductive cycle in females on the qualitative and quantitative features of pork carcasses. The observed changes in the level of sex hormones are characteristic symptoms of phases of the reproductive cycle. The changes in the levels of the respective sex hormones during the reproductive cycle have been described in detail in previous studies (Knox et al., 2015; Soede et al., 2015). Particularly dynamic changes in the production and levels of sex hormones are observed during oestrus and the ovulation phase (Brandt et al., 2007; Tilton et al., 1982). During proestrus, a significant increase in oestradiol levels (E2) is observed. Oestradiol, next to progesterone, is the most important steroid hormone which regulates reproduc-

tive functions in gilts. E2 is produced in ovaries by the maturing Graafian follicles. It regulates sexual drive and the secretion of mucus by uterine glands, it also dilates arteries. By impacting the endothelium of vessels and the blood vessels directly it also promotes endometrial growth. The concentration of oestradiol varies depending on the phase of the reproductive cycle, which in gilts lasts on average 21 days. The lowest level of oestradiol is observed in the early follicular phase. The concentration increases together with the development of ovarian follicles and reaches its highest level directly before oestrus, preceding the release of the luteinizing hormone (LH). The maximum concentration of oestradiol in a correct reproductive cycle in gilts is observed around 10–12 hours before the maximum concentration of LH. A rapid decrease in the concentration of oestradiol and of the luteinizing hormone occurs before ovulation (Brandt et al., 2007).

In the pork processing industry, especially in the group of processors specializing in the craft production of traditional pork products, there is a well-established view that due to the deterioration of processing qualities, gilts showing symptoms of oestrus should not be sent to slaughter. Previous research (Tereszkiewicz et al., 2023), which analysed the influence of the LH hormone and progesterone on the meat quality of gilts has shown that LH concentration impacts the post-slaughter temperature of sirloin and ham muscles. Carcasses with lower concentration of the luteinizing hormone were definitely better bled.

The aim of the research was to examine the impact of the concentration of oestradiol on selected haematological and biochemical parameters of blood, on slaughter characteristics and on the quality of meat obtained from gilts.

Material and methods

The material for the study was obtained from 60 gilts slaughtered in one of the slaughterhouses located in south-eastern Poland. The processed gilts which were intended to be used as research material were selected in the livestock warehouse. Gilts selected for the research originated from the contract deliveries and they were a mixed breed of Polish Landrace type.

The experimental animals came from suppliers from the Podkarpackie Voivodeship, were kept in a group system, on bedding, and fed with complete dry mixtures. Pigs were slaughtered in accordance with the regulations and standards applicable in the European Union (Council Regulation, 2009). For the study, gilts with a body weight over 125 kg were selected. The body weight of the animals was measured on a slaughtering stand equipped with the system for individual weighing and selection of the optimal electric load for the correct pre-slaughter stunning. During slaughter bleeding, performed in a hanging position, blood samples were collected in which haematological and biochemical indicators were determined. For the test, blood flowing from the slaughter wound was collected within 20 seconds of the onset of bleeding. The material for haematology tests was collected into calibrated tubes sprayed with an anti-coagulant (double-potassium EDTA).

Haematological indicators (HGB – haemoglobin, RBC – red blood cell, WBC – white blood cells, PVC – packed cell volume, MCV – mean corpuscular volume, MCH – mean corpuscular haemoglobin, MCHC – mean corpuscular haemoglobin concentration, RDW – red blood cell distribution width, MPV – mean platelet volume, PDW – platelet distribution width), LYMPH % (percentage of lymphocytes), MONO % (percentage of monocytes), NEUT % (percentage of neutrophils), LYMPH # (total count of lymphocytes), MONO # (total count of monocytes), and NEUT # (total count of neutrophils) were determined in blood with methods previously adopted in clinical trials on pigs. The determinations were made using the MINDRAY BC-30 vet apparatus. Blood for biochemical determinations was collected into dry test tubes with granules for rapid clotting. In order to obtain serum for biochemical tests, blood was centrifuged for 20 min at a speed of 3000 rpm at a temperature of

4°C. The obtained plasma, after dispensing into plastic test tubes with a capacity of 3.0 mL, was stored at a temperature of –25°C. In the blood serum, the content of total protein and glucose was determined with colorimetric methods using the Hitachi 912 analyser. The concentration of oestradiol (E2) was determined with the electrochemiluminescence immunoassay (ECLIA) technique using the COBAS e-411 analyser, in accordance with the producers' instruction manual. Haematological and biochemical blood tests were carried out in the LaWet Analytical Laboratory, which performs animal blood tests.

After the slaughtering operations were completed at the classification stand, the carcasses were weighed with an accuracy of 0.5 kg and the meat content was determined using the Ultra Fom 300 apparatus. Then, the initial pH_1 of the meat was measured 45 min after bleeding. Measurements were taken in the loin (*longissimus thoracis* muscle) and ham (*semimembranosus* muscle). pH was measured at a depth of 2.5 cm with a CPU-Star pH meter equipped with a dagger-combined measuring cell. At the same time, the temperature T_1 was measured in both muscles. The measurement was made with an electronic thermometer ET-200 with a dagger sensor. Ninety minutes after bleeding, the electrical conductivity of PE_{90} was determined using the Matthäus conductometer. Final pH_{24} was measured 24 h after slaughter. Then, the carcasses were weighed and the measurements of the backfat thickness were carried out at five points in accordance with the SKURTCh methodology, on the basis of which average backfat thickness from the five measurements was determined (Różycki, 1996). Subsequently, muscle samples were taken from the neck muscle and the diaphragm muscle to determine the degree of post-mortem bleeding. The degree of muscle bleeding was determined by the compressor test (Tereszkiewicz et al., 2023; Beutling, 1984). The content of intramuscular fat was determined in the *longissimus thoracis* muscle using the Soxhlet method according to PN-ISO 1444: 2000, in the VELP Extractor 148/3 apparatus.

The results were statistically verified. The performed analysis concerned the determination of oestradiol level within the blood samples (less or greater than 12 pg/mL). The level of oestradiol was low and in the case of 48 samples was determined to be below detection limits of the method utilized. In turn, in the group of animals which were characterized by high concentration of oestradiol in blood samples belonged all gilts by which the oestradiol was detected. According to Figure 1 high level was observed in the case of the oestradiol level greater than 12 pg/mL. Aside of the hormone level blood parameters, meat quality parameters were determined to identify the characteristics of the haematological and biochemical blood parameters as well as the parameters of the slaughter value and meat quality. Due to the incompatibility of the distribution of the analysed variables with the normal distribution and due to the comparison of non-parallel groups, the non-parametric Mann-Whitney U test was used. The level of differences between the groups of observations was calculated using the coefficient $r = z/\sqrt{n}$. Statistical calculations were made using Statistica version 12.

Results

Figure 1 shows the individual results of the measurements of oestradiol concentration in the blood serum of the examined gilts. Of the 60 gilts whose blood was taken for testing, low concentration of E2 was recorded in 48 samples, whereas high concentration of the hormone (over 10 pg/mL) was recorded in the blood serum of 12 animals. The lowest concentration of oestradiol in the group was 12.00 pg/mL (Figure 1).

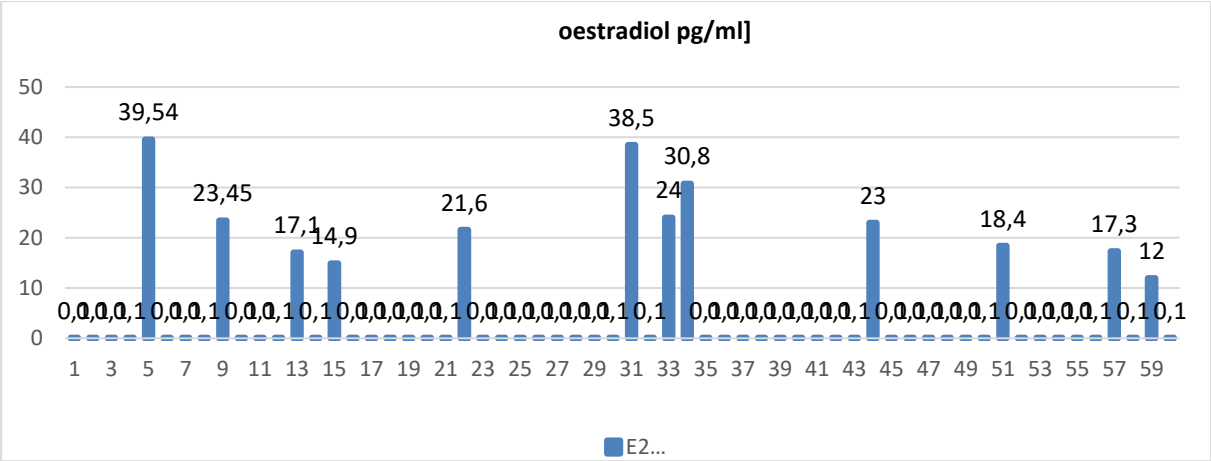

Figure 1. Results of measuring the concentration of oestradiol (E2) in the blood of the examined female pigs

It was observed that the concentration of oestradiol had a statistically significant impact on the level of MPV (mean platelet volume) (Z=2.04; P<0.05; r=0.51), PDW (platelet distribution width) (Z=2.23; P<0.05; r=0.56), glucose (Z=1.97; P<0.05; r=0.44) and P-LCR (platelet large cell ratio) (Z=2.09; P<0.05; r=0.52) (Table 1). The blood of the gilts with the concentration of oestradiol >10 pg/mL had a significantly lower level of MPV, PDW, glucose and P-LCR.

Table 1. The impact of oestradiol on selected haematological and biochemical blood parameters of gilts

The parameter measured	Oestradiol < 12		Oestradiol > 12		Z	P	r
	M	SD	M	SD			
WBC (10^9/L)	17.01	4.22	18.52	4.55	0.87	0.383	0.20
RBC (10^6/mm³ 10^{12}/L)	8.06	0.2	8.20	0.45	0.57	0.570	0.13
HGB (g/dL)	14.13	1.26	14.44	1.24	0.26	0.793	0.06
HCT (%)	48.59	4.74	48.78	4.16	0.13	0.896	0.03
PLT (10^9/L)	326.47	115.48	278.20	127.28	0.92	0.359	0.21
MCV (fL)	60.33	2.02	59.40	2.97	0.84	0.402	0.19
MCH (pg)	17.55	0.63	17.58	0.58	0.13	0.896	0.03
MCHC (g/dL)	29.11	0.71	29.60	0.95	1.14	0.256	0.25
RDW (%)	17.10	1.60	17.14	0.65	0.35	0.726	0.08
MPV (fL)	9.95	0.43	9.40	0.10	**2.04**	**0.041**	**0.51**
PDW (fL)	12.92	0.84	11.90	0.78	**2.23**	**0.026**	**0.56**
LYMPH (%)	42.75	12.52	36.96	7.21	1.05	0.295	0.23
MONO (%)	6.10	2.39	5.03	1.36	0.89	0.376	0.21
NEUT (%)	50.70	13.29	54.73	8.30	0.50	0.614	0.12
LYMPH (10^9/L)	7.16	2.69	4.90	2.76	1.22	0221	0.27
MONO (10^9/L)	1.04	0.40	0.90	0.35	0.64	0.525	0.15
NEUT (10^9/L)	9.11	3.75	10.60	4.20	0.57	0.571	0.14
Glucose (mg/dL)	110.60	22.11	93.00	13.51	**1.97**	**0.049**	**0.44**
P-LCR (%)	27.32	3.84	21.93	1.58	**2.09**	**0.037**	**0.52**
Total protein (g/dL)	6.42	0.51	6.86	0.36	1.89	0.059	0.42

M – mean, SD – standard deviation, Z – Mann-Whitney U statistics, P – level of statistical significance.

The results did not show statistically significant differences between the compared groups in the basic slaughter parameters (Table 2). However, interesting interrelations were observed in the case of parameters determining the quality characteristics of the meat. The series of comparative analyses between the groups with the Mann-Whitney U tests showed a statistically significant influence of oestradiol concentration on the temperature of the ham muscles (Z=4.20; P<0.05; r=0.554), pH_{45} of ham (Z=2.02; P<0.05; r=0.26), the electrical conductivity of PE_{90} of the ham (Z=3.10; P<0.05; r=0.40) and pH_{24} of the ham (Z=3.15; P<0.05; r=0.41). The results of the carcass bleeding presented in Table 2 are also worth noting. The better parameters of bleeding of gilts were observed in cases where the oestradiol level was low. This observation was verified by statistical analysis concerning diaphragm muscle.

The research showed a relationship between the degree of bleeding of the muscles and the concentration of the analysed hormone. Carcasses of gilts with low oestradiol concentration were definitely better bled. The differences in the degree of bleeding were statistically confirmed for the diaphragm muscle (Z=3.45; P<0.001) (Table 2).

Table 2. The impact of oestradiol (E2) on selected quality parameters of female pigs meat

The parameter measured	Oestradiol < 12		Oestradiol > 12		Z	P	r
	M	SD	M	SD			
Body weight (kg)	125.11	7.34	128.90	6.34	2.41	0.157	0.29
Hot carcass weight (kg)	94.52	5.95	100.12	7.49	1.18	0.238	0.26
Meatiness (%)	57.28	3.40	55.82	1.58	1.62	0.106	0.36
Backfat thickness (mm)	21.29	3.68	24.32	5.18	1.27	0.205	0.28
Intramuscular fat content (%)	2.56	1.27	2.09	0.13	0.70	0.243	0.17
Temperature of loin (°C)	38.45	0.88	38.64	0.60	0.13	0.895	0.03
Temperature of ham (°C)	38.15	1.63	39.07	0.75	**4.20**	**0.000**	**0.54**
pH_{45} of loin (pH)	6.23	0.24	6.19	0.38	0.13	0.896	0.03
pH_{45} of ham (pH)	6.09	0.29	6.26	0.24	**2.02**	**0.043**	**0.26**
PE_{90} of loin (mS)	3.79	0.79	3.47	0.56	1.46	0.144	0.19
PE_{90} of ham (mS)	4.17	1.05	3.54	0.77	**3.10**	**0.002**	**0.40**
pH_{24} of loin	5.53	0.08	5.47	0.21	0.70	0.484	0.16
pH_{24} of ham	5.56	0.11	5.81	0.36	**3.15**	**0.002**	**0.41**
PE_{90} of loin (mS)	4.75	1.87	4.00	1.05	0.90	0.368	0.12
PE_{90} of ham (mS)	4.60	1.99	4.66	1.52	0.42	0.672	0.05
Evaluation of bleeding of the colli muscle	1.33	0.49	1.40	0.89	0.27	0.785	0.06
Evaluation of bleeding of the diaphragm muscle	1.40	0.32	1.75	0.79	**3.45**	**0.001**	**0.45**

M – mean, SD – standard deviation, *Z* – Mann-Whitney U statistics, P – level of statistical significance.

Discussion

Oestradiol, next to progesterone, is the most important steroid hormone regulating reproductive functions of gilts (Brandt et al., 2007; Tilton et al., 1982; Mariscal et al., 1998). The concentration of E2 during the reproductive cycle starts to increase together with the development of ovarian follicles. According to Mariscal et al. (1998), the maximum concentration of E2 in the reproductive cycle of gilts is observed before a rapid increase in LH, with a simultaneously low concentration of FSH, and it does not depend on the genetic line. At the same time, it needs to be underlined that the concentration of oestradiol, which increases in the proestrus phase, stimulates the occurrence of heat symptoms typical of gilts and young gilts. The

observed higher concentration of oestradiol in the blood of 12 slaughtered gilts indicates that most probably the females were slaughtered in the peak phase of the reproductive cycle (Brandt et al., 2007). The peak phase of the reproductive cycle was additionally verified by the determination of the LH level which was described in earlier work by authors (Tereszkiewicz et al., 2023) The conducted research shows that the analysed haematological and biochemical parameters of the blood of the tested animals were within the reference values for the population of pigs in Poland (Winnicka, 2015).

Simultaneously it should be underlined that the scope of the reference values of particular blood parameters of investigated animals is broad. The authors (Czech et al., 2017; Friendship and Henry, 1996; Zhang et al., 2022) indicate that the major role in shaping the haematological and biochemical indicators present in pork blood was played by the genetic determinants, technological group, environmental conditions, feeding, age, gender and physiological status. Elberes et al. (1992) indicated the significant discrepancies in blood profile of pork in different production groups but also in particular pig batches. Moreover the discrepancies between the castrated boars and the female pigs were significant.

Despite the fact that the tests did not show that regarding the norms of the determined only some blood parameters were exceeded, it should be noted that there were statistically significant intergroup differences in blood parameters related to the level of the E2 hormone (Table 1). The interpretation of these results is difficult due to the lack of data in the literature. It can be assumed that the demonstrated results could have a physiological basis related to the phases of the reproductive cycle. It is believed that depending on the age of the females and the phase of the reproductive cycle, some of the haematological indicators change their activity, but there are also those whose concentration remains relatively constant (Friendship and Henry, 1996). The fluctuations noted in our own research could also be the effects of stress, animal excitement, the handling process and the disturbances in the homeostasis of the organism in the pre-slaughter period (Tereszkiewicz et al., 2023; Choe, 2018). This can be indicated by the relatively high value of WBC and low concentration of glucose in the blood of female pigs which had shown elevated level of estradiol. According to authors the white blood cells play a pivotal role within the defence mechanisms and their elevated level can be observed in blood of pigs that were either tired or exposed to some stressful factors. The lymphocytosis was observed in animals with elevated body temperature values (Czech et al., 2017; Zhang et al., 2022). In turn lower level of glucose indicates the lower amount of energetic compounds in blood resulting from the conditions of pre-slaughter period and withdrawal of access to food.

The aim of the presented research was to determine the influence of oestradiol concentration on the quality parameters of the carcasses. The analysis of the obtained results shows that the concentration of oestradiol significantly influenced the quality parameters of the ham muscles of the tested gilts (Table 2). It was shown that the ham muscles of the gilts with a high concentration of E2 were characterized by higher average pH_{45} and pH_{24} values and a higher temperature. The difference in the temperature of the ham muscles between the groups was particularly high and amounted on average to 0.92°C. In the group with a high concentration of oestradiol, a decrease in the degree of bleeding was observed, with the differences between the groups statistically confirmed for the degree of diaphragm bleeding (Table 2). A decrease in the post-slaughter bleeding of muscles is typically observed in excited, or physically tired and stressed animals. Meat with a lower degree of bleeding is a less valuable processing material (Tereszkiewicz et al., 2023; Beutling, 1984; Tereszkiewicz and Choroszy, 2017).

The results obtained in the tests and the results of previous own research (Tereszkiewicz et al., 2023) show that high concentrations of sex hormones, in particular of the luteinizing hormone and of oestradiol, cause a range of symptoms of heat typical of female pigs and

influence selected quality parameters of the meat. As shown, the differences in the quality parameters were observed mainly in the ham muscles of the tested gilts. It can be assumed that it was an effect of physical excitation, which is observed in females during oestrus. Previous research (Simões et al., 2014) shows that in the pre-ovulation period in pigs, an increase in body temperature is observed. The maximum values of the temperature are recorded within 24–48 hours from the appearance of tolerance reflex in gilts. According to the authors, the increase in temperature is associated with a higher oestradiol secretion, the peak of which precedes the pre-ovulatory LH release. According to Johnson et al. (2017), one of the behavioural symptoms accompanying oestrus is increased physical activity, including muscle tension and the jumping reflex of other animals. As can be assumed, higher body temperature, which is one of the symptoms of heat, may be related to the observed higher temperature of muscles in the gilts whose oestradiol concentration was higher. High muscle temperature was probably the result of hormonal interactions and the result of thermal stress, which is often observed in animals during the pre-slaughter period, and which leads to physical fatigue in the body. This could result in a reduction in energy resources and disturbances in the course of post-mortem glycogenolysis which determines the quality of the meat (Choe, 2018).

As a result of authors' own research within the group with elevated level (E2), it was observed that this factor had also impact on the level of post-mortem bleeding of muscles. Worse bleeding was observed in both assessed muscles, but the bleeding test result was statistically confirmed for the diaphragm (Table 2). Decreased post-slaughter muscle bleeding is one of the symptoms of physical fatigue of slaughter animals. It may also occur in sexually aroused gilts as a result of increased physical activity, manifested by the reflex of jumping on other animals in the group as a characteristic symptom occurring in sows in heat. The concentration of LH was in the range between 14 and 38 (mlU/mL) (Tereszkiewicz et al., 2023). According to the authors (Tereszkiewicz and Choroszy, 2017; Tereszkiewicz and Choroszy, 2014), the blood remaining in the muscles after slaughter due to its buffering properties affects the rate of acidification and the pH value of the final meat.

Conclusions

In the authors' own research it was indicated that within the blood samples of the gilts intended for slaughter, a significant concentration of oestradiol was detected which means that at least some of them were sexually mature. The meat of those animals was characterized by a statistically significant temperature and final pH of ham. At the same time their muscles were characterized by a lower level of bleeding which was statistically verified for the diaphragm muscle. A significant influence of oestradiol concentration on temperature, pH_{24} of the ham and on the degree of post-slaughter bleeding was observed. The obtained results and the results of previous own research (Tereszkiewicz et al., 2023) suggest that the increased concentration of the analysed hormones causes a range of physiological, metabolic and behavioural changes, typical of the oestrus phase and its external manifestation. The above-mentioned changes and their interactions can influence selected meat parameters and can shape its technological usefulness. The obtained results are interesting and encourage further discussion and a continuation of research on the impact of sex hormones on the quality parameters of gilt carcasses.

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WPŁYW POZIOMU ESTRADIOLU NA WYBRANE PARAMETRY KRWI I JAKOŚCI MIĘSA LOSZEK

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STRESZCZENIE

Celem badań była ocena wpływu stężenia estradiolu na wybrane parametry hematologiczne i biochemiczne krwi oraz parametry rzeźne i jakość mięsa loszek. Materiał badawczy stanowiło 60 loszek o masie ciała powyżej 125 kg. W próbach krwi pobranej w czasie uboju określono stężenie estradiolu oraz poziom wybranych wskaźników hematologicznych i biochemicznych. Następnie zmierzono podstawowe parametry rzeźne i wskaźniki jakości mięsa. Stwierdzono, że tusze loszek z wyższym stężeniem estradiolu charakteryzowały się statystycznie istotnie wyższą temperaturą, pH_{45} i pH_{24} szynki oraz obniżonym stopniem wykrwawienia poubojowego mięśni. Uzyskane w przeprowadzonych badaniach rezultaty oraz wyniki wcześniejszych badań własnych sugerują, że podwyższone stężenie analizowanych hormonów wywołuje szereg zmian fizjologicznych, metabolicznych i behawioralnych, charakterystycznych dla fazy rui i jej manifestacji zewnętrznej. Powyższe zmiany oraz ich interakcje mogą mieć wpływ na niektóre parametry mięsa i kształtować jego przydatność technologiczną. Uzyskane wyniki są interesujące i zachęcają do dyskusji oraz kontynuacji badań dotyczących wpływu poziomu hormonów płciowych na cechy jakościowe tusz loszek.

Słowa kluczowe: świnie, loszki, poziom hormonów płciowych, estradiol, jakość mięsa